2010 Annual Revision Cycle

National Electrical Code® Committee Report on Comments

NOTE: Notice of Intent to Make an NEC® Motion (NITMAM) deadline is May 7, 2010

A compilation of the documented action on comments received by the code-making panels for the 2010 Annual Revision Cycle

NOTE: The proposals contained in the NEC Report on Proposals (ROP) and the comments addressed in this Report on Comments (ROC) will be presented for action at the NFPA June 2010 Annual Association Technical Meeting to be held June 7–10 in Las Vegas, NV, only when proper Amending Motions have been submitted to the NFPA by the deadline of May 7, 2010. For more information on the new rules and for up-to-date information on schedules and deadlines for processing NFPA Documents, check the NFPA website (www.nfpa.org) or contact NFPA Standards Administration.

National Fire Protection Association®
1 BATTERYMARCH PARK, QUINCY, MA 02169-7471

ISSN 1079-5332

Information on NFPA Codes and Standards Development

I. Applicable Regulations. The primary rules governing the processing of NFPA documents (codes, standards, recommended practices, and guides) are the NFPA *Regulations Governing Committee Projects (Regs)*. Other applicable rules include NFPA *Bylaws*, NFPA *Technical Meeting Convention Rules*, NFPA *Guide for the Conduct of Participants in the NFPA Standards Development Process*, and the NFPA *Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council*. Most of these rules and regulations are contained in the *NFPA Directory*. For copies of the *Directory*, contact Codes and Standards Administration at NFPA Headquarters; all these documents are also available on the NFPA website at "www.nfpa.org."

The following is general information on the NFPA process. All participants, however, should refer to the actual rules and regulations for a full understanding of this process and for the criteria that govern participation.

II. Technical Committee Report. The Technical Committee Report is defined as "the Report of the Technical Committee and Technical Correlating Committee (if any) on a document. A Technical Committee Report consists of the Report on Proposals (ROP), as modified by the Report on Comments (ROC), published by the Association."

III. Step 1: Report on Proposals (ROP). The ROP is defined as "a report to the Association on the actions taken by Technical Committees and/or Technical Correlating Committees, accompanied by a ballot statement and one or more proposals on text for a new document or to amend an existing document." Any objection to an action in the ROP must be raised through the filing of an appropriate Comment for consideration in the ROC or the objection will be considered resolved.

IV. Step 2: Report on Comments (ROC). The ROC is defined as "a report to the Association on the actions taken by Technical Committees and/or Technical Correlating Committees accompanied by a ballot statement and one or more comments resulting from public review of the Report on Proposals (ROP)." The ROP and the ROC together constitute the Technical Committee Report. Any outstanding objection following the ROC must be raised through an appropriate Amending Motion at the Association Technical Meeting or the objection will be considered resolved.

V. Step 3a: Action at Association Technical Meeting. Following the publication of the ROC, there is a period during which those wishing to make proper Amending Motions on the Technical Committee Reports must signal their intention by submitting a Notice of Intent to Make a Motion. Documents that receive notice of proper Amending Motions (Certified Amending Motions) will be presented for action at the annual June Association Technical Meeting. At the meeting, the NFPA membership can consider and act on these Certified Amending Motions as well as Follow-up Amending Motions, that is, motions that become necessary as a result of a previous successful Amending Motion. (See 4.6.2 through 4.6.9 of *Regs* for a summary of the available Amending Motions and who may make them.) Any outstanding objection following action at an Association Technical Meeting (and any further Technical Committee consideration following successful Amending Motions, see *Regs* at 4.7) must be raised through an appeal to the Standards Council or it will be considered to be resolved.

VI. Step 3b: Documents Forwarded Directly to the Council. Where no Notice of Intent to Make a Motion (NITMAM) is received and certified in accordance with the Technical Meeting Convention Rules, the document is forwarded directly to the Standards Council for action on issuance. Objections are deemed to be resolved for these documents.

VII. Step 4a: Council Appeals. Anyone can appeal to the Standards Council concerning procedural or substantive matters related to the development, content, or issuance of any document of the Association or on matters within the purview of the authority of the Council, as established by the *Bylaws* and as determined by the Board of Directors. Such appeals must be in written form and filed with the Secretary of the Standards Council (see 1.6 of *Regs*). Time constraints for filing an appeal must be in accordance with 1.6.2 of the *Regs*. Objections are deemed to be resolved if not pursued at this level.

VIII. Step 4b: Document Issuance. The Standards Council is the issuer of all documents (see Article 8 of *Bylaws*). The Council acts on the issuance of a document presented for action at an Association Technical Meeting within 75 days from the date of the recommendation from the Association Technical Meeting, unless this period is extended by the Council (see 4.8 of *Regs*). For documents forwarded directly to the Standards Council, the Council acts on the issuance of the document at its next scheduled meeting, or at such other meeting as the Council may determine (see 4.5.6 and 4.8 of *Regs*).

IX. Petitions to the Board of Directors. The Standards Council has been delegated the responsibility for the administration of the codes and standards development process and the issuance of documents. However, where extraordinary circumstances requiring the intervention of the Board of Directors exist, the Board of Directors may take any action necessary to fulfill its obligations to preserve the integrity of the codes and standards development process and to protect the interests of the Association. The rules for petitioning the Board of Directors can be found in the *Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council* and in 1.7 of the *Regs*.

X. For More Information. The program for the Association Technical Meeting (as well as the NFPA website as information becomes available) should be consulted for the date on which each report scheduled for consideration at the meeting will be presented. For copies of the ROP and ROC as well as more information on NFPA rules and for up-to-date information on schedules and deadlines for processing NFPA documents, check the NFPA website (www.nfpa.org) or contact NFPA Codes & Standards Administration at 617-984-7246.

Chapter 5. Special Occupancies

Chapter 6. Special Equipment

Chapter 7. Special Conditions

Chapter 8. Communications Systems

Chapter 9. Tables

Key to Comment Headings

The first line of every proposal includes the following information:

Document No.	Proposal No.	Log No.	Paragraph Reference	Committee Action
101	6	38	3.4	Accept

Example: 101-6 Log #38 **Final Action: Accept (3.4)**

TYPES OF ACTION

P Partial Revision **C** Complete Revision **N** New Document **R** Reconfirmation **W** Withdrawal

The following classifications apply to Committee members and represent their principal interest in the activity of the Committee.

1. M Manufacturer: A representative of a maker or marketer of a product, assembly, or system, or portion thereof, that is affected by the standard.

2. U User: A representative of an entity that is subject to the provisions of the standard or that voluntarily uses the standard.

3. IM Installer/Maintainer: A representative of an entity that is in the business of installing or maintaining a product, assembly, or system affected by the standard.

4. L Labor: A labor representative or employee concerned with safety in the workplace.

5. RT Applied Research/Testing Laboratory: A representative of an independent testing laboratory or independent applied research organization that promulgates and/or enforces standards.

6. E Enforcing Authority: A representative of an agency or an organization that promulgates and/or enforces standards.

7. I Insurance: A representative of an insurance company, broker, agent, bureau, or inspection agency.

8. C Consumer: A person who is or represents the ultimate purchaser of a product, system, or service affected by the standard, but who is not included in (2).

9. SE Special Expert: A person not representing (1) through (8) and who has special expertise in the scope of the standard or portion thereof.

NOTE 1: “Standard” connotes code, standard, recommended practice, or guide.

NOTE 2: A representative includes an employee.

NOTE 3: While these classifications will be used by the Standards Council to achieve a balance for Technical Committees, the Standards Council may determine that new classifications of member or unique interests need representation in order to foster the best possible Committee deliberations on any project. In this connection, the Standards Council may make such appointments as it deems appropriate in the public interest, such as the classification of “Utilities” in the National Electrical Code Committee.

NOTE 4: Representatives of subsidiaries of any group are generally considered to have the same classification as the parent organization.

FORM FOR FILING NEC® NOTICE OF INTENT TO MAKE A MOTION (NITMAM) AT AN ASSOCIATION TECHNICAL MEETING 2010 ANNUAL REVISION CYCLE

FINAL DATE FOR RECEIPT OF NEC® NITMAM: 5:00 pm EDST, May 7, 2010 (NEC only)

If you have questions about filling out or filing the NEC® NITMAM, please contact the Codes and Standards Administration at 617-984-7249

For further information on the Codes- and Standards-Making Process see the NFPA website (www.nfpa.org)

FOR OFFICE USE ONLY

Log #:_____

Date Rec'd:_____

Date 8/10/2005 **Name** John B. Smith **Tel. No.** 617-555-1212

Company or Affiliation John B. Smith Consulting **Email Address**

Street Address 9 Seattle Street **City** Seattle **State** WA **Zip** 02255

1. (a) NFPA Document (include Number and Title) National Fire Alarm Code/NFPA 72 1999ed

(b) Proposal or Comment Number **72-5**

(c) Section/Paragraph 1.5.8.1

2. Motion to be made. Please check one (See also 4.6 of the Regulations Governing Committee Projects):

(a) Proposal

X (1) Accept. ____ (2) Accept an Identifiable Part.*

____ (3) Accept as modified by the TC. ____ (4) Accept an Identifiable Part as modified by TC.*

(b) Comment

____ (1) Accept. ____(2) Accept an Identifiable Part. * ____(3) Accept as modified by the TC.

____ (4) Accept an Identifiable Part as modified by TC.* ____(5) Reject ____(6) Reject an Identifiable Part.*

(c) Return Technical Committee Report for Further Study

____(1) Return entire Report. ____ (2) Return a portion of a Report in the form of a proposal and related comment(s).

____(3) Return a portion of a Report in the form of identifiable part(s) of a proposal and related comment(s). (Identify the specific portion of the proposal and the related comments below)*

*** Clearly identify the Identifiable Part(s) indicated above (use separate sheet if required).**

3. I am entitled to make this motion in accordance with 4.6.8 of the Regulations Governing Committee Projects, as follows [check (a), (b), or (c)]:

(a) X This motion may be made by the original submitter or their designated representative, and I am the [if you check (a) indicate one of the following]:

X I am the original submitter, or

___I am the submitter's designated representative (attach written authorization signed by the original submitter), or

(b)____This motion may be made by a Technical Committee Member and I am a Member of the responsible Technical Committee.

(c)____This motion may be made by anyone.

(Form continued on next page)

NEC® NITMAM form (continued)

4. Comments or Clarification (optional): This NEC® NITMAM will be reviewed by a Motions Committee. In addition to determining whether your Amending Motion is proper, the Panel may take other actions as described in 2.3 of the Technical Meeting Convention Rules as follows:

> **Restating and Grouping of Motions. Upon request or on its own initiative, and in consultation with the mover(s), the Motions Committee may: (a) restate an Amending Motion to facilitate the making of a proper motion or to clarify the intent of the mover; and (b) group Amending Motions that are dependent on one another into a single Amending Motion. Dependent motions are motions that the mover(s) wish to be considered by the assembly and voted on as single up or down package. In addition to the foregoing, the Motions Committee may take such other actions or make such other recommendations as will facilitate the fair and efficient consideration of motions within the available time.**

The NFPA Staff may contact you to clarify your motion or to consult on the permitted actions in 2.3. If you have any comments, suggestions or requests of the Motions Committee as it reviews your NITMAM and considers actions permitted in 2.3, please provide them below. (Use additional sheet if necessary):

_____

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_____

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_____

_____

Name (please print): John B. Smith

Signature (required): _____

(Note: This NEC® NITMAM will be reviewed, and if proper, your Amending Motion will be certified in accordance with the Technical Meeting Convention Rules and posted on the NFPA website by May 21, 2010. Documents that have NEC® Certified Amending Motions will be considered at the June 2010 Annual Meeting Technical Committee Report Session. In order to have your Certified Amending Motion considered at that meeting, you must appear, sign in, and make the motion as prescribed in the Convention Rules).

PLEASE USE A SEPARATE NITMAM FORM FOR EACH NEC® AMENDING MOTION YOU WISH TO MAKE

Mail to: Secretary, Standards Council, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471
NFPA Fax: (617) 770-3500

FORM FOR FILING NEC® NOTICE OF INTENT TO MAKE A MOTION (NITMAM) AT AN ASSOCIATION TECHNICAL MEETING 2010 ANNUAL REVISION CYCLE FINAL DATE FOR RECEIPT OF NEC® NITMAM: 5:00 pm EDST, May 7, 2010 (NEC only)

If you have questions about filling out or filing the NEC® NITMAM, please contact the Codes and Standards Administration at 617-984-7249

For further information on the Codes- and Standards-Making Process, see the NFPA website (www.nfpa.org)

FOR OFFICE USE ONLY

Log #:_____

Date Rec'd:_____

Date_____ **Name**_____ **Tel. No.**_____

Company or Affiliation _____ **Email Address**_____

Street Address_____ **City**_____ **State**_____ **Zip**_____

1. (a) NFPA Document (include Number and Title)_____

(b) Proposal or Comment Number_____

(c) Section/Paragraph _____

2. Motion to be made. Please check one: (See also 4.6 of the Regulations Governing Committee Projects)

(a) Proposal

_____(1) Accept. _____ (2) Accept an Identifiable Part.*

_____ (3) Accept as modified by the TC. _____ (4) Accept an Identifiable Part as modified by TC.*

(b) Comment

_____ (1) Accept. ____(2) Accept an Identifiable Part.* ____(3) Accept as modified by the TC.

_____ (4) Accept an Identifiable Part as modified by TC.* ____(5) Reject ____(6) Reject an Identifiable Part.*

(c) Return Technical Committee Report for Further Study

_____(1) Return entire Report. _____ (2) Return a portion of a Report in the form of a proposal and related comment(s).

_____(3) Return a portion of a Report in the form of identifiable part(s) of a proposal and related comment(s). (Identify the specific portion of the proposal and the related comments below)*

*** Clearly identify the Identifiable Part(s) indicated above (use separate sheet if required).**

_____

_____

_____

3. I am entitled to make this motion in accordance with 4.6.8 of the Regulations Governing Committee Projects, as follows: [check (a), (b), or (c)]:

(a)____ This motion may be made by the original submitter or their designated representative, and I am the [if you check (a) indicate one of the following]:

___I am the Original submitter, or

___I am the submitter's designated representative (attach written authorization signed by the original submitter), or

(b)____This motion may be made by a Technical Committee Member and I am a Member of the responsible Technical Committee.

(c)____This motion may be made by anyone.

(Form continued on next page)

NEC® NITMAM form (continued)

4. Comments or Clarification (optional): This NEC® NITMAM will be reviewed by a Motions Committee. In addition to determining whether your Amending Motion is proper, the Panel may take other actions as described in 2.3 of the Technical Meeting Convention Rules as follows:

> **Restating and Grouping of Motions. Upon request or on its own initiative, and in consultation with the mover(s), the Motions Committee may: (a) restate an Amending Motion to facilitate the making of a proper motion or to clarify the intent of the mover; and (b) group Amending Motions that are dependent on one another into a single Amending Motion. Dependent motions are motions that the mover(s) wish to be considered by the assembly and voted on as single up or down package. In addition to the foregoing, the Motions Committee may take such other actions or make such other recommendations as will facilitate the fair and efficient consideration of motions within the available time.**

The NFPA Staff may contact you to clarify your motion or to consult on the permitted actions in 2.3. If you have any comments, suggestions, or requests of the Motions Committee as it reviews your NITMAM and considers actions permitted in 2.3, please provide them below. (Use additional sheet if necessary):

_____

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Name (please print):_____

Signature (required):_____

(Note: This NEC® NITMAM will be reviewed, and if proper, your Amending Motion will be certified in accordance with the Technical Meeting Convention Rules and posted on the NFPA website by May 21, 2010. Documents that have NEC® Certified Amending Motions will be considered at the June 2010 Annual Meeting Technical Committee Report Session. In order to have your NEC® Certified Amending Motion considered at that meeting, you must appear, sign in, and make the motion as prescribed in the Convention Rules).

PLEASE USE A SEPARATE NITMAM FORM FOR EACH NEC® AMENDING MOTION YOU WISH TO MAKE.

Mail to: Secretary, Standards Council, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471
NFPA Fax: (617) 770-3500

Sequence of Events Leading to Issuance of an NFPA Committee Document

Step 1 Call for Proposals

▼ Proposed new document or new edition of an existing document is entered into one of two yearly revision cycles, and a Call for Proposals is published.

Step 2 Report on Proposals (ROP)

▼ Committee meets to act on Proposals, to develop its own Proposals, and to prepare its Report.

▼ Committee votes by written ballot on Proposals. If two-thirds approve, Report goes forward. Lacking two-thirds approval, Report returns to Committee.

▼ Report on Proposals (ROP) is published for public review and comment.

Step 3 Report on Comments (ROC)

▼ Committee meets to act on Public Comments to develop its own Comments, and to prepare its report.

▼ Committee votes by written ballot on Comments. If two-thirds approve, Report goes forward. Lacking two-thirds approval, Report returns to Committee.

▼ Report on Comments (ROC) is published for public review.

Step 4 Association Technical Meeting

▼ *"Notices of intent to make a motion"* are filed, are reviewed, and valid motions are certified for presentation at the Association Technical Meeting. ("Consent Documents" that have no certified motions bypass the Association Technical Meeting and proceed to the Standards Council for issuance.)

▼ NFPA membership meets each June at the Association Technical Meeting and acts on Technical Committee Reports (ROP and ROC) for documents with "certified amending motions."

▼ Committee(s) vote on any amendments to Report approved at NFPA Annual Membership Meeting.

Step 5 Standards Council Issuance

▼ Notification of intent to file an appeal to the Standards Council on Association action must be filed within 20 days of the NFPA Annual Membership Meeting.

▼ Standards Council decides, based on all evidence, whether or not to issue document or to take other action, including hearing any appeals.

The Association Technical Meeting

The process of public input and review does not end with the publication of the ROP and ROC. Following the completion of the Proposal and Comment periods, there is yet a further opportunity for debate and discussion through the Association Technical Meeting that takes place at the NFPA Annual Meeting.

The Association Technical Meeting provides an opportunity for the final Technical Committee Report (i.e., the ROP and ROC) on each proposed new or revised code or standard to be presented to the NFPA membership for the debate and consideration of motions to amend the Report. The specific rules for the types of motions that can be made and who can make them are set forth in NFPA's rules, which should always be consulted by those wishing to bring an issue before the membership at an Association Technical Meeting. The following presents some of the main features of how a Report is handled.

The Filing of a Notice of Intent to Make a Motion. Before making an allowable motion at an Association Technical Meeting, the intended maker of the motion must file, in advance of the session, and within the published deadline, a Notice of Intent to Make a Motion. A Motions Committee appointed by the Standards Council then reviews all notices and certifies all amending motions that are proper. The Motions Committee can also, in consultation with the makers of the motions, clarify the intent of the motions and, in certain circumstances, combine motions that are dependent on each other together so that they can be made in one single motion. A Motions Committee report is then made available in advance of the meeting listing all certified motions. Only these Certified Amending Motions, together with certain allowable Follow-Up Motions (that is, motions that have become necessary as a result of previous successful amending motions) will be allowed at the Association Technical Meeting.

Consent Documents. Often there are codes and standards up for consideration by the membership that will be noncontroversial and no proper Notices of Intent to Make a Motion will be filed. These "Consent Documents" will bypass the Association Technical Meeting and head straight to the Standards Council for issuance. The remaining documents are then forwarded to the Association Technical Meeting for consideration of the NFPA membership.

What Amending Motions Are Allowed. The Technical Committee Reports contain many Proposals and Comments that the Technical Committee has rejected or revised in whole or in part. Actions of the Technical Committee published in the ROP may also eventually be rejected or revised by the Technical Committee during the development of its ROC. The motions allowed by NFPA rules provide the opportunity to propose amendments to the text of a proposed code or standard based on these published Proposals, Comments, and Committee actions. Thus, the list of allowable motions include motions to accept Proposals and Comments in whole or in part as submitted or as modified by a Technical Committee action. Motions are also available to reject an accepted Comment in whole or part. In addition, Motions can be made to return an entire Technical Committee Report or a portion of the Report to the Technical Committee for further study.

The NFPA Annual Meeting, also known as the NFPA Conference & Expo, takes place in June of each year. A second Fall membership meeting was discontinued in 2004, so the NFPA Technical Committee Report Session now runs once each year at the Annual Meeting in June.

Who Can Make Amending Motions. NFPA rules also define those authorized to make amending motions. In many cases, the maker of the motion is limited by NFPA rules to the original submitter of the Proposal or Comment or his or her duly authorized representative. In other cases, such as a Motion to Reject an accepted Comment, or to Return a Technical Committee Report or a portion of a Technical Committee Report for Further Study, anyone can make these motions. For a complete explanation, the NFPA Regs should be consulted.

Action on Motions at the Association Technical Meeting. In order to actually make a Certified Amending Motion at the Association Technical Meeting, the maker of the motion must sign in at least an hour before the session begins. In this way a final list of motions can be set in advance of the session. At the session, each proposed document up for consideration is presented by a motion to adopt the Technical Committee Report on the document. Following each such motion, the presiding officer in charge of the session opens the floor to motions on the document from the final list of Certified Amending Motions followed by any permissible Follow-Up Motions. Debate and voting on each motion proceeds in accordance with NFPA rules. NFPA membership is not required in order to make or speak to a motion, but voting is limited to NFPA members who have joined at least 180 days prior to the Association Technical Meeting and have registered for the meeting. At the close of debate on each motion, voting takes place, and the motion requires a majority vote to carry. In order to amend a Technical Committee Report, successful amending motions must be confirmed by the responsible Technical Committee, which conducts a written ballot on all successful amending motions following the meeting and prior to the document being forwarded to the Standards Council for issuance.

Standards Council Issuance

One of the primary responsibilities of the NFPA Standards Council, as the overseer of the NFPA codes and standards development process, is to act as the official issuer of all NFPA codes and standards. When it convenes to issue NFPA documents, it also hears any appeals related to the document. Appeals are an important part of assuring that all NFPA rules have been followed and that due process and fairness have been upheld throughout the codes and standards development process. The Council considers appeals both in writing and through the conduct of hearings at which all interested parties can participate. It decides appeals based on the entire record of the process as well as all submissions on the appeal. After deciding all appeals related to a document before it, the Council, if appropriate, proceeds to issue the document as an official NFPA code or standard. Subject only to limited review by the NFPA Board of Directors, the decision of the Standards Council is final, and the new NFPA code or standard becomes effective twenty days after Standards Council issuance.

Report of the Committee on

National Electrical Code®

Technical Correlating Committee

James W. Carpenter, *Chair*
International Association of Electrical Inspectors, NC [E]
Rep. International Association of Electrical Inspectors

Mark W. Earley, *Secretary (NV)*
National Fire Protection Association, MA

Jean A. O'Connor, *Recording Secretary (NV)*
National Fire Protection Association, MA

James E. Brunssen, Telcordia, NJ [UT]
Rep. Alliance for Telecommunications Industry Solutions
Merton W. Bunker, Jr., US Department of State, VA [U]
(VL to Document: 110, Document: 111, Document: 70, Document: 70B, Document: 70E, Document: 79, Document: 790, Document: 791)
James M. Daly, General Cable, NJ [M]
Rep. National Electrical Manufacturers Association
William R. Drake, Marinco, CA [M]
Stanley J. Folz, Morse Electric Company, NV [IM]
Rep. National Electrical Contractors Association
Palmer L. Hickman, National Joint Apprentice & Training Committee, MD [L]
Rep. International Brotherhood of Electrical Workers
David L. Hittinger, Independent Electrical Contractors of Greater Cincinnati, OH [IM]
Rep. Independent Electrical Contractors, Inc.
John R. Kovacik, Underwriters Laboratories Inc., IL [RT]
Neil F. LaBrake, Jr., National Grid, NY [UT]
Rep. Electric Light & Power Group/EEI
Danny Liggett, DuPont Engineering, TX [U]
Rep. American Chemistry Council

Alternates

Thomas L. Adams, Engineering Consultant, IL [UT]
(Alt. to Neil F. LaBrake, Jr.)
Rep. Electric Light & Power Group/EEI
Lawrence S. Ayer, Biz Com Electric, Inc., OH [IM]
(Alt. to David L. Hittinger)
Rep. Independent Electrical Contractors, Inc.
Larry D. Cogburn, Cogburn Bros, Inc., FL [IM]
(Alt. to Stanley J. Folz)
Rep. National Electrical Contractors Association
James T. Dollard, Jr., IBEW Local Union 98, PA [L]
(Alt. to Palmer L. Hickman)
Rep. International Brotherhood of Electrical Workers
Ernest J. Gallo, Telcordia Technologies, Inc., NJ [UT]
(Alt. to James E. Brunssen)
Rep. Alliance for Telecommunications Industry Solutions
Daniel J. Kissane, Legrand/Pass & Seymour, NY [M]
(Alt. to James M. Daly)
Rep. National Electrical Manufacturers Association
Michael E. McNeil, FMC Bio Polymer, ME [U]
(Alt. to Danny Liggett)
Rep. American Chemistry Council
Mark C. Ode, Underwriters Laboratories Inc., AZ [RT]
(Alt. to John R. Kovacik)
Richard P. Owen, Oakdale, MN [E]
(Alt. to James W. Carpenter)
Rep. International Association of Electrical Inspectors

Nonvoting

Richard G. Biermann, Biermann Electric Company, Inc., IA [IM]
(Member Emeritus)
David Mascarenhas, Canadian Standards Association, Canada [RT]
D. Harold Ware, Libra Electric Company, OK [IM]

Staff Liaison: **Mark W. Earley**

CODE-MAKING PANEL NO. 1

Articles 90, 100, 110, Annex A, Annex H

Gil Moniz, *Chair*
National Electrical Manufacturers Association, MA [M]

Michael A. Anthony, University of Michigan, MI [U]
Rep. Association of Higher Education Facilities Officers
Louis A. Barrios, Shell Global Solutions, TX [U]
Rep. American Chemistry Council
Kenneth P. Boyce, Underwriters Laboratories Inc., IL [RT]
William T. Fiske, Intertek Testing Services, NY [RT]
H. Landis Floyd, The DuPont Company, DE [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Palmer L. Hickman, National Joint Apprentice & Training Committee, MD [L]
Rep. International Brotherhood of Electrical Workers
David L. Hittinger, Independent Electrical Contractors of Greater Cincinnati, OH [IM]
Rep. Independent Electrical Contractors, Inc.
Neil F. LaBrake, Jr., National Grid, NY [UT]
Rep. Electric Light & Power Group/EEI
Randall R. McCarver, Telcordia Technologies, Inc., NJ [U]
Rep. Alliance for Telecommunications Industry Solutions
Harry J. Sassaman, Forest Electric Corporation, NJ [IM]
Rep. National Electrical Contractors Association

Alternates

Thomas L. Adams, Engineering Consultant, IL [UT]
(Alt. to Neil F. LaBrake, Jr.)
Rep. Electric Light & Power Group/EEI
Joseph F. Andre, National Electrical Manufacturers Association, WA [M]
(Alt. to Gil Moniz)
Rep. National Electrical Manufacturers Association
Mark Christian, National Joint Apprentice & Training Committee, MD [L]
(Alt. to Palmer L. Hickman)
Rep. International Brotherhood of Electrical Workers
Benjamin F. Dunford, Ben Dunford Electric Company Inc., TN [IM]
(Alt. to David L. Hittinger)
Rep. Independent Electrical Contractors, Inc.
Ernest J. Gallo, Telcordia Technologies, Inc., NJ [U]
(Alt. to Randall R. McCarver)
Rep. Alliance for Telecommunications Industry Solutions
Thomas R. Lichtenstein, Underwriters Laboratories Inc., IL [RT]
(Alt. to Kenneth P. Boyce)
Donald H. McCullough, II, Washington Savannah River Company, SC [U]
(Alt. to H. Landis Floyd)
Rep. Institute of Electrical & Electronics Engineers, Inc.
Susan Newman Scearce, State of Tennessee, TN [E]
(Voting Alt. to IAEI Rep.)
Rep. International Association of Electrical Inspectors
James F. Pierce, Intertek Testing Services, OR [RT]
(Alt. to William T. Fiske)

Nonvoting

Ark Tsisserev, City of Vancouver, Canada [SE]
Rep. CSA/Canadian Electrical Code Committee

CODE-MAKING PANEL NO. 2

Articles 210, 215, 220, Annex D
Examples D1 through D6

Raymond W. Weber, *Chair*
State of Wisconsin, WI [E]
Rep. International Association of Electrical Inspectors

Richard W. Becker, Engineered Electrical Systems, Inc., WA [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Charles L. Boynton, The DuPont Company, TX [U]
Rep. American Chemistry Council
Frank Coluccio, New York City Department of Buildings, NY [E]
Thomas L. Harman, University of Houston-Clear Lake, TX [SE]
Donald M. King, IBEW Local Union 313, DE [L]
Rep. International Brotherhood of Electrical Workers
Robert L. LaRocca, Underwriters Laboratories Inc., NY [RT]
Steven Orlowski, National Association of Home Builders, DC [U]
Jim Pauley, Square D Company/Schneider Electric, KY [M]
Rep. National Electrical Manufacturers Association
Ronald L. Purvis, Sharpsburg, GA [UT]
Rep. Electric Light & Power Group/EEI
Robert G. Wilkinson, IEC Texas Gulf Coast, TX [IM]
Rep. Independent Electrical Contractors, Inc.
Thomas H. Wood, Cecil B. Wood, Inc., IL [IM]
Rep. National Electrical Contractors Association

Alternates

Jacob G. Benninger, Cornell University, NY [L]
(Alt. to Donald M. King)
Rep. International Brotherhood of Electrical Workers
Lawrence Brown, National Association of Home Builders, DC [U]
(Alt. to Steven Orlowski)
Paul Crivell, Camp, Dresser, & McKee Inc., WA [U]
(Alt. to Richard W. Becker)
Rep. Institute of Electrical & Electronics Engineers, Inc.
David A. Dini, Underwriters Laboratories Inc., IL [RT]
(Alt. to Robert L. LaRocca)
Daniel J. Kissane, Pass & Seymour/Legrand, NY [M]
(Alt. to Jim Pauley)
Rep. National Electrical Manufacturers Association
William Ross McCorcle, American Electric Power, OK [UT]
(Alt. to Ronald L. Purvis)
Rep. Electric Light & Power Group/EEI
William J. McGovern, City of Plano, TX [E]
(Alt. to Raymond W. Weber)
Rep. International Association of Electrical Inspectors
Stephen V. St. Croix, 1st Electric, Inc., MD [IM]
(Alt. to Robert G. Wilkinson)
Rep. Independent Electrical Contractors, Inc.

Nonvoting

William Burr, Canadian Standards Association, Canada [RT]
Douglas A. Lee, US Consumer Product Safety Commission, MD [C]
Andrew M. Trotta, US Consumer Product Safety Commission, MD [C]
(Alt. to Douglas A. Lee)

CODE-MAKING PANEL NO. 3

Articles 300, 590, 720, 725, 727,
760, Chapter 9, Tables 11(A) and (B), Tables 12(A) and (B)

Paul J. Casparro, *Chair*
Scranton Electricians JATC, PA [L]
Rep. International Brotherhood of Electrical Workers

Lawrence S. Ayer, Biz Com Electric, Inc., OH [IM]
Rep. Independent Electrical Contractors, Inc.
Thomas F. Connaughton, Intertek Testing Services, NJ [RT]
Les Easter, Tyco/Allied Tube and Conduit, IL [M]
Rep. National Electrical Manufacturers Association
Sanford E. Egesdal, Egesdal Associates PLC, MN [M]
Rep. Automatic Fire Alarm Association, Inc.
Stanley D. Kahn, Tri-City Electric Company, Inc., CA [IM]
Rep. National Electrical Contractors Association
Ray R. Keden, ERICO, Inc., CA [M]
Rep. Building Industry Consulting Services International
Juan C. Menendez, Southern California Edison Company, CA [UT]
Rep. Electric Light & Power Group/EEI
Richard P. Owen, Oakdale, MN [E]
Rep. International Association of Electrical Inspectors
Steven J. Owen, Steven J. Owen, Inc., AL [IM]
Rep. Associated Builders & Contractors
David A. Pace, Olin Corporation, AL [U]
Rep. American Chemistry Council
Melvin K. Sanders, Things Electrical Co., Inc. (TECo., Inc.), IA [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Mark A. Sepulveda, USA Alarm Systems, Inc., CA [IM]
Rep. National Burglar & Fire Alarm Association
(VL to 720, 725, 727, 760)
John E. Sleights, Travelers Insurance Company, CT [I]
Susan L. Stene, Underwriters Laboratories Inc., CA [RT]

Alternates

Richard S. Anderson, RTKL Associates Inc., VA [M]
(Alt. to Ray R. Keden)
Rep. Building Industry Consulting Services International
Steven D. Burlison, Progress Energy, FL [UT]
(Alt. to Juan C. Menendez)
Rep. Electric Light & Power Group/EEI
Shane M. Clary, Bay Alarm Company, CA [M]
(Alt. to Sanford E. Egesdal)
Rep. Automatic Fire Alarm Association, Inc.
Adam D. Corbin, Corbin Electrical Services, Inc., NJ [IM]
(Alt. to Lawrence S. Ayer)
Rep. Independent Electrical Contractors, Inc.
Danny Liggett, DuPont Engineering, TX [U]
(Alt. to David A. Pace)
Rep. American Chemistry Council
T. David Mills, Savannah River Nuclear Solutions, LLC, SC [U]
(Alt. to Melvin K. Sanders)
Rep. Institute of Electrical & Electronics Engineers, Inc.
Mark C. Ode, Underwriters Laboratories Inc., AZ [RT]
(Alt. to Susan L. Stene)
Roger S. Passmore, IES Industrial, Inc., SC [IM]
(Alt. to Steven J. Owen)
Rep. Associated Builders & Contractors
Marty L. Riesberg, IBEW Local Union 22, MD [L]
(Alt. to Paul J. Casparro)
Rep. International Brotherhood of Electrical Workers
George A. Straniero, Tyco/AFC Cable Systems, Inc., NJ [M]
(Alt. to Les Easter)
Rep. National Electrical Manufacturers Association
Robert J. Walsh, City of Hayward, CA [E]
(Alt. to Richard P. Owen)
Rep. International Association of Electrical Inspectors
Wendell R. Whistler, Intertek Testing Services, OR [RT]
(Alt. to Thomas F. Connaughton)
Edward C. Lawry, Oregon, WI [E]
(Member Emeritus)

CODE-MAKING PANEL NO. 4

Articles 225, 230, 690, 692, 705

Ronald J. Toomer, *Chair*
Toomer Electrical Company Inc., LA [IM]
Rep. National Electrical Contractors Association

Ward I. Bower, Sandia National Laboratories, NM [U]
Rep. Solar Energy Industries Association
(VL to 690, 692, 705)
Robert J. Deaton, The Dow Chemical Company, TX [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Tony Dorta, Intertek Testing Services, CA [RT]
Roger D. McDaniel, Georgia Power Company, GA [UT]
Rep. Electric Light & Power Group/EEI
James J. Rogers, Towns of Oak Bluffs, Tisbury, West Tisbury, MA [E]
Rep. International Association of Electrical Inspectors
John A. Sigmund, PPG Industries, Inc., LA [U]
Rep. American Chemistry Council
Todd W. Stafford, National Joint Apprentice & Training Committee, TN [L]
Rep. International Brotherhood of Electrical Workers
Robert H. Wills, Intergrid, LLC, NH [U]
Rep. American Wind Energy Association
(VL to 690, 692, 705)
John W. Young, Siemens Industry, Inc., GA [M]
Rep. National Electrical Manufacturers Association
Timothy P. Zgonena, Underwriters Laboratories Inc., IL [RT]
Vincent C. Zinnante, Westpoint Electric Inc., TX [IM]
Rep. Independent Electrical Contractors, Inc.

Alternates

Paul D. Barnhart, Underwriters Laboratories Inc., NC [RT]
(Alt. to Timothy P. Zgonena)
Alex Z. Bradley, The DuPont Company, DE [U]
(Alt. to John A. Sigmund)
Rep. American Chemistry Council
William F. Brooks, Brooks Engineering, CA [U]
(Alt. to Ward I. Bower)
Rep. Solar Energy Industries Association
(VL to 690, 692, 705)
Thomas E. Buchal, Intertek Testing Services, NY [RT]
(Alt. to Tony Dorta)
Larry D. Cogburn, Cogburn Bros. Inc., FL [IM]
(Alt. to Ronald J. Toomer)
Rep. National Electrical Contractors Association
Brian L. Crise, NIETC, OR [L]
(Alt. to Todd W. Stafford)
Rep. International Brotherhood of Electrical Workers
Mark D. Gibbs, B&W Y-12, LLC, TN [U]
(Alt. to Robert J. Deaton)
Rep. Institute of Electrical & Electronics Engineers, Inc.
Barry N. Hornberger, PECO Energy Company, PA [UT]
(Alt. to Roger D. McDaniel)
Rep. Electric Light & Power Group/EEI
Tim LaLonde, Haskin Electric, Inc., WA [IM]
(Alt. to Vincent C. Zinnante)
Rep. Independent Electrical Contractors, Inc.
Philip M. Piqueira, General Electric Company, CT [M]
(Alt. to John W. Young)
Rep. National Electrical Manufacturers Association
Robert W. Preus, Abundant Renewable Energy, LLC, OR [U]
(Alt. to Robert H. Wills)
Rep. American Wind Energy Association
(VL to 690, 692, 705)
Glenn A. Soles, Clark County Department of Development Services, NV [E]
(Alt. to James J. Rogers)
Rep. International Association of Electrical Inspectors

CODE-MAKING PANEL NO. 5

Articles 200, 250, 280, 285

Michael J. Johnston, *Chair*
National Electrical Contractors Association, MD [IM]

Trevor N. Bowmer, Telcordia Technologies, NJ [U]
Rep. Alliance for Telecommunications Industry Solutions
David Brender, Copper Development Association, Inc., NY [M]
Rep. Copper Development Association Inc.
Martin J. Brett, Jr., Wheatland Tube Company, DE [M]
Rep. American Iron and Steel Institute
Paul Dobrowsky, Innovative Technology Services, NY [U]
Rep. American Chemistry Council
Dan Hammel, IBEW Local Union 704, IA [L]
Rep. International Brotherhood of Electrical Workers
G. Scott Harding, F. B. Harding, Inc., MD [IM]
Rep. Independent Electrical Contractors, Inc.
William J. Helfrich, US Department of Labor, PA [E]
Charles F. Mello, Underwriters Laboratories Inc., WA [RT]
Daleep C. Mohla, DCM Electrical Consulting Services, Inc., TX [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Christine T. Porter, Intertek Testing Services, WA [RT]
Gregory J. Steinman, Thomas & Betts Corporation, TN [M]
Rep. National Electrical Manufacturers Association
Robert G. Stoll, Thomas Associates, Inc., OH [M]
Rep. Power Tool Institute, Inc.
Richard Temblador, Southwire Company, GA [M]
Rep. The Aluminum Association, Inc.
C. Douglas White, CenterPoint Energy, Inc., TX [UT]
Rep. Electric Light & Power Group/EEI
David A. Williams, Delta Charter Township, MI [E]
Rep. International Association of Electrical Inspectors

Alternates

Ron D. Alley, Northern New Mexico IEC, NM [IM]
(Alt. to G. Scott Harding)
Rep. Independent Electrical Contractors, Inc.
Joseph P. DeGregoria, Underwriters Laboratories Inc., NY [RT]
(Alt. to Charles F. Mello)
Ronald Lai, Burndy LLC, NH [M]
(Alt. to Gregory J. Steinman)
Rep. National Electrical Manufacturers Association
Paul J. LeVasseur, Bay City JEATC, MI [L]
(Alt. to Dan Hammel)
Rep. International Brotherhood of Electrical Workers
Richard E. Loyd, R & N Associates, AZ [M]
(Alt. to Martin J. Brett, Jr.)
Rep. American Iron and Steel Institute
Randall R. McCarver, Telcordia Technologies, Inc., NJ [U]
(Alt. to Trevor N. Bowmer)
Rep. Alliance for Telecommunications Industry Solutions
Michael E. McNeil, FMC Bio Polymer, ME [U]
(Alt. to Paul Dobrowsky)
Rep. American Chemistry Council
Mike O'Meara, Arizona Public Service Company, AZ [UT]
(Alt. to C. Douglas White)
Rep. Electric Light & Power Group/EEI
William A. Pancake, III, Universal Engineering Sciences, FL [E]
(Alt. to David A. Williams)
Rep. International Association of Electrical Inspectors
Nathan Philips, Integrated Electronic Systems, OR [IM]
(Alt. to Michael J. Johnston)
Paul R. Picard, Tyco/AFC Cable Systems, Inc., MA [M]
(Alt. to Richard Temblador)
Rep. The Aluminum Association, Inc.
Elliot Rappaport, Electro Technology Consultants, Inc., FL [U]
(Alt. to Daleep C. Mohla)
Rep. Institute of Electrical & Electronics Engineers, Inc.
Phil Simmons, Simmons Electrical Services, WA [M]
(Alt. to David Brender)
Rep. Copper Development Association Inc.
Thomas R. Siwek, Robert Bosch Tool Corporation, IL [M]
(Alt. to Robert G. Stoll)
Rep. Power Tool Institute, Inc.

Nonvoting

Robert A. Nelson, Canadian Standards
Association, Canada [RT]

CODE-MAKING PANEL NO. 6

Articles 310, 400, 402, Chapter 9 Tables 5 through 9, and Annex B

Scott Cline, *Chair*
McMurtrey Electric, Inc., CA [IM]
Rep. National Electrical Contractors Association

Samuel B. Friedman, General Cable Corporation, RI [M]
Rep. National Electrical Manufacturers Association
Robert L. Huddleston, Jr., Eastman Chemical Company, TN [U]
Rep. American Chemistry Council
Randal Hunter, City of Las Vegas, NV [E]
Rep. International Association of Electrical Inspectors
G. W. Kent, Kent Electric & Plumbing Systems, TX [IM]
Rep. Independent Electrical Contractors, Inc.
William F. Laidler, IBEW Local 223 JATC, MA [L]
Rep. International Brotherhood of Electrical Workers
L. Bruce McClung, Mc Squared Electrical Consulting LLC, WV [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Paul R. Picard, Tyco/AFC Cable Systems, Inc., MA [M]
Rep. The Aluminum Association, Inc.
John M. Thompson, Underwriters Laboratories Inc., NC [RT]
Carl Timothy Wall, Alabama Power Company, AL [UT]
Rep. Electric Light & Power Group/EEI
Joseph S. Zimnoch, The Okonite Company, NJ [M]
Rep. Copper Development Association Inc.

Alternates

Peter E. Bowers, Satellite Electric Company, Inc., MD [IM]
(Alt. to G. W. Kent)
Rep. Independent Electrical Contractors, Inc.
John J. Cangemi, Underwriters Laboratories Inc., NY [RT]
(Alt. to John M. Thompson)
James M. Daly, General Cable, NJ [M]
(Alt. to Joseph S. Zimnoch)
Rep. Copper Development Association Inc.
Roland E. Deike, CenterPoint Energy, Inc., TX [UT]
(Alt. to Carl Timothy Wall)
Rep. Electric Light & Power Group/EEI
Richard A. Holub, DuPont Engineering, DE [U]
(Alt. to Robert L. Huddleston, Jr.)
Rep. American Chemistry Council
Phillip J. Huff, Inglett & Stubbs LLC, GA [IM]
(Alt. to Scott Cline)
Rep. National Electrical Contractors Association
Christel K. Hunter, Alcan Cable, NV [M]
(Alt. to Paul R. Picard)
Rep. The Aluminum Association, Inc.
Lowell Lisker, American Insulated Wire Corporation, MA [M]
(Alt. to Samuel B. Friedman)
Rep. National Electrical Manufacturers Association
John Stacey, City of St. Louis, MO [E]
(Alt. to Randal Hunter)
Rep. International Association of Electrical Inspectors
Donald A. Voltz, BP, TX [U]
(Alt. to L. Bruce McClung)
Rep. Institute of Electrical & Electronics Engineers, Inc.
James R. Weimer, Eastern Idaho Electrical JATC, ID [L]
(Alt. to William F. Laidler)
Rep. International Brotherhood of Electrical Workers

CODE-MAKING PANEL NO. 7

Articles 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 382, 394, 396, 398

Michael W. Smith, Wentzel Electric, MO [IM]
Rep. National Electrical Contractors Association

Thomas H. Cybula, Underwriters Laboratories Inc., NY [RT]
James M. Daly, General Cable, NJ [M]
Rep. National Electrical Manufacturers Association
Chris J. Fahrenthold, Facilities Solutions Group, TX [IM]
Rep. Independent Electrical Contractors, Inc.
Herman J. Hall, Austin, TX [M]
Rep. The Vinyl Institute
James K. Hinrichs, State of Washington, WA [E]
Rep. International Association of Electrical Inspectors
Christel K. Hunter, Alcan Cable, NV [M]
Rep. The Aluminum Association, Inc.
Samuel R. La Dart, City of Memphis, TN [L]
Rep. International Brotherhood of Electrical Workers
Ronald G. Nickson, National Multi Housing Council, DC [U]
Dennis A. Nielsen, Lawrence Berkeley National Laboratory, CA [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
John W. Ray, Duke Energy Corporation, NC [UT]
Rep. Electric Light & Power Group/EEI
Gregory L. Runyon, Eli Lilly and Company, IN [U]
Rep. American Chemistry Council
David E. Schumacher, Associated Builders and Contractors, IA [IM]
Rep. Associated Builders & Contractors
George A. Straniero, Tyco/AFC Cable Systems, Inc., NJ [M]
Rep. Copper Development Association Inc.

Alternates

William B. Crist, Houston Stafford Electric Company, TX [IM]
(Alt. to Chris J. Fahrenthold)
Rep. Independent Electrical Contractors, Inc.
Donald G. Dunn, Aramco Services Company, TX [U]
(Alt. to Dennis A. Nielsen)
Rep. Institute of Electrical & Electronics Engineers, Inc.
Rachel E. Krepps, Baltimore Gas & Electric Company, MD [UT]
(Alt. to John W. Ray)
Rep. Electric Light & Power Group/EEI
Charles David Mercier, Southwire Company, GA [M]
(Alt. to James M. Daly)
Rep. National Electrical Manufacturers Association
Keith Owensby, Chattanooga Electrical JATC, TN [L]
(Alt. to Samuel R. La Dart)
Rep. International Brotherhood of Electrical Workers
Charles J. Palmieri, Town of Norwell, MA [E]
(Alt. to James K. Hinrichs)
Rep. International Association of Electrical Inspectors
Kevin T. Porter, Encore Wire Corporation, TX [M]
(Alt. to George A. Straniero)
Rep. Copper Development Association Inc.
Susan L. Stene, Underwriters Laboratories Inc., CA [RT]
(Alt. to Thomas H. Cybula)
Peter Waldrab, Alcan Cable, PA [M]
(Alt. to Christel K. Hunter)
Rep. The Aluminum Association, Inc.
Wesley L. Wheeler, Cogburn Bros., Inc., FL [IM]
(Alt. to Michael W. Smith)
Rep. National Electrical Contractors Association

CODE-MAKING PANEL NO. 8

Articles 342, 344, 348, 350, 352, 353, 354, 355 356, 358, 360, 362, 366, 368, 370, 372, 374, 376, 378, 380, 384, 386, 388, 390, 392, Chapter 9, Tables 1 through 4, and Annex C

Julian R. Burns, *Chair*
Quality Power Solutions, Inc., NC [IM]
Rep. Independent Electrical Contractors, Inc.

Joyce Evans Blom, The Dow Chemical Company, CA [U]
Rep. American Chemistry Council
David M. Campbell, Tyco/AFC Cable Systems, Inc., MA [M]
Rep. The Aluminum Association, Inc.
Joseph Dabe, City of St. Paul, MN [L]
Rep. International Brotherhood of Electrical Workers
M. Shan Griffith, Elektek, PLLC, TX [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
David G. Humphrey, County of Henrico, Virginia, VA [E]
Rep. International Association of Electrical Inspectors
David H. Kendall, Thomas & Betts Corporation, OH [M]
Rep. The Vinyl Institute
Richard E. Loyd, R & N Associates, AZ [M]
Rep. American Iron and Steel Institute
Stephen P. Poholski, Newkirk Electric Associates, Inc., MI [IM]
Rep. National Electrical Contractors Association
George F. Walbrecht, Underwriters Laboratories Inc., IL [RT]
Rodney J. West, Square D Company/Schneider Electric, OH [M]
Rep. National Electrical Manufacturers Association
Leslie R. Zielke, South Carolina Electric & Gas Company, SC [UT]
Rep. Electric Light & Power Group/EEI

Alternates

Richard J. Berman, Underwriters Laboratories Inc., IL [RT]
(Alt. to George F. Walbrecht)
Duane A. Carlson, PRS Consulting Engineers, WA [U]
(Alt. to M. Shan Griffith)
Rep. Institute of Electrical & Electronics Engineers, Inc.
George R. Dauberger, Thomas & Betts Corporation, TN [M]
(Alt. to David H. Kendall)
Rep. The Vinyl Institute
James T. Dwight, Sasol North America, Inc., LA [U]
(Alt. to Joyce Evans Blom)
Rep. American Chemistry Council
Kenneth J. Gilbert, Florida Power & Light Company, FL [UT]
(Alt. to Leslie R. Zielke)
Rep. Electric Light & Power Group/EEI
Kenneth W. Hengst, EAS Contracting, LP, TX [IM]
(Alt. to Julian R. Burns)
Rep. Independent Electrical Contractors, Inc.
James M. Imlah, City of Hillsboro, OR [E]
(Alt. to David G. Humphrey)
Rep. International Association of Electrical Inspectors
Gregory L. Maurer, Wheatland Tube Company, PA [M]
(Alt. to Richard E. Loyd)
Rep. American Iron and Steel Institute
Gary W. Pemble, Montana Electrical JATC, MT [L]
(Alt. to Joseph Dabe)
Rep. International Brotherhood of Electrical Workers
Frederic F. Small, Hubbell Incorporated, CT [M]
(Alt. to Rodney J. West)
Rep. National Electrical Manufacturers Association
Richard Temblador, Southwire Company, GA [M]
(Alt. to David M. Campbell)
Rep. The Aluminum Association, Inc.

CODE-MAKING PANEL NO. 9

Articles 312, 314, 404, 408, 450, 490

Robert A. McCullough, *Chair*
Tuckerton, NJ [E]
Rep. International Association of Electrical Inspectors

Rodney D. Belisle, NECA-IBEW Electrical Training Trust, OR [L]
Rep. International Brotherhood of Electrical Workers
Billy Breitkreutz, Fluor Corporation, TX [U]
Rep. Associated Builders & Contractors
Paul D. Coghill, Intertek Testing Services, OH [RT]
Richard P. Fogarty, Consolidated Edison Company of New York, Inc., NY [UT]
Rep. Electric Light & Power Group/EEI
Frederic P. Hartwell, Hartwell Electrical Services, Inc., MA [SE]
Thomas J. LeMay, LeMay Electric, Inc., GA [IM]
Rep. Independent Electrical Contractors, Inc.
Robert D. Osborne, Underwriters Laboratories Inc., NC [RT]
Bradford D. Rupp, Allied Moulded Products, Inc., OH [M]
Rep. National Electrical Manufacturers Association
Sukanta Sengupta, FMC Corporation, NJ [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Monte Szendre, Wilson Construction Company, OR [IM]
Rep. National Electrical Contractors Association
Ralph H. Young, Eastman Chemical Company, TN [U]
Rep. American Chemistry Council

Alternates

Kevin J. Breen, Breen Electrical Contractors Inc., NY [IM]
(Alt. to Thomas J. LeMay)
Rep. Independent Electrical Contractors, Inc.
Robert R. Gage, National Grid, NY [UT]
(Alt. to Richard P. Fogarty)
Rep. Electric Light & Power Group/EEI
L. Keith Lofland, International Association of Electrical Inspectors (IAEI), TX [E]
(Alt. to Robert A. McCullough)
Kenneth L. McKinney, Jr., Underwriters Laboratories Inc., NC [RT]
(Alt. to Robert D. Osborne)
Paul W. Myers, Potash Corporation, OH [U]
(Alt. to Sukanta Sengupta)
Rep. Institute of Electrical & Electronics Engineers, Inc.
Ronnie H. Ridgeway, Siemens Industry, Inc., TX [M]
(Alt. to Bradford D. Rupp)
Rep. National Electrical Manufacturers Association
Rhett A. Roe, IBEW Local Union 26 JATC, MD [L]
(Alt. to Rodney D. Belisle)
Rep. International Brotherhood of Electrical Workers

CODE-MAKING PANEL NO. 10

Article 240

Donald R. Cook, *Chair*
Shelby County Development Services, AL [E]
Rep. International Association of Electrical Inspectors

Madeline Borthick, IEC of Houston, Inc., TX [IM]
Rep. Independent Electrical Contractors, Inc.
Dennis M. Darling, Stantec, Canada [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
James T. Dollard, Jr., IBEW Local Union 98, PA [L]
Rep. International Brotherhood of Electrical Workers
Charles Eldridge, Indianapolis Power & Light Company, IN [UT]
Rep. Electric Light & Power Group/EEI
Carl Fredericks, The Dow Chemical Company, TX [U]
Rep. American Chemistry Council
Roderic Hageman, PRIT Service, Inc., IL [IM]
Rep. InterNational Electrical Testing Association
Jeffrey H. Hidaka, Underwriters Laboratories Inc., IL [RT]
Alan Manche, Square D Company/Schneider Electric, KY [M]
Rep. National Electrical Manufacturers Association
Robert W. Mount, Jr., Hussmann Corporation, MO [M]
Rep. Air-Conditioning, Heating, & Refrigeration Institute
George J. Ockuly, Technical Marketing Consultants, MO [M]
Richard Sobel, Quantum Electric Corporation, NY [IM]
Rep. National Electrical Contractors Association

Alternates

Scott A. Blizard, American Electrical Testing Company, Inc., MA [IM]
(Alt. to Roderic Hageman)
Rep. InterNational Electrical Testing Association
Robert J. Kauer, Building Inspection Underwriters, Inc., PA [E]
(Alt. to Donald R. Cook)
Rep. International Association of Electrical Inspectors
Frank G. Ladonne, Underwriters Laboratories Inc., IL [RT]
(Alt. to Jeffrey H. Hidaka)
Kevin J. Lippert, Eaton Corporation, PA [M]
(Alt. to Alan Manche)
Rep. National Electrical Manufacturers Association
Richard E. Lofton, II, IBEW Local Union 280, OR [L]
(Alt. to James T. Dollard, Jr.)
Rep. International Brotherhood of Electrical Workers
Vincent J. Saporita, Cooper Bussmann, MO [M]
(Alt. to George J. Ockuly)
Roy K. Sparks, III, Eli Lilly and Company, IN [U]
(Alt. to Carl Fredericks)
Rep. American Chemistry Council
Steve A. Struble, Freeman's Electric Service, Inc., SD [IM]
(Alt. to Madeline Borthick)
Rep. Independent Electrical Contractors, Inc.
Steven E. Townsend, General Motors Corporation, MI [U]
(Alt. to Dennis M. Darling)
Rep. Institute of Electrical & Electronics Engineers, Inc.
John F. Vartanian, National Grid, MA [UT]
(Alt. to Charles Eldridge)
Rep. Electric Light & Power Group/EEI

CODE-MAKING PANEL NO. 11

Articles 409, 430, 440, 460, 470, Annex D, Example D8

Wayne Brinkmeyer, *Chair*
Britain Electric Company, TX [IM]
Rep. National Electrical Contractors Association

Terry D. Cole, Hamer Electric, Inc., WA [IM]
Rep. Independent Electrical Contractors, Inc.
Jeffrey A. DesJarlais, Underwriters Laboratories Inc., IL [RT]
James M. Fahey, IBEW Local Union 103/MBTA, MA [L]
Rep. International Brotherhood of Electrical Workers
Robert G. Fahey, City of Janesville, WI [E]
Rep. International Association of Electrical Inspectors
William D. Glover, PPG Industries, Inc., WV [U]
Rep. American Chemistry Council
Paul E. Guidry, Fluor Enterprises, Inc., TX [U]
Rep. Associated Builders & Contractors
Paul S. Hamer, Chevron Energy Technology Company, CA [U]
Rep. American Petroleum Institute
James C. Missildine, Jr., Southern Company Services, Inc., AL [UT]
Rep. Electric Light & Power Group/EEI
Vincent J. Saporita, Cooper Bussmann, MO [M]
Lynn F. Saunders, Brighton, MI [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Lawrence E. Todd, Intertek Testing Services, OR [RT]
Ron Widup, Shermco Industries, Inc., TX [IM]
Rep. InterNational Electrical Testing Association
James R. Wright, Siemens Industry, Inc., IL [M]
Rep. National Electrical Manufacturers Association

Alternates

Stanley J. Folz, Morse Electric Company, NV [IM]
(Alt. to Wayne Brinkmeyer)
Rep. National Electrical Contractors Association
Philip C. Hack, Constellation Energy Power Generation, MD [UT]
(Alt. to James C. Missildine, Jr.)
Rep. Electric Light & Power Group/EEI
Barry G. Karnes, Underwriters Laboratories Inc., CA [RT]
(Alt. to Jeffrey A. DesJarlais)
Ed Larsen, Square D Company/Schneider Electric, IA [M]
(Alt. to James R. Wright)
Rep. National Electrical Manufacturers Association
Thomas E. Moore, City of Beachwood, OH [E]
(Alt. to Robert G. Fahey)
Rep. International Association of Electrical Inspectors
Arthur S. Neubauer, Arseal Technologies, GA [U]
(Alt. to Paul S. Hamer)
Rep. American Petroleum Institute
Jebediah J. Novak, Cedar Rapids Electrical JATC, IA [L]
(Alt. to James M. Fahey)
Rep. International Brotherhood of Electrical Workers
George J. Ockuly, Technical Marketing Consultants, MO [M]
(Alt. to Vincent J. Saporita)
Charles L. Powell, Eastman Chemical Company, TN [U]
(Alt. to William D. Glover)
Rep. American Chemistry Council
Arthur J. Smith, III, Waldemar S. Nelson & Company, Inc., LA [U]
(Alt. to Lynn F. Saunders)
Rep. Institute of Electrical & Electronics Engineers, Inc.
L. Matthew Snyder, Intertek Testing Services, NY [RT]
(Alt. to Lawrence E. Todd)
Russell A. Tiffany, R. A. Tiffany & Associates, PA [M]
(Voting Alt. to AHRI Rep.)
Rep. Air-Conditioning, Heating, & Refrigeration Institute
Michael K. Weitzel, Central Washington Electrical Education, WA [IM]
(Alt. to Terry D. Cole)
Rep. Independent Electrical Contractors, Inc.

CODE-MAKING PANEL NO. 12

Articles 610, 620, 625, 626, 630, 640, 645, 647, 650, 660, 665, 668, 669, 670, 685 Annex D, Examples D9 and D10

Timothy M. Croushore, *Chair*
Allegheny Power, PA [UT]
Rep. Electric Light & Power Group/EEI

William E. Anderson, The Procter & Gamble Company, OH [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Thomas R. Brown, Intertek Testing Services, NY [RT]
Karl M. Cunningham, Alcoa, Inc., PA [M]
Rep. The Aluminum Association, Inc.
(VL to 610, 625, 630, 645, 660, 665, 668, 669, 685)
Thomas L. Hedges, Hedges Electric & Construction Inc., CA [IM]
Rep. National Electrical Contractors Association
Michael J. Hittel, GM Worldwide Facilites Group, MI [U]
Rep. Society of Automotive Engineers-Hybrid Committee
Robert E. Johnson, ITE Safety, MA [U]
Rep. Information Technology Industry Council
(VL to 640, 645, 647, 685)
Andy Juhasz, Kone, Inc., IL [M]
Rep. National Elevator Industry Inc.
(VL to 610, 620, 630)
Stanley Kaufman, CableSafe, Inc./OFS, GA [M]
Rep. Society of the Plastics Industry, Inc.
(VL to 640, 645)
John R. Kovacik, Underwriters Laboratories Inc., IL [RT]
Todd Lottmann, Cooper Bussmann, MO [M]
Rep. National Electrical Manufacturers Association
Sam Marcovici, New York City Department of Buildings, NY [E]
Tim McClintock, Wayne County, Ohio, OH [E]
Rep. International Association of Electrical Inspectors
David R. Quave, IBEW Local Union 903, MS [L]
Rep. International Brotherhood of Electrical Workers
Duke W. Schamel, Electrical Service Solutions, Inc., CO [IM]
Rep. Independent Electrical Contractors, Inc.
Arthur E. Schlueter, Jr., A. E. Schlueter Pipe Organ Company, GA [M]
Rep. American Institute of Organ Builders
(VL to 640, 650)
Robert C. Turner, Inductotherm Corporation, MD [M]
(VL to 610, 630, 665, 668, 669)
Ryan Gregory Ward, IdleAire, Inc., TN [U]
Rep. Transportation Electrification Committee
(VL to 625, 626)
Kenneth White, Olin Corporation, NY [U]
Rep. American Chemistry Council

Alternates

Timothy M. Andrea, Southwire Company, GA [M]
(Alt. to Karl M. Cunningham)
Rep. The Aluminum Association, Inc.
(VL to 610, 625, 630, 645, 660, 665, 668, 669, 685)
Jeffrey W. Blain, Schindler Elevator Corporation, NY [M]
(Alt. to Andy Juhasz)
Rep. National Elevator Industry Inc.
(VL to 610, 620, 630)
Thomas M. Burke, Underwriters Laboratories Inc., CA [RT]
(Alt. to John R. Kovacik)
Jeffrey L. Holmes, IBEW Local Union 1 JATC, MO [L]
(Alt. to David R. Quave)
Rep. International Brotherhood of Electrical Workers
Gery J. Kissel, General Motors Corporation, MI [U]
(Alt. to Michael J. Hittel)
Rep. Society of Automotive Engineers-Hybrid Committee
Todd R. Konieczny, Intertek Testing Services, MA [RT]
(Alt. to Thomas R. Brown)
Christopher P. O'Neil, NSTAR Electric & Gas Corporation, MA [UT]
(Alt. to Timothy M. Croushore)
Rep. Electric Light & Power Group/EEI
David L. Sher, City of Bellevue, WA [E]
(Alt. to Tim McClintock)
Rep. International Association of Electrical Inspectors
Emad Tabatabaei, Inductotherm Corporation, NJ [M]
(Alt. to Robert C. Turner)
(VL to 610, 630, 665, 668, 669)
Lori L. Tennant, Square D Company/Schneider Electric, NC [M]
(Alt. to Todd Lottmann)
Rep. National Electrical Manufacturers Association
Stephen J. Thorwegen, Jr., FSG Electric, TX [IM]
(Alt. to Duke W. Schamel)
Rep. Independent Electrical Contractors, Inc.
Charles M. Trout, Maron Electric Company, FL [IM]
(Alt. to Thomas L. Hedges)
Rep. National Electrical Contractors Association

Nonvoting

Andre R. Cartal, Yardley, PA [E]
(Member Emeritus)

CODE-MAKING PANEL NO. 13

Articles 445, 455, 480, 695, 700, 701, 702, 708, Annex F, and Annex G

Donald P. Bliss, *Chair*
NI2 Center for Infrastructure Expertise, NH [U]

Martin D. Adams, Adams Electric, Inc., CO [IM]
Rep. National Electrical Contractors Association
Suzanne M. Borek, New Jersey Department of Community Affairs, NJ [E]
Rep. International Association of Electrical Inspectors
James L. Brown, Detroit Edison, DTE Energy, MI [UT]
Rep. Electric Light & Power Group/EEI
Daniel J. Caron, Bard, Rao + Athanas Consulting Engineers, LLC, MA [SE]
James S. Conrad, Tyco Thermal Controls, CT [M]
Rep. Copper Development Association Inc.
Richard D. Currin, Jr., North Carolina State University, NC [U]
Rep. American Society of Agricultural & Biological Engineers
Neil A. Czarnecki, Reliance Controls Corporation, WI [M]
Rep. National Electrical Manufacturers Association
Herbert H. Daugherty, Electric Generating Systems Association, NJ [M]
(Alt. to Herbert V. Whittall)
James E. Degnan, Sparling, WA [U]
Rep. American Society for Healthcare Engineering
Ronald A. Keenan, M. C. Dean, Inc., VA [IM]
Rep. Independent Electrical Contractors, Inc.
Linda J. Little, IBEW Local 1 Electricians JATC, MO [L]
Rep. International Brotherhood of Electrical Workers
Craig A. Mouton, ExxonMobil Chemical Corporation, TX [U]
Rep. American Chemistry Council
Mark C. Ode, Underwriters Laboratories Inc., AZ [RT]
Gary L. Olson, Cummins Power Generation, MN [M]
Michael L. Savage, Sr., Middle Department Inspection Agency, Inc., MD [E]
Mario C. Spina, Verizon Wireless, OH [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
David Tobias, Jr., Intertek Testing Services, OH [RT]

Alternates

Barry S. Bauman, Alliant Energy, WI [U]
(Alt. to Richard D. Currin, Jr.)
Rep. American Society of Agricultural & Biological Engineers
Steven A. Corbin, Corbin Solar Solutions LLC, NJ [IM]
(Alt. to Ronald A. Keenan)
Rep. Independent Electrical Contractors, Inc.
James T. Dollard, Jr., IBEW Local Union 98, PA [L]
(Alt. to Linda J. Little)
Rep. International Brotherhood of Electrical Workers
Lawrence W. Forshner, Cummins Northeast, Inc., MA [M]
(Alt. to Gary L. Olson)
Chad Kennedy, Square D Company/Schneider Electric, SC [M]
(Alt. to Neil A. Czarnecki)
Rep. National Electrical Manufacturers Association
John R. Kovacik, Underwriters Laboratories Inc., IL [RT]
(Alt. to Mark C. Ode)
Peter M. Olney, Vermont Department of Public Safety, VT [E]
(Alt. to Suzanne M. Borek)
Rep. International Association of Electrical Inspectors
Bayly Morgan Tyler, Consolidated Edison Company of New York Inc., NY [UT]
(Alt. to James L. Brown)
Rep. Electric Light & Power Group/EEI
Herbert V. Whittall, Electrical Generating Systems Association, FL [M]
(Alt. to Herbert H. Daugherty)

CODE-MAKING PANEL NO. 14

Articles 500, 501, 502, 503, 504, 505, 506, 510, 511, 513, 514, 515, and 516

Robert A. Jones, *Chair*
Independent Electrical Contractors, Inc., TX [IM]
Rep. Independent Electrical Contractors, Inc.

Daniel Batta, Jr., Constellation Power Source Generation, Inc., MD [UT]
Rep. Electric Light & Power Group/EEI
Marc J. Bernsen, National Electrical Contractors Association, ID [IM]
Rep. National Electrical Contractors Association
Edward M. Briesch, Underwriters Laboratories Inc., IL [RT]
James D. Cospolich, Waldemar S. Nelson & Company Inc., LA [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Mark Goodman, Jacobs Engineering Group, CA [U]
Rep. American Petroleum Institute
Joseph H. Kuczka, Killark Electric Manufacturing Company, MO [M]
Rep. National Electrical Manufacturers Association
William G. Lawrence, Jr., FM Global, MA [I]
L. Evans Massey, Baldor Electric Company, SC [M]
Rep. Instrumentation, Systems, & Automation Society
Jeremy Neagle, Intertek Testing Services, NY [RT]
Donald R. Offerdahl, North Dakota State Electrical Board, ND [E]
Rep. International Association of Electrical Inspectors
John L. Simmons, Florida East Coast JATC, FL [L]
Rep. International Brotherhood of Electrical Workers
David B. Wechsler, The Dow Chemical Company, TX [U]
Rep. American Chemistry Council
Mark C. Wirfs, R & W Engineering, Inc., OR [U]
Rep. Grain Elevator and Processing Society

Alternates

Harold G. Alexander, American Electric Power Company, OH [UT]
(Alt. to Daniel Batta, Jr.)
Rep. Electric Light & Power Group/EEI
Donald W. Ankele, Underwriters Laboratories Inc., IL [RT]
(Alt. to Edward M. Briesch)
Steven J. Blais, EGS Electrical Group, IL [M]
(Alt. to Joseph H. Kuczka)
Rep. National Electrical Manufacturers Association
Mark W. Bonk, Cargill Incorporated, MN [U]
(Alt. to Mark C. Wirfs)
Rep. Grain Elevator and Processing Society
Dave Burns, Shell Exploration & Production Company, TX [U]
(Alt. to Mark Goodman)
Rep. American Petroleum Institute
Larry W. Burns, Burns Electric, Inc., TX [IM]
(Alt. to Robert A. Jones)
Rep. Independent Electrical Contractors, Inc.
Jonathan L. Cadd, International Association of Electrical Inspectors, TX [E]
(Alt. to Donald R. Offerdahl)
Thomas E. Dunne, Long Island Joint Apprenticeship & Training Committee, NY [L]
(Alt. to John L. Simmons)
Rep. International Brotherhood of Electrical Workers
Richard A. Holub, DuPont Engineering, DE [U]
(Alt. to David B. Wechsler)
Rep. American Chemistry Council
Ted H. Schnaare, Rosemount Incorporated, MN [M]
(Alt. to L. Evans Massey)
Rep. Instrumentation, Systems, & Automation Society
Donald W. Zipse, Zipse Electrical Forensics, LLC, PA [U]
(Alt. to James D. Cospolich)
Rep. Institute of Electrical & Electronics Engineers, Inc.

Nonvoting

Timothy J. Pope, Canadian Standards Association, Canada [RT]
Eduardo N. Solano, Estudio Ingeniero Solano S.A., Argentina [SE]
Fred K. Walker, US Department of the Air Force, FL [U]
Rep. TC on Airport Facilities

CODE-MAKING PANEL NO. 15

Articles 517, 518, 520, 522, 525, 530, 540

Donald J. Talka, *Chair*
Underwriters Laboratories Inc., NY [RT]

James R. Duncan, Sparling Electrical Engineering & Technology Consulting, WA [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Ronald E. Duren, PacifiCorp, WA [UT]
Rep. Electric Light & Power Group/EEI
Douglas S. Erickson, American Society for Healthcare Engineering, VI [U]
Rep. American Society for Healthcare Engineering
Mitchell K. Hefter, Entertainment Technology/Philips, TX [IM]
Rep. Illuminating Engineering Society of North America
(VL to 518, 520, 525, 530, 540)
Kim Jones, Funtastic Shows, OR [U]
Rep. Outdoor Amusement Business Association, Inc.
(VL to 525)
Edwin S. Kramer, Radio City Music Hall, NY [L]
Rep. International Alliance of Theatrical Stage Employees
(VL to 518, 520, 525, 530, 540)
Larry Lau, US Department of Veterans Affairs, DC [U]
(VL to 517, 518)
Stephen M. Lipster, The Electrical Trades Center, OH [L]
Rep. International Brotherhood of Electrical Workers
Hugh O. Nash, Jr., Nash Lipsey Burch, LLC, TN [SE]
Rep. TC on Electrical Systems
Kevin T. Porter, Encore Wire Corporation, TX [M]
Rep. The Aluminum Association, Inc.
Marcus R. Sampson, Minnesota Department of Labor & Industry, MN [E]
Rep. International Association of Electrical Inspectors
James C. Seabury III, Enterprise Electric, LLC, TN [IM]
Rep. Independent Electrical Contractors, Inc.
Bruce D. Shelly, Shelly Electric Company, Inc., PA [IM]
Rep. National Electrical Contractors Association
Michael D. Skinner, CBS Studio Center, CA [U]
Rep. Alliance of Motion Picture and Television Producers
(VL to 518, 520, 525, 530, 540)
Kenneth E. Vannice, Leviton Manufacturing Company Inc., OR [M]
Rep. US Institute for Theatre Technology
(VL to 518, 520, 525, 530, 540)
Michael Velvikis, High Voltage Maintenance Corporation, WI [IM]
Rep. InterNational Electrical Testing Association
James L. Wiseman, Square D Company/Schneider Electric, TN [M]
Rep. National Electrical Manufacturers Association

Alternates

Gary A. Beckstrand, Utah Electrical JATC, UT [L]
(Alt. to Stephen M. Lipster)
Rep. International Brotherhood of Electrical Workers
James L. Brown, Detroit Edison, DTE Energy, MI [UT]
(Alt. to Ronald E. Duren)
Rep. Electric Light & Power Group/EEI
Matthew B. Dozier, IDesign Services, TN [U]
(Alt. to James R. Duncan)
Rep. Institute of Electrical & Electronics Engineers, Inc.
Samuel B. Friedman, General Cable Corporation, RI [M]
(Alt. to James L. Wiseman)
Rep. National Electrical Manufacturers Association
Steven R. Goodman, Alcan Cable, PA [M]
(Alt. to Kevin T. Porter)
Rep. The Aluminum Association, Inc.
Dennis W. Marshall, D & L Electric Company, TX [IM]
(Alt. to James C. Seabury III)
Rep. Independent Electrical Contractors, Inc.
Joseph P. Murnane, Jr., Underwriters Laboratories Inc., NY [RT]
(Alt. to Donald J. Talka)
Richard E. Pokorny, City of Marshfield, Wisconsin, WI [E]
(Alt. to Marcus R. Sampson)
Rep. International Association of Electrical Inspectors
Steven R. Terry, Electronic Theatre Controls Inc., NY [M]
(Alt. to Kenneth E. Vannice)
Rep. US Institute for Theatre Technology
(VL to 518, 520, 525, 530, 540)

CODE-MAKING PANEL NO. 16

Articles 770, 800, 810, 820, 830

Ron L. Janikowski, City of Wausau, Wisconsin, WI [E]
Rep. International Association of Electrical Inspectors

Donna Ballast, dbi, TX [M]
Rep. Telecommunications Industry Association
George Bish, MasTec, Inc., dba Advanced Technologies, NC [IM]
Rep. Satellite Broadcasting & Communications Association
J. Robert Boyer, GE Security, NJ [M]
Rep. National Electrical Manufacturers Association
James E. Brunssen, Telcordia, NJ [U]
Rep. Alliance for Telecommunications Industry Solutions
Gerald Lee Dorna, Belden Wire & Cable Co., IN [M]
Rep. Insulated Cable Engineers Association Inc.
Ralph M. Esemplare, Consolidated Edison Company of New York, NY [UT]
Rep. Electric Light & Power Group/EEI
Dale R. Funke, Shell Oil Company, TX [U]
Rep. American Chemistry Council
Roland W. Gubisch, Intertek Testing Services, MA [RT]
Randolph J. Ivans, Underwriters Laboratories Inc., NY [RT]
Robert W. Jensen, dbi-Telecommunication Infrastructure Design, TX [M]
Rep. Building Industry Consulting Services International
Steven C. Johnson, Johnson Telecom, LLC, NC [UT]
Rep. National Cable & Telecommunications Association
William J. McCoy, Telco Sales, Inc., TX [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Harold C. Ohde, IBEW-NECA Technical Institute, IL [L]
Rep. International Brotherhood of Electrical Workers
W. Douglas Pirkle, Pirkle Electric Company, Inc., GA [IM]
Rep. National Electrical Contractors Association
Luigi G. Prezioso, M. C. Dean, Inc., VA [IM]
Rep. Independent Electrical Contractors, Inc.

Alternates

Trevor N. Bowmer, Telcordia Technologies, NJ [U]
(Alt. to James E. Brunssen)
Rep. Alliance for Telecommunications Industry Solutions
Terry C. Coleman, National Joint Apprentice & Training Committee, TN [L]
(Alt. to Harold C. Ohde)
Rep. International Brotherhood of Electrical Workers
Timothy D. Cooke, Times Fiber Communications, Inc., VA [UT]
(Alt. to Steven C. Johnson)
Rep. National Cable & Telecommunications Association
Jeff Fitzloff, State of Idaho Division of Building Safety, ID [E]
(Alt. to Ron L. Janikowski)
Rep. International Association of Electrical Inspectors
John A. Kacperski, Tele Design Services, CA [M]
(Alt. to Robert W. Jensen)
Rep. Building Industry Consulting Services International
Roderick S. Kalbfleisch, Northeast Utilities, CT [UT]
(Alt. to Ralph M. Esemplare)
Rep. Electric Light & Power Group/EEI
Stanley Kaufman, CableSafe, Inc./OFS, GA [M]
(Alt. to Gerald Lee Dorna)
Rep. Insulated Cable Engineers Association Inc.
David M. Lettkeman, Dish Network Service, LLC, CO [IM]
(Alt. to George Bish)
Rep. Satellite Broadcasting & Communications Association
Jack McNamara, Bosch Security Systems, NY [M]
(Alt. to J. Robert Boyer)
Rep. National Electrical Manufacturers Association
Craig Sato, Underwriters Laboratories Inc., CA [RT]
(Alt. to Randolph J. Ivans)
David B. Schrembeck, DBS Communications, Inc., OH [IM]
(Alt. to Luigi G. Prezioso)
Rep. Independent Electrical Contractors, Inc.
Mario C. Spina, Verizon Wireless, OH [U]
(Alt. to William J. McCoy)
Rep. Institute of Electrical & Electronics Engineers, Inc.
James T. Sudduth, Intertek Testing Services, KY [RT]
(Alt. to Roland W. Gubisch)

CODE-MAKING PANEL NO. 17

Articles 422, 424, 426, 427, 680, 682

Don W. Jhonson, Interior Electric, Inc., FL [IM]
Rep. National Electrical Contractors Association

Thomas V. Blewitt, Underwriters Laboratories Inc., NY [RT]
Paul Crivell, Camp, Dresser, & McKee Inc., WA [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Christopher S. Gill, New York Board of Fire Underwriters, NY [E]
Bruce R. Hirsch, Baltimore Gas & Electric Company, MD [UT]
Rep. Electric Light & Power Group/EEI
James E. Maldonado, City of Tempe, AZ [E]
Rep. International Association of Electrical Inspectors
Wayne E. Morris, Association of Home Appliance Manufacturers, DC [M]
(VL to 422, 424)
Jurgen Pannock, Whirlpool Corporation, TN [M]
Rep. Air-Conditioning, Heating, & Refrigeration Institute
(VL to 422, 424)
Marcos Ramirez, Hatfield-Reynolds Electric Company, AZ [IM]
Rep. Independent Electrical Contractors, Inc.
Brian E. Rock, Hubbell Incorporated, CT [M]
Rep. National Electrical Manufacturers Association
Ronald F. Schapp, Intertek Testing Services, OH [RT]
Kenneth M. Shell, Tyco Thermal Controls, CA [M]
Rep. Copper Development Association Inc.
(VL to 426, 427)
Ronald Sweigart, E.I. duPont de Nemours & Company, Inc., DE [U]
(VL to 422, 424, 426, 427, 682)
Lee L. West, Newport Controls, LLC, CA [M]
Rep. Association of Pool & Spa Professionals
(VL to 680)
Randy J. Yasenchak, IBEW Local Union 607, PA [L]
Rep. International Brotherhood of Electrical Workers

Alternates

Dennis L. Baker, Springs & Sons Electrical Contractors Inc., AZ [IM]
(Alt. to Marcos Ramirez)
Rep. Independent Electrical Contractors, Inc.
Bobby J. Gray, Hoydar/Buck, Inc., WA [IM]
(Alt. to Don W. Jhonson)
Rep. National Electrical Contractors Association
E. P. Hamilton, III, E. P. Hamilton & Associates, Inc., TX [M]
(Alt. to Lee L. West)
Rep. Association of Pool & Spa Professionals
(VL to 680)
Robert M. Milatovich, Clark County Building Department, NV [E]
(Alt. to James E. Maldonado)
Rep. International Association of Electrical Inspectors
Brian Myers, IBEW Local Union 98, PA [L]
(Alt. to Randy J. Yasenchak)
Rep. International Brotherhood of Electrical Workers
Stephen C. Richbourg, Gulf Power Company, FL [UT]
(Alt. to Bruce R. Hirsch)
Rep. Electric Light & Power Group/EEI
Patrick G. Salas, GE Consumer and Industrial, CT [M]
(Alt. to Brian E. Rock)
Rep. National Electrical Manufacturers Association
Chester L. Sandberg, Shell Exploration & Production Inc., CA [U]
(Alt. to Paul Crivell)
Rep. Institute of Electrical & Electronics Engineers, Inc.
Gary L. Siggins, Underwriters Laboratories Inc., CA [RT]
(Alt. to Thomas V. Blewitt)
Kam Fai Siu, Intertek, China [RT]
(Alt. to Ronald F. Schapp)

Nonvoting

Douglas A. Lee, US Consumer Product Safety Commission, MD [C]
(Alt. to Andrew M. Trotta)
Andrew M. Trotta, US Consumer Product Safety Commission, MD [C]
(Alt to Douglas A. Lee)

CODE-MAKING PANEL NO. 18

Articles 406, 410, 411, 600, 605

Michael N. Ber, IEC, Houston, TX [IM]
Rep. Independent Electrical Contractors, Inc.

Frederick L. Carpenter, Lithonia Lighting, GA [M]
Rep. National Electrical Manufacturers Association
Paul Costello, NECA and IBEW Local 90 JATC, CT [L]
Rep. International Brotherhood of Electrical Workers
Lee C. Hewitt, Underwriters Laboratories Inc., IL [RT]
Melvyn J. Kochan, Young Electric Sign Company, NV [M]
Rep. International Sign Association
(VL to 600)
Steven A. Larson, MS Technology, Inc., TN [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Amos D. Lowrance, Jr., City of Chattanooga, Tennessee, TN [E]
Rep. International Association of Electrical Inspectors
Michael S. O'Boyle, Philips-Lightolier, MA [M]
Rep. American Lighting Association
(VL to 410, 411)
James F. Pierce, Intertek Testing Services, OR [RT]
Sondra K. Todd, Westar Energy, Inc., KS [UT]
Rep. Electric Light & Power Group/EEI
Charles M. Trout, Maron Electric Company, FL [IM]
Rep. National Electrical Contractors Association
Jack Wells, Pass & Seymour/Legrand, NC [M]
Randall K. Wright, RKW Consulting, PA [SE]

Alternates

Steve Campolo, Leviton Manufacturing Company, Inc., NY [M]
(Alt. to Frederick L. Carpenter)
Rep. National Electrical Manufacturers Association
Robert T. Carlock, R. T. Carlock Company, TN [IM]
(Alt. to Michael N. Ber)
Rep. Independent Electrical Contractors, Inc.
Larry Chan, City of New Orleans, LA [E]
(Alt. to Amos D. Lowrance, Jr.)
Rep. International Association of Electrical Inspectors
David D'Hooge, ComEd, IL [UT]
(Alt. to Sondra K. Todd)
Rep. Electric Light & Power Group/EEI
Richard D. Gottwald, International Sign Association, VA [M]
(Alt. to Melvyn J. Kochan)
Rep. International Sign Association
(VL to 600)
Charles S. Kurten, Underwriters Laboratories Inc., NY [RT]
(Alt. to Lee C. Hewitt)
Terry K. McGowan, Lighting Ideas, Inc., OH [M]
(Alt. to Michael S. O'Boyle)
Rep. American Lighting Association
(VL to 410, 411)
Jesse Sprinkle, IBEW Local 461, IL [L]
(Alt. to Paul Costello)
Rep. International Brotherhood of Electrical Workers
Chandresh Thakur, Intertek Testing Services, CA [RT]
(Alt. to James F. Pierce)

CODE-MAKING PANEL NO. 19

Articles 545, 547, 550, 551, 552, 553, 555, 604, 675, and Annex D, Examples D11 and D12

Leslie Sabin-Mercado, *Chair*
San Diego Gas & Electric Company, CA [UT]
Rep. Electric Light & Power Group/EEI

Barry S. Bauman, Alliant Energy, WI [U]
Rep. American Society of Agricultural & Biological Engineers
Ron B. Chilton, North Carolina Department of Insurance, NC [E]
Rep. International Association of Electrical Inspectors
Garry D. Cole, Shelby/Mansfield KOA, OH [U]
Rep. National Association of RV Parks & Campgrounds
(VL to 550, 551, 552)
Steven R. Goodman, Alcan Cable, PA [M]
Rep. The Aluminum Association, Inc.
Bruce A. Hopkins, Recreation Vehicle Industry Association, VA [M]
(VL to 550, 551, 552)
Howard D. Hughes, Hughes Electric Company Inc., AR [IM]
Rep. National Electrical Contractors Association
David W. Johnson, CenTex IEC, TX [IM]
Rep. Independent Electrical Contractors, Inc.
Thomas R. Lichtenstein, Underwriters Laboratories Inc., IL [RT]
Timothy P. McNeive, Thomas & Betts Corporation, TN [M]
Rep. National Electrical Manufacturers Association
Ronald Michaelis, South Bend & Vicinity Electrical JATC, IN [L]
Rep. International Brotherhood of Electrical Workers
Doug Mulvaney, Kampgrounds of America, Inc., MT [U]
(VL to 550, 551, 552, 555)
Michael L. Zieman, RADCO, CA [RT]
(VL to 545, 550, 551, 552)

Alternates

Glenn H. Ankenbrand, Delmarva Power, MD [UT]
(Alt. to Leslie Sabin-Mercado)
Rep. Electric Light & Power Group/EEI
Michael B. F. Atkinson, Kampgrounds of America, Inc., MT [U]
(Alt. to Doug Mulvaney)
(VL to 550, 551, 552, 555)
William Bruce Bowman, Fox Systems, Inc., GA [IM]
(Alt. to David W. Johnson)
Rep. Independent Electrical Contractors, Inc.
Robert J. Fick, Alliant Energy, WI [U]
(Alt. to Barry S. Bauman)
Rep. American Society of Agricultural & Biological Engineers
John P. Goodsell, Hubbell Incorporated, CT [M]
(Alt. to Timothy P. McNeive)
Rep. National Electrical Manufacturers Association
Kent Perkins, Recreation Vehicle Industry Association, VA [M]
(Alt. to Bruce A. Hopkins)
(VL to 550, 551, 552)
Raymond F. Tucker, Consulting Professional Engineer/RADCO, CA [RT]
(Alt. to Michael L. Zieman)
(VL to 545, 550, 551, 552)
Ronald D. Weaver, Jr., North Alabama Electrical JATC, AL [L]
(Alt. to Ronald Michaelis)
Rep. International Brotherhood of Electrical Workers
Cari Williamette, City of St. Paul, MN [E]
(Alt. to Ron B. Chilton)
Rep. International Association of Electrical Inspectors
Eugene W. Wirth, Underwriters Laboratories Inc., WA [RT]
(Alt. to Thomas R. Lichtenstein)

NFPA Electrical Engineering Division Technical Staff

William Burke, Division Manager
Mark W. Earley, Chief Electrical Engineer
Paul Choiniere, Senior Electrical Specialist
Mark Cloutier, Senior Electrical Engineer
Christopher Coache, Senior Electrical Engineer
Jean O'Connor, Electrical Projects Specialist and Support Supervisor
Lee Richardson, Senior Electrical Engineer
Richard Roux, Senior Electrical Specialist
Jeffrey Sargent, Senior Electrical Specialist

These lists represent the membership at the time each Committee was balloted on the text of this report. Since that time, changes in the membership may have occurred. A key to classifications is found at the front of the document.

Committee Scope: This Committee shall have primary responsibility for documents on minimizing the risk of electricity as a source of electric shock and as a potential ignition source of fires and explosions. It shall also be responsible for text to minimize the propagation of fire and explosions due to electrical installations.

This portion of the National Electrical Code Committee is presented for adoption.

This Report on Comments was prepared by the **National Electrical Code Committee**, and documents its action on the comments received on its Report on Proposals on NFPA 70, **National Electrical Code**, 2011 edition, as published in the Report on Proposals for the 2010 Annual Revision Cycle.

This Report on Comments has been submitted to letter ballot of the **National Electrical Code Committee**. The results of the balloting, after circulation of any negative votes, can be found in the report.

This Report on Comments has also been submitted to the **Technical Correlating Committee on the National Electrical Code®** (TCC) in two Parts. Part 1 is a letter ballot on the TCC Actions, if any; and Part II is a letter ballot Authorizing the Release of the Report. The TCC, which consists of 11 voting members, votes as follows:

Part 1: 11 voted affirmatively

Part 2: 11 voted affirmatively

9-1 Log #46 NEC-P09 **Final Action: Reject**
(Entire Document)

Submitter: Paul Guidry, Fluor Enterprises, Inc.
Comment on Proposal No: 9-1
Recommendation: Accept the proposal. Change terms "high voltage" and "medium voltage" to correlate with new proposed definitions in Article 100. This is a companion proposal to a proposal to add definitions for low voltage, medium voltage, and high voltage to Article 100.
Substantiation: If the proposal for adding the definitions in Article 100 is accepted, this proposal must be accepted as well to correlate between all chapters of the NEC.

I agree with the panel that the terms for high voltage and medium voltage are inconsistent within various standards. This is the very issue I'm trying to rectify with this proposal. Also, the terms mean different things to different people. For instance, if you're discussing voltage levels with an instrument technician, he may think that 120V is high voltage. Whereas, if you're discussing high voltage with a utility, they're probably thinking in terms of voltages above 69kV. I feel that if the NEC is going to use the terms "medium voltage" and "high voltage" that there must be some consistency.

I also understand that for many years the NEC has been mainly concentrated on non-industrial areas, such as trailer parks, swimming pools, health care facilities, residential, and commercial installations. Hence, 490.2 defines "high voltage" as more than 600V, nominal. Since the NEC is trying to incorporate more medium and high voltage requirements into the document, as evidenced through the high voltage task group that I was a part of this cycle, I think it's important that we establish in terms of how it is used in the NEC, that "high voltage" doesn't really start at the 600V level.

As far as the panel statement goes that I didn't specify where and in what form the revisions should be made, my thought was that if the definitions that I had submitted were accepted, then many various adjustments would have to be made throughout the NEC. Staff members would have to go through the entire document and edit the phrases according to the definition parameters.
Panel Meeting Action: Reject
Panel Statement: CMP 9 does not support changing these definitions until and unless it is presented with a coordinated set of proposals generated by a task group specifically formed for that purpose and operating under the aegis of the Technical Correlating Committee.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 90 — INTRODUCTION

1-1 Log #509 NEC-P01 **Final Action: Accept**
(90.1(C))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-9
Recommendation: Continue to reject this proposal. The concept of a 'service point' does not apply, or applies differently, to communications systems than to a power utility interface.
Substantiation: The text proposed in the original submission is not applicable to communications as the terms 'service point' and 'load side' do not apply. Mr. LaBrake, in his 'explanation of negative', proposed revised text that continues to use the term 'service point'. In addition, where telecom and CATV are concerned, there may be communications wiring on the premises that is not "… on the premises wiring side of the service point". Such is the case when communications cables enter the building and the Network Interface Device (NID), Network Interface Unit (NIU) or Optical Network Terminal (ONT) is located within the building.

Although we believe that this proposal should continue to be rejected, we would like to express our support for the NEC/NESC Ad Hoc Task Group and the harmonization of the NEC and NESC.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-3.

1-2 Log #511 NEC-P01 **Final Action: Accept**
(90.1(C))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-11
Recommendation: Continue to reject this proposal. The concept of a 'service point' does not apply, or applies differently, to communications systems than to a power utility interface.
Substantiation: The text proposed is not applicable to communications as the terms 'service point' and 'load side' do not apply. In addition, where telecom and CATV are concerned, there may be communications wiring on the premises that is not "… on the premises wiring side of the service point". Such is the case when communications cables enter the building and the Network Interface Device (NID), Network Interface Unit (NIU) or Optical Network Terminal (ONT) is located within the building.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-3.

1-3 Log #1373 NEC-P01 **Final Action: Reject**
(90.1(C))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-9
Recommendation: Change 90.1(C) to read as follows.
90.1(C) Intention. This Code applies to the design and installation of electrical and communications systems and equipment on the premises wiring side of the service point. This Code is not intended as a design specification or an instruction manual for untrained persons.
Substantiation: Edison Electric Institute recommends Proposal 1-9 be accepted-in-principle and supports the proposed text in Mr. LaBrake's negative ballot statement for the change to 90.1(C).
Panel Meeting Action: Reject
Panel Statement: The panel reiterates that the comment does not enhance clarity or usability. The proposed text is a scope statement, that is already addressed in 90.2, and it should not be repeated in a different form in 90.1(C).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: As was stated in the substantiation to the original Proposal, "Specifically, the rationale for this change is to state what the Code intends in positive language". Additionally, it was to provide harmonization with text in the NESC so that a clear demarcation between the applications of the two codes is possible.

1-4 Log #1217 NEC-P01 **Final Action: Reject**
(90.1(C) and FPN)

Submitter: David E. Shapiro, Safety First Electric
Comment on Proposal No: 1-8
Recommendation: Resive as follows:
...users such as qualified inspection authorities... FPN...~~as a design specification or as an instruction manual for untrained person.~~ ... to serve as a complete set of design specifications, nor as an instruction manual.
Substantiation: This Code is not intended to serve as a complete set of design specifications, nor as a design or instruction manual for *anyone*.
I just left a meeting where the County lawyer was confronted by seasoned contractors and inspectors on the issue of eliminating the chief electrical inspector, using an unqualified person for his duties. He told the Council that he would "look it up." Unfortunately, he undoubtedly considers himself a "trained person."
Panel Meeting Action: Reject
Panel Statement: The comment does not conform with 4.4.5(d) of the NFPA Regulations Governing Committee Projects. The substantiation fails to explain how the proposed text changes will solve the alleged problem.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-5 Log #517 NEC-P01 **Final Action: Accept**
(90.2)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-12
Recommendation: Continue to reject this proposal.
Substantiation: The proposed figure is inappropriate for communications as the concept of 'line side' and 'load side' does not apply. Further, the term 'service point' does not apply, or applies differently to communications systems than to a power utility interface. Additionally, communications wiring covered by the NEC may not be completely located on the 'premises side of the service point'. Such is the case when communications cables enter the building and the Network Interface Device (NID), Network Interface Unit (NIU) or Optical Network Terminal (ONT) is located within the building.

Although we believe that this proposal should continue to be rejected, we would like to express our support for the NEC/NESC Ad Hoc Task Group and the harmonization of the NEC and NESC.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

ANTHONY, M.: Please refer to my statement on Comment 1-6.

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-6.

1-6 Log #1374 NEC-P01 **Final Action: Reject**
(90.2)

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-12
Recommendation: Add the Informational Annex proposed text:
Annex "TBD": "General Information Regarding Utility Electric Supply to Premises Wiring"
1. The following is a general illustration of where utility electric supply and premises wiring meet for what is covered and what is not covered by this Code as described in 90.2. Local conditions of service may locate the utility metering at any point on either side of the service point; see 90.2(B)(5). Conditions of electric service are based on governmental laws or regulations that determine the utility authority to provide electric service under their tariffs. These conditions of electric service affect the location of the service point and facilities under the local serving utility's exclusive control.

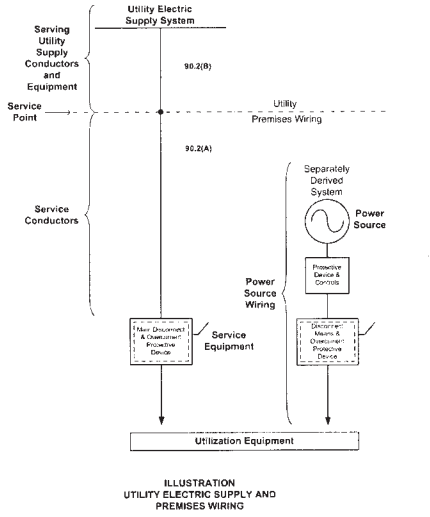

ILLUSTRATION
UTILITY ELECTRIC SUPPLY AND PREMISES WIRING

(ROP 1-12, 1-23)

2. The following are terms for general understanding of where utility electric supply and premises wiring meet for what is covered and what is not covered by this Code as described in 90.2.
Area Lighting. A lighting distribution system that provides lumens on public or private property.
Advisory Note: See 90.2(A) where area lighting is not under the exclusive control of utilities. ANSI C2-2007, *National Electrical Safety Code* contains information that covers area lighting under the exclusive control of utilities.
(ROP 1-53)
Exclusive Control. Generally covers installation, ownership, restricted access, operation, and maintenance by qualified and authorized persons.
(ROP 1-79)
Premises. The land and buildings of a user located on the user side of the service point to electric supply, communication or signal premises wiring.
Advisory Note: For communication wiring, service point is sometimes called the utility-user network point of demarcation.
(ROP 1-101)
Restricted Access. Areas that are separated from public access by a spatial or physical barrier, such as an equipment enclosure, and that are accessible only under exclusive control.
(ROP 1-104)
Supervised Installation. Conditions of maintenance and engineering supervision ensure that only qualified persons monitor and service the system continuously provided by a single building management.
(ROP 1-106)
Substantiation: Edison Electric Institute recommends Proposal 1-12 be accepted-in-principle and supports the proposed text in Mr. LaBrake's negative ballot statement for the change to include it as a new Informational Annex to describe general information regarding utility electric supply to premises wiring. In recognition of Mr. McCarver's affirmative ballot statement on this proposal, the recommended Annex covers only the electrical service point as discussed in 90.2(B)(5) rather than including communications systems discussed in 90.2(B)(4) since these systems differ from each other and have differing terminology. Refer to the attached Informational Annex that would contain this proposal's recommendation along with companion comments on Proposals 1-16, 1-53, 1-79, 1-101, 1-104, and 1-106.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its panel statement on Proposal 1-12. The proposed informational annex does not enhance clarity or usability.

The proposed Figure is too general for practical application to all installations.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

ANTHONY, M.: Almost all of APPA.ORG's comments on Edison Electric Institute or the American Public Power Association's positions, and other safety concepts reflected in comments:

1,2,3,5,7,11,12,14,15,16,17,18,19,21,22,23,24,25,27,29,30,33,38,40,57,58,71, 72,73, and 74 will be referred back to this statement.

In its rejection of this comment 1-6, our committee has missed an opportunity to accumulate into one annex, at least a decade's worth of debate on Sections 90.2(A) and 90.2(B). Observers of the scope and jurisdiction debate over the past 4 code cycles have seen dozens, if not hundreds, of proposals and comments in these two subsections alone. Most of the proposals involved the four code canonicals -- access, disconnect, grounding, and overcurrent protection -- at least implictly.

Had the comment been at least accepted in principle, a work group could have been formed to prepare a draft for CMP 1 to review. Admittedly, time needed to conform to the rules for writing an informative annex would have been a significant constraint.

Our hope is that we will see a draft of Informative Annex U (call it U, for "utility" for the moment) well before the beginning of the 2014 ROP. Within Annex U the work group could write in a more relaxed fashion, to capture as many of the 30-odd issues that came before our committee, as well as related issues that were presented to other technical panels. Here is a partial list of concepts that have appeared before our committee in this cycle alone: Premises, premises wiring(system), area lighting, tariff-based lighting, engineering supervision, service point, telecommunications demarcation, voltage nomenclature, backup generation, interactive systems, "other agreements", etc.

Even as we prepare to send the 2011 edition of the NEC out into the world there are a lot of very smart people who are in full motion, looking at our industry as a mad contraption. They see our the energy problem as a "network problem". They see the flashpoints where power and telecommunications technology converges. They want that convergence. They draw from their experiences of layered development of the internet over the past 15 years as their working metaphor.

Even if they are only partially right, and all this talk about an energy web and a smart grid is only speculative hype, we still need Annex U as a platform away from the restrictions involved in writing model law. In just such an annex we could clear up many of the paradoxes in the NEC that are at the root of so many proposals and set ourselves up for the next leg of its development.

LABRAKE, JR., N.: This diagram and the associated definitions are proposed for an Annex where they would not be considered mandatory but could provide valuable information concerning the application of the NEC.

I disagree with the Panel statement that the diagram is "too general" for application in the NEC. Similar "general" diagrams exist in Section 210.52(C) (1), 410.2, and 514.3. This diagram (and the others) provides valuable guidance for the application of the NEC. Similarly, I disagree that the diagram does not provide additional clarity and usability to the NEC.

1-7 Log #2855 NEC-P01 **Final Action: Reject**
(90.2)

Submitter: Louis Barrios, Shell Global Solutions / Rep. American Chemistry Council
Comment on Proposal No: 1-12
Recommendation: The panel action should have been to Accept In Principle, with the principle being to show the proposed figure as a FPN to 90.2(B)(5) so that it is not considered mandatory text.
Substantiation: The drawing is a good representation of the Service Point definition and shows that this point is not defined by a specific piece of equipment like a disconnecting means, but will change depending on the utility/custom arrangements. The coverage of the Code and where it applies versus the NESC is a complex one. Even though this figure may not perfectly apply to all examples, it is better than what we have available today.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on Proposal 1-12.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-6.

1-8 Log #435 NEC-P01 **Final Action: Reject**
(90.2(A))

Submitter: Thomas R. Sanders, Kellog Brown & Root
Comment on Proposal No: 1-14
Recommendation: Revise text to read as follows:
Accept the proposal so the 2011 NEC will read as follows:
"**90.2(A) Covered.** This *Code* covers the installation and use of electrical conductors, equipment and raceways; signaling and communications conductors, equipment, and raceways; and optical fiber cables and raceways for the following:" no further changes
Substantiation: In addition to 110.3(B), see the 2009 UL White book, Marking Guides, and correlation between these documents via the internet.
http://www.ul.com/global/eng/pages/offerings/perspectives/regulator/ccd/
http://www.ul.com/global/eng/pages/offerings/perspectives/regulator/electrical/
Panel Meeting Action: Reject
Panel Statement: The word "use" is included in 110.3(B) to ensure compliance with listing requirements which include intended product usage (application).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
HICKMAN, P.: We reaffirm our statement in the ROP on Proposal 1-14. We conclude that the submitters reference to 110.3(B) was offered as an example of where "and use" is used to substantiate the recommendation and agree with the submitter that the Scope of the document should include "and use" since the NEC does, as it should, include installation as well as use in a number of instances.
HITTINGER, D.: The suggested revision of the Scope 90.2(A) to add "in use" is appropriate and better describes the intent of what the Scope covers, the Code provides the rules for installation of electrical conductors, equipment, and raceways and their "use". There are numerous places in the Code that specifically state this such as the Scope of Article 110, section110.3, the Scope of Article 455 and section 490.51(A) to name a few. The panel statement is correct in identifying 110.3(B) for product compliance rules however, the Code clearly covers installation and "use".

1-9 Log #436 NEC-P01 **Final Action: Reject**
(90.2(A))

Submitter: Chester Camp, Agriculture Business
Comment on Proposal No: 1-14
Recommendation: Revise text to read as follows:
Accept the proposal so the 2011 NEC will read as follows:
"**90.2(A) Covered.** This *Code* covers the installation and use of electrical conductors, equipment and raceways; signaling and communications conductors, equipment, and raceways; and optical fiber cables and raceways for the following:" no further changes
Substantiation: In addition to 110.3(B), see the 2009 UL White book, Marking Guides, and correlation between these documents via the internet.
http://www.ul.com/global/eng/pages/offerings/perspectives/regulator/ccd/
http://www.ul.com/global/eng/pages/offerings/perspectives/regulator/electrical/
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 1-8.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
ANTHONY, M.: Mr. Hickman and Mr. McMahill correctly diagnosed the problem with the substantiation of the original proposal in the explanation of their votes. The change proposed by Mr. Tedesco is not conceptual but of a housekeeping nature and should have been accepted as such.
HICKMAN, P.: See explanation of negative on comment 1-8.
HITTINGER, D.: See my Explanation of Negative on 1-8.

1-10 Log #437 NEC-P01 **Final Action: Reject**
(90.2(A))

Submitter: Joseph A. Tedesco, Boston, MA
Comment on Proposal No: 1-14
Recommendation: ACCEPT THE proposal so the new 2011 NEC will read as follows:
"90.2(A) Covered. This Code covers the installation and use of electrical conductors, equipment, and raceways; signaling and communications conductors, equipment, and raceways; and optical fiber cables and raceways for the following...". No further changes.
Substantiation: In addition to 110.3(B), see the 2009 UL White book, Marking Guides, and correlation between these documents via the internet.
http://www.ul.com/global/eng/pages/offerings/perspectives/regulator/ccd/
http://www.ul.com/global/eng/pages/offerings/perspectives/regulator/electrical/
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 1-8.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
ANTHONY, M.: Mr. Hickman and Mr. McMahill correctly diagnosed the problem with the substantiation of the original proposal in the explanation of their votes. The change proposed by Mr. Tedesco is not conceptual but of a housekeeping nature and should have been accepted as such.
HICKMAN, P.: See explanation of negative on comment 1-8.
HITTINGER, D.: See my Explanation of Negative on 1-8.

1-11 Log #512 NEC-P01 **Final Action: Accept**
(90.2(A))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-15
Recommendation: Continue to reject this proposal.
Substantiation: The term 'service point' does not apply, or applies differently, to communications systems than to a power utility interface (see last paragraph of submitter's substantiation). Additionally, communications wiring covered by the NEC may not be completely located on the 'premises side of the service point'. Such is the case when communications cables enter the building and the Network Interface Device (NID), Network Interface Unit (NIU) or Optical Network Terminal (ONT) is located within the building.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: Based on discussion in the Panel, the original Proposal text "covers requirements of" could have been changed to "establishes requirements for" to provide the clarity the Panel seeks. The addition of the text "premises wiring systems" in the proposal provides for clear understanding that the itemized list that follows pertains to what is covered by the NEC.
The premises wiring system for the communications devices described by the Submitter begins at those devices within the building.

1-12 Log #1375 NEC-P01 **Final Action: Reject**
(90.2(A))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-16
Recommendation: Change text to read as follows:
Informational Note: See Informational Annex "TBD" on general information regarding utility electric supply to premises wiring.
Substantiation: Edison Electric Institute recommends Proposal 1-16 be accepted-in-principle and supports the proposed text in Mr. LaBrake's negative ballot statement for the change to include an Informational Note reference to a new Informational Annex based on our companion comment on Proposal 1-12.
Panel Meeting Action: Reject
Panel Statement: Since the panel has rejected the inclusion of the Informational Annex, the addition of an Informational Note is a moot point.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-6.

1-13 Log #1978 NEC-P01 **Final Action: Accept**
(90.2(A))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 1-14
Recommendation: This proposal should be rejected.
Substantiation: This proposal should be rejected. The AHJ does not have access or authority to enforce usage rules and at least one Code Making Panel is on record stating that unenforceable rules cannot be included in the NEC. The following is from the panel statement for comment 3-30 in the 70-A207 ROC.
"Unenforceable requirements must not be inserted into the NEC."
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
ANTHONY, M.: Mr. Hickman and Mr. McMahill correctly diagnosed the problem with the substantiation of the original proposal. The change proposed by Mr. Tedesco is not conceptual but editorial in nature and should have been accepted as such.
HICKMAN, P.: See explanation of negative on comment 1-8.
HITTINGER, D.: See my Explanation of Negative on 1-8.

1-14 Log #2387 NEC-P01 **Final Action: Reject**
(90.2(A))

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facility Executives
Comment on Proposal No: 1-15
Recommendation: Accept the proposal as written.
Substantiation: Many colleges and universities are running "utility-like" enterprises and many are their own inspection authority. State utility regulations are uneven and not ready for a "one-size-fits-all" safety rule for the type of electrical installations that will be possible in distributed resource power delivery regimes. This proposal, along with Proposal 1-17, makes an important distinction for our industry.
Many colleges and universities have complicated relationships with municipal and investor-owned power utilities. Most have "systems-within-a system" that form a microgrid; with wiring and equipment on either side of a boundary governed by standard easement and right-of-way agreements. Safety concerns along this boundary typically involve area lighting, emergency power sources, site placement of transformers and generators and alternative energy sources, metering, operation and maintenance of high voltage overhead and underground supply at the service point.
The Panel Statement, "The proposed changes do not add clarity to the existing scope statement in 90.2(A)", is a reminder that "clarity" may lie in the eye of the beholder -- if the beholder chooses to see. In our view, the adding this language clarifies 90.2(A). So does the Fine Print Note Figure 90.2 proposed in Proposal 1-16.
Panel Meeting Action: Reject
Panel Statement: The proposed revisions are unnecessary and do not provide further clarity.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-11.

1-15 Log #513 NEC-P01 **Final Action: Accept**
(90.2(A), FPN (New))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-16
Recommendation: Continue to reject this proposal.
Substantiation: The proposed figure is inappropriate as it does not cover communications. The term 'service point' does not apply, or applies differently, to communications systems than to a power utility interface (see last paragraph of submitter's substantiation). Additionally, communications wiring covered by the NEC may not be completely located on the 'premises side of the service point'. Such is the case when communications cables enter the building and the Network Interface Device (NID), Network Interface Unit (NIU) or Optical Network Terminal (ONT) is located within the building.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-6.

1-16 Log #1376 NEC-P01 **Final Action: Reject**
(90.2(A)(2), FPN (New))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-17
Recommendation: Please reconsider the original proposal. The text of the Fine Print Note should read as follows:
FPN to (2): For additional information concerning such installations in an industrial or multibuilding complex, see ANSI C2-2007, *National Electrical Safety Code.*
Substantiation: Edison Electric Institute recommends Proposal 1-17 be accepted in principal and supports the negative ballot statements written by Messrs. Anthony and LaBrake for this reinstatement of the FPN to add clarity for the differentiation of the scopes of two ANSI codes. The text for the requested FPN is included in the legislative text above which includes the correct year of the current edition of the National Electrical Safety Code.
Panel Meeting Action: Reject
Panel Statement: The proposed FPN does add confusion when one considers that the NEC is an enforcement document that is adopted by jurisdictions in the US. The proposed FPN reference as a source from the NEC implies that it is capable of being used without interfering with the use of the NEC, and that the code loses nothing by deleting the reference, but has increased confusion/ conflict with the reference included.
Sufficient substantiation has not been provided to substantiate this fine print note referencing the NESC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: I disagree that this Note adds confusion. It is similar in wording to a number of existing Notes in Chapter 5 of the NEC. It also provides a reciprocal reference to a similar Note in the NESC.
In addition, there are and have been a significant number of Proposals and Comments to revise and include all or parts of the NESC in the NEC. This Note would add a reference to that document without making it mandatory, thus including the requested information.

1-17 Log #1377 NEC-P01 **Final Action: Reject**
(90.2(A)(3))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-19
Recommendation: Please reconsider this proposal and accept it.
Substantiation: Edison Electric Institute recommends Proposal 1-19 be accepted and supports the negative ballot statements by Messrs. Anthony and LaBrake on this proposal and on Proposals 1-17 and 1-29 for this needed change as requested in the panel statement for proposal 1-19.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 1-18.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-18.

1-18 Log #2856 NEC-P01 **Final Action: Reject**
(90.2(A)(3))

Submitter: Louis Barrios, Shell Global Solutions / Rep. American Chemistry Council
Comment on Proposal No: 1-19
Recommendation: The panel action should have been to Accept in Part, accepting re-inserting the FPN reference to the NESC in 90.2(A)(3) but not the remainder of the proposal.
Substantiation: Since electrical installations in the US must be installed in accordance with the NEC or the NESC, depending on the location of the installation in relation to the service point, it is appropriate for the NEC to reference the NESC, and likewise for the NESC to reference the NEC. The NESC provides important installation requirements on the utility side of the service point.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 1-16.
The submitter's substantiation states in part: "electrical installations in the US must be installed in accordance with the NEC or the NESC." This is not entirely correct since there are jurisdictions that do not use either document.
The Scope of 90.2(A)(3) establishes what is covered in the NEC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: This Comment should have been accepted. While the Submitter's substantiation may not have been completely accurate, it does note that the NESC can provide important guidance about the installation of utility equipment. In addition, see my explanation of negative vote for Comment 1-16.

1-19 Log #1378 NEC-P01 **Final Action: Reject**
(90.2(B))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-23
Recommendation: Change text to read as follows:
Informational Note: See Informational Annex "TBD" on general information regarding utility electric supply to premises wiring.
Substantiation: Edison Electric Institute recommends Proposal 1-23 be accepted-in-principle and supports the proposed text in Mr. LaBrake's negative ballot statement for the change to include an Informational Note reference to a new Informational Annex based on our companion comment on Proposal 1-12.
Panel Meeting Action: Reject
Panel Statement: Since the panel has rejected the inclusion of the Informational Annex, the addition of an Informational Note is a moot point.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-6.

1-20 Log #515 NEC-P01 **Final Action: Accept**
(90.2(B)(4), FPN (New))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-28
Recommendation: Continue to reject this proposal.
Substantiation: The proposed FPN is misleading as written and cannot be broadly applied to all communications facilities identified in 90.2(B)(4) as not covered. For example, it would not apply to a communications closet of less than 500 square feet on a customer premises (e.g., office building or shopping center). It would also not apply to service to a PBX located on a customer premises.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-21 Log #514 NEC-P01 **Final Action: Accept**
(90.2(B)(4) and (5), FPN)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-27
Recommendation: Continue to reject this proposal.
Substantiation: The concept of a "service point" does not apply, or applies differently, to communications systems than to a power utility interface. Further, the communications utility may not own (as suggested in the submitter's added second-to-last sentence) the facility under their 'exclusive control' such as a communications closet located in an office building or shopping center.
Although we believe that this proposal should continue to be rejected, we would like to express our support for the NEC/NESC Ad Hoc Task Group and the harmonization of the NEC and NESC.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-22.

1-22 Log #1379 NEC-P01 **Final Action: Reject**
(90.2(B)(4) and (5), FPN)

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-27
Recommendation: Change the last sentence of the original proposal as follows and retain the rest of the proposal to read as follows:
FPN to (4) and (5): Examples of utilities may include those public or private entities that are typically designated or recognized by governmental law or regulation by public service/utility commissions and that install, operate, and maintain electric supply (such as generation, transmission, or distribution systems) or communication systems (such as telephone, CATV, Internet, satellite, or data services) to the service point. Utilities may be subject to compliance with codes and standards covering their regulated activities as adopted under governmental law or regulation. Additional information can be found through consultation with the appropriate governmental bodies, such as state regulatory commissions, the Federal Energy Regulatory Commission, and the Federal Communications Commission. Exclusive control generally covers installation, ownership, restricted access, operation, and maintenance by qualified and authorized persons. Restricted access generally covers areas that are separated from public access by a spatial or physical barrier, such as an equipment enclosure, and that are accessible only under exclusive control.
Substantiation: Edison Electric Institute recommends Proposal 1-27 be accepted-in-principle and supports the proposed text in Mr. LaBrake's negative ballot statement for the change.
Panel Meeting Action: Reject
Panel Statement: The recommendation does not enhance clarity or usability. The concept of a service point does not apply to communications systems or applies differently than to a power utility interface.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: This should have been accepted in part and changed to apply only to 90.2(B)(5) to satisfy the concerns expressed in Comment 1-21.

1-23 Log #1753 NEC-P01 **Final Action: Accept**
(90.2(B)(5))

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 1-29
Recommendation: This proposal should be accepted in principle as follows:
Change 90.2(B)(5) to read as follows:
(5) Installations under the exclusive control of an electric utility where such installations
a. Consist of service drops or service laterals, and associated metering, or
be. Are on property owned or leased by the electric utility for the purpose of communications, metering, generation, control, transformation, transmission, or distribution of electric energy, or
cb. Are located in legally established easements or rights-of-way, or

d. Are located by other written agreements either designated by or recognized by public service commissions, utility commissions, or other regulatory agencies having jurisdiction for such installations. These written agreements shall be limited to installations for the purpose of communications, metering, generation, control, transformation, transmission, or distribution of electric energy where legally established easements or rights-of-way cannot be obtained. These installations shall be limited to Federal Lands, Native American Reservations through the U.S. Department of the Interior Bureau of Indian Affairs, Military bases, lands controlled by port authorities and State agencies and departments, and lands owned by railroads.

Substantiation: Members of an Ad Hoc group representing the committees of the NEC and NESC have deliberated in good faith to resolve conflicts between the NEC and NESC documents primarily with the location of utility facilities on Federal Lands, Native American Reservations through the U.S. Department of the Interior Bureau of Indian Affairs, Military bases, lands controlled by port authorities and State agencies and departments, and lands owned by railroads.

The voting members of this Ad Hoc group reached consensus and recommend Proposal 1-29 be accepted-in-principle using the proposed revised text in this comment. This group's voting members are: James Dollard, Jr., David Hittinger, Michael Johnston, Alan Manche, Richard Owen, James Carpenter, Alan Clapp, Michael Hyland, Michael Pehosh, Jim Tomaseski, and Neil LaBrake, Jr.

This proposed text addresses Code-Making Panel No. 1's concern for clarity and usability, substantiation, and identifying the issues.

1. Clarity and usability is established by:

a. Providing clear and unambiguous text for 90.2(B)(5) with respect to utility installations where easements and rights-of-way cannot legally be obtained.

b. Clarifying the text in the 2005 NEC edition where the 2008 NEC change action was concerned. This is accomplished by rearranging the order of the list and appropriately associating text that was specific only to "other agreements".

2. The following Substantiation addresses the issue.

a. Recognizing that there are areas in which an easement or right-of-way cannot legally be obtained. This comment provides text to permit "other written agreements" for those installations as well as a prescriptive list of the locations. This restricted list is provided to aid the code user in determining where this permission will apply.

b. The following list identifies where the problem lies, along with a rationale for each item. This list is provided to support the assertion of utilities that it is necessary to include the proposed text for locations where typical easements or rights-of-way are unobtainable on property for utility installations.

Item / Location / Rationale

1. Federal Lands. The Federal government permits electric utility serving installations on their property such as National Forests only by written agreement.

2. Native American Reservations through the U.S. Department of the Interior Bureau of Indian Affairs. The U.S. Department of the Interior Bureau of Indian Affairs permits electric utility serving installations on Native American Reservations only by written agreement.

3. Military bases. The U.S. Department of Defense permits electric utility serving installations on their property only by written agreement.

4. Lands controlled by port authorities and State agencies and departments. Departments of Transportation and State Game Lands for instance permit electric utility serving installations on their property only by written agreement. Utilities have experienced trouble gaining right-of-ways in these areas. Most are done through a permitting process not a right-of-way process.

5. Lands owned by railroads. Railroad companies under federal government regulation permit electric utility serving installations on their property only by written agreement.

The Ad Hoc group recognizes that the text of 90.2(B)(5)(b) should be modified as suggested to eliminate potential problems where electric utilities provide service to owners, as listed, who do not grant easements or allow rights-of-way to utilities. This proposed revision will avoid conflict at regulatory bodies, the state, and local jurisdictional levels. Further, this proposed revision avoids utility interest to modify 90.2(B)(5) by local revision of the NEC scope in its adoption process, which has already occurred in some areas for the 2008 NEC. As such, confusion will be avoided in the field regarding installations where legally acquired easements and rights-of-way cannot be obtained.

The Ad Hoc group has submitted this comment in a consensus based effort to resolve this issue. This group urges CMP-1 to accept this comment in an effort to provide clarity and usability and to permit specified locations of utility supply facilities under "other agreements" as not covered by the NEC.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

ANTHONY, M.: The work of the NESC-NEC Ad Hoc Task Group is significant and appreciated. Please also refer to my statement on Comment 1-6.

LABRAKE, JR., N.: EEI accepts the consensus of the NEC-NESC Ad Hoc for this Comment. It is important to note that property rights have no bearing on safe wiring installations.

1-24 Log #1976 NEC-P01 **Final Action: Reject**
(90.2(B)(5))

Submitter: Neil F. LaBrake, Jr., National Grid USA

Comment on Proposal No: 1-29

Recommendation: Accept the proposal in principle relative to the need for other written agreements and utility street and area lights as being not covered by the NEC in 90.2(B)(5).

Substantiation: Two points substantiating this comment are:

1. I support the work of the NEC-NESC Ad Hoc Task Group endorsing a comment on this proposal to include other written agreements by a utility's condition of service for utility facilities not covered by the NEC where the locations make easements and rights-of-way unobtainable.

2. In the original proposal item 90.2(B)(5)b, the word "utility" should precede "street" to clarify that street and area lights referenced are those that are exclusively owned, operated, and maintained by utilities.

For further information regarding this comment, please refer to the article on "Connecting Premises Wiring to Supply Lines" published by the International Association of Electrical Inspectors in their September/October 2009 magazine (http://www.iaei.org/magazine/?p=4329#more-4329) on page 93. I have provided copies of figures 4 and 5 of the article that illustrate examples of utility exclusively owned, operated, and maintained area lighting on private property that are covered by the NESC. Street lighting under the exclusive control of utilities are typically in the public domain and part of a utility distribution system covered by the NESC.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The comment does not provide the proposed text including the wording to be added, revised (and how revised), or deleted as per 4.4.5(c) of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

ANTHONY, M.: Please refer to my statement on Comment 1-6.

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-25.

1-25 Log #2463 NEC-P01 **Final Action: Accept in Principle in Part**
(90.2(B)(5))

Submitter: Michael Hyland, American Public Power Association / Rep. IEEE NESC Committee

Comment on Proposal No: 1-29

Recommendation: Change 90.2(B)(5) to read as follows:

(5) Installations under the exclusive control of an electric utility where such installations

a. Consist of service drops or service laterals, and associated metering, or

be. Are on property owned or leased by the electric utility for the purpose of communications, metering, generation, control, transformation, transmission, or distribution of electric energy, or

c. Are utility-owned street or area lighting luminaires providing a supply of lumens, where such luminaires are operated and maintained by the utility, supplied directly from utility wiring, and supported on utility station, line, or service structures, or

db. Are located in legally established easements or rights-of-way, or

e. Are located by other written agreements either designated by or recognized by public service commissions, utility commissions, or other regulatory agencies having jurisdiction for such installations. These written agreements shall be limited to installations for the purpose of communications, metering, generation, control, transformation, transmission, or distribution of electric energy where legally established easements or rights-of-way cannot be obtained. These installations shall be limited to Federal Lands, Native American Reservations through the U.S. Department of the Interior Bureau of Indian Affairs, Military bases, lands controlled by port authorities and State agencies and departments, and lands owned by railroads.

Substantiation: This comment is in two parts. The first addresses utility provided street and area lighting, while the secondary addresses areas where utilities do not have easements as a result of practical restrictions.

Part 1.

The proposed new item "c" text addresses concerns expressed by NEC panel members of the NEC-NESC Ad Hoc Task Group that the previous wording "or by other agreements" [that was removed from

90.2(B)(5) in the 2008 NEC] may have inadvertently allowed utilities to provide lighting in or on customer structures. The proposed language limits application of the exemption to the customary practice of supplying lighting from luminaires mounted on utility structures and fed directly from the utility system with no control by any party other than the utility involved.

Lighting is not just supplied from utility poles on distribution lines—it is also supplied from utility towers, station structures, meter service poles, and lighting service poles (the latter may have no other electrical utility facility on them). In addition, to avoid the issue of whether a lighting pole is a line pole, the language that is proposed is specific and reflects actual practice—it specifically includes utility service poles used for lighting service or metering of electricity service.

In addition, in some cases, the actual lighting fixtures may be originally provided by a municipality or other entity and then accepted by the utility, operated by the utility, and maintained by the utility. This is particularly the case where the particular fixture is not a regular utility offering but is a special design used in historic districts, etc. As a result, it is not appropriate to require that the utility originally supply the fixture and this has not been done for that reason. It is, however, appropriate to require that the utility luminaires meeting the NESC be fed directly from utility structures and not be either supported on a customer building or supplied through customer wiring; lighting installations supported on customer buildings or supplied through customer wiring should meet the NEC.

See ANSI C2-2007, National Electrical Safety Code for information that covers utility street and area lighting that are a lighting distribution system under the exclusive control of utilities providing lumens on public or private property.

Part 2.

There are areas in which an easement or right-of-way cannot legally be obtained. The new item "d" text in this comment permits "other written agreements" for those installations as well as a prescriptive list of the locations. This list provides the determination where this permission will apply. The rationale for each item that utilities reason that it would be necessary where typical easements or rights-of-way are unobtainable on property for utility installations typically covered by the NESC are:

Item	Location	Rationale
1	Federal Lands	Federal government permits electric utility serving installations on their property such as National Forests only by written agreement.
2	Federal government permits electric utility serving installations on their property such as National Forests only by written agreement.	U.S. Department of the Interior Bureau of Indian Affairs permits electric utility serving installations on Native American Reservations only by written agreement.
3	Military bases	U.S. Department of Defense permits electric utility serving installations on their property only by written agreement.
4	Lands controlled by port authorities and State and Municipal agencies and departments	Department of Transportation and State Game Lands for instance permit electric utility serving installations on their property only by written agreement. Utilities have experienced trouble gaining right-of-ways in these areas. Most are done through a permitting process not a right-of way process. In some cases, rights can only be obtained permanently on state lands through a constitutional amendment. For certain rivers in the State of New York, rights can only be acquired through the state office of General Services. For NY prisons, the same is true. For crossings of the NYS Barge Canal System and Thruway, the Thruway authority or NYSDOT grant permits. Permits can only be obtained for state highway crossings also from the NYSDOT. In the Adirondack Park, rights can be typically acquired from private landowners, but construction activities are restricted by the Adirondack Park Agency (APA) in accordance to rules of the agency. Municipal governments who own electric T&D in their jurisdictions site their utility facilities on their own lands without need of easements, rights-of-way, or agreements that supply their buildings on the line side of the service point.
5	Lands owned by railroads	Railroad companies under federal government regulation permit electric utility serving installations on their property only by written agreement.
6	Lands owned by members of utility cooperatives	Electric and communication membership cooperative utilities site utility facilities on member lands in accordance with the permission granted as a condition of service. Specific easements are not issued.

The IEEE NESC Committee anticipates an altruistic approach in this regard toward harmonization of the two codes. Like the NEC, the NESC is in the process of a public comment period and comments from all concerned parties are invited and needed. See the preprint draft of the 2012 NESC now available for public comment at http://standards.ieee.org/nesc/nesc_preprint.html.

Panel Meeting Action: Accept in Principle in Part

In the recommended wording, the panel Rejects the language of proposed "c.", and Accepts in Principle the remainder of the comment.

Panel Statement: The panel recognizes that the NEC/NESC Task Group (as identified in the substantiation of Comment 1-23) considered this issue and did not reach consensus to add the proposed text in "c.".

The proposed "c." does not improve clarity or enhance usability. "Area Lighting" is not defined in the NEC, and the proposed wording may introduce confusion about the applicability of requirements to a particular installation.

The remainder of the recommended wording was Accepted in Principle by the panel action taken on Comment 1-23.

In addition, the panel does not necessarily agree with all of the submitter's substantiation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

ANTHONY, M.: Please refer to my statement on Comment 1-6.

LABRAKE, JR., N.: This Comment should have been "accepted-in-principle" and the term "area lighting" revised to something acceptable to the Panel. Although the term "area lighting" is not presently defined, there was a Proposal and subsequent Comment submitted in conjunction to do just that. To reject the definition and then reject the text as being "undefined" seems self-serving.

Although outreach efforts continue, more is needed for proper code application where area lighting is installed by utilities. Compliance is enforced rather than legislated.

1-26 Log #2857 NEC-P01 **Final Action: Accept in Principle (90.2(B)(5))**

Submitter: Louis Barrios, Shell Global Solutions / Rep. American Chemistry Council

Comment on Proposal No: 1-30

Recommendation: The panel action should have been to Accept proposal 1-30.

Substantiation: During the 2008 Code cycle, Panel 1 removed the phrase "other agreements" because it was vague and unenforceable. The submitter has provided clarification of what "other agreements" cover in this proposal.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel actions and statements on Comments 1-23 and 1-25.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-27 Log #1380 NEC-P01 **Final Action: Accept in Principle (90.2(B)(5) and 90.2(B)(6))**

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force

Comment on Proposal No: 1-29

Recommendation: Change 90.2(B)(5) to read as follows with a new item 90.2(B)(6):

(5) Installations under the exclusive control of an electric utility where such installations

a. Are for utility facilities and functions for the purpose of communications, metering, generation, control, transformation, transmission or distribution of electric energy, lumens, communications data, or signals, or

b. Are for street and area lights providing a supply of lumens where these facilities are supplied by underground or overhead conductors, or

c. Consist of service drops or service laterals, and associated metering.

(6) Locations of utility supply conductors and equipment on the line side of the service point that are an integral part of the exclusive control of an electric utility where such installations

a. Are on property owned or leased by the electric utility, or

b. Are located in legally established easements or rights-of-way, or

c. Are located by other agreements, written or by condition of service, that meet the requirements that are either designated by or recognized by public service commissions, utility commissions, or other regulatory agencies having jurisdiction, or governing bodies where unregulated, provided further that such installations are outside a building or terminate immediately inside a building wall.

Agreements include locating utility supply facilities where typical easements or rights-of-way are unobtainable on property for Federal Lands, Native American Reservations through the U.S. Department of the Interior Bureau of Indian Affairs, military bases, lands controlled by port authorities and State agencies and departments, and lands owned by railroads.
Informational Note: See ANSI C2-2007, *National Electrical Safety Code* for information that covers utility street and area lighting that are a lighting distribution system under the exclusive control of utilities providing lumens on public or private property.
Substantiation: Edison Electric Institute recommends Proposal 1-29 be accepted-in-principle and supports the proposed text in Mr. LaBrake's negative ballot statement for the change.
Panel Meeting Action: Accept in Principle
See the panel actions and statements on Comments 1-16 and 1-18, regarding the Rejection of the Informational Note, and 1-23 and 1-25, regarding the remainder of the text.
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.

1-28 Log #2471 NEC-P01 **Final Action: Accept in Principle**
(90.2(B)(5)(b))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-31
Recommendation: Accept the proposal.
Substantiation: The panel action and statement to reject this proposal failed to respond to its technical merit, which had much to do with a drawing that unfortunately did not publish in the ROP. For the benefit of the readers of this document, a verbal description follows. The drawing showed a drugstore with a parking lot out back. At the far end of the parking lot there was a rear exit onto a public street with two conventional street lighting luminaires. On a utility pole, also within the public way and to the rear of the parking lot, the drug store leased from the serving utility a 250W HPS luminaire. The drug store owners decided they wanted additional light, so they leased a second 250 W HPS luminaire, mounted to an existing utility pole midway into and on one side of the parking lot. This pole was not in a public way, and the drop to this luminaire did not pass over a legally defined easement; it was placed through an "other agreement", specifically, an established tariff recognized by the relevant agency of the state government. Ownership of and the service responsibilities for all four luminaires under discussion remained with the serving utility. Under the current NEC, the additional luminaire, but not the three within the public way, must have a service, grounding electrode, overcurrent protection, disconnecting means, etc., etc.

The proposal concluded: "If CMP 1 chooses to reject this proposal, the submitter expects to read the panel statement with great interest in the hope of learning exactly why the luminaire nearest the drug store, but not the other three luminaires, presents such a hazard that the NEC would try to overturn established utility practice going back over a century." Pursuant to the NFPA Regulations Governing Committee Projects, which indicate a strong preference for a response that is technical in nature to such proposals and comments, the submitter is still awaiting a technical response. The submitter refers CMP 1 to the comments in the voting on the proposal for the complete details with respect to this lack of responsiveness. The proposal goes to the heart of a jurisdictional conflict between two ANSI standards that may not end well for NFPA's continuing stewardship of the NEC unless this is resolved in a technically credible manner.

The other objection to the service point demarcation objective focuses on certain utility activities that seem to be squarely within the province of the NEC. For example, at the recently concluded IAEI Eastern Section Meeting it was asserted by a very reliable source that a certain utility apparently believes it can wire motor control centers to the NESC or whatever, and declare that the various load connections within or adjacent to each bucket constitute a multiplicity of service points. This practice, where it is occurring, needs to be stopped, period. Very few utilities are trying to attempt this type of business. The wording of the proposal being supported by this comment plainly states that such activities would violate the NEC.

The larger issue, however, is whether the NEC can ever be written in a way that will stop it. Electric utilities are natural monopolies with respect to distribution activities, and for that reason those activities are regulated by public entities. If a utility is wiring motor control centers wearing its utility hat, and not as an electrical contractor working on the same playing field as such contractors generally, then it can only be doing so pursuant to a tariff approved by a regulatory agency. Such activities usually, upon close examination, reveal that the utility is milking its rate base to capitalize these ventures. As such, they raise, or should raise, serious public policy concerns within the regulating authority. In the end, this is a political question regarding competition and the abuse of a rate base. Interested parties should shine a very bright spotlight on any public authority that is permitting such misbehavior to proceed, and force its discontinuance.

This proposal is carefully drawn to prohibit that which should be prohibited, and allow that which has been allowed for over a century. It coordinates well with the NESC, and should be accepted to finally put this problem behind the NEC Committee and bring it out into the political arena where applicable.
Panel Meeting Action: Accept in Principle
See the panel actions and statements on Comments 1-23 and 1-25.
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-29 Log #516 NEC-P01 **Final Action: Accept**
(90.2(B)(5), FPN (New))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-23
Recommendation: Continue to reject this proposal.
Substantiation: The proposed figure is inappropriate as it does not cover communications. The term 'service point' does not apply, or applies differently, to communications systems than to a power utility interface (see last paragraph of submitter's substantiation). Additionally, communications wiring covered by the NEC may not be completely located on the 'premises side of the service point'. Such is the case when communications cables enter the building and the Network Interface Device (NID), Network Interface Unit (NIU) or Optical Network Terminal (ONT) is located within the building.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.

1-30 Log #1381 NEC-P01 **Final Action: Reject**
(90.2(C))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-34
Recommendation: Change the new last paragraph in the original proposal to read as follows:
Within this Code's requirements, other codes and standards and good engineering practice shall be permissible by the authority having jurisdiction to apply to specific systems having supervised installation that are under engineering supervision and the control of qualified persons authorized by a regulating or controlling body, such as systems associated with an industrial complex or utility interactive system.
Substantiation: Edison Electric Institute recommends Proposal 1-34 be accepted-in-principle and supports Mr. LaBrake's negative ballot statement. Remove the word "governmental" and change "such as those" to "such systems".
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on Proposal 1-34 that the language does not provide further clarity. In addition, this is already covered in 90.4.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: I disagree that this is already covered by 90.4. That Section details how enforcement of the Code is accomplished and allows Special Permission. Section 90.2(C) details what Special Permission is and, as such, the additional details outlined in this Comment are needed in that Section.

This is an example where the Proposals and Comments to add definitions for "engineering supervision" and "supervised installations" would support special permission by an AHJ.

1-31 Log #1466 NEC-P01 **Final Action: Reject**
(90.2(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-33
Recommendation: In panel action add "other" between "building or" and "structure."
Substantiation: Edit. A building is defined as a structure but all structures are not buildings.
Panel Meeting Action: Reject
Panel Statement: The additional text is unnecessary and does not enhance clarity or usability.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-32 Log #2472 NEC-P01 **Final Action: Accept**
(90.2(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-33
Recommendation: Accept the panel action in principle. Make the following changes in the final clause as worded by the panel: "provided such installations are outside a building or structure, or terminate ~~within service equipment at a location~~ inside nearest the point of entrance of the service conductors.
Substantiation: As covered in the comments in the voting, these terminations may not be at service equipment. This comment differs slightly from that suggested in the voting in that it retains the word "inside" for clarity, and for continuity with the existing text.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-33 Log #2858 NEC-P01 **Final Action: Reject**
(90.2(C))

Submitter: Louis Barrios, Shell Global Solutions / Rep. American Chemistry Council
Comment on Proposal No: 1-34
Recommendation: The panel action should have been Accept in Principle and revised to read as follows "The authority having jurisdiction for enforcing this Code can grant exception for the installation of conductors and equipment based on other codes and standards and good engineering practice for supervised installations that are under engineering supervision and the control of qualified persons authorized by a regulating or controlling body, such as those associated with an industrial complex or utility interactive system".
Substantiation: The proposed language introduces latitude for AHJ's to accept other based codes and standards and sound engineering judgement for facilities having competent engineering staff overseeing the design, installation and operation of the facilities. The proposed text from the submitter was rewritten to active voice and made similar in format to the text already in 90.2(C). Also the phrase "can be recognized" was replaced with "can grant exception" to be more enforceable and to mimic the text already in 90.2(C).
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 1-30.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-30.

1-34 Log #430 NEC-P01 **Final Action: Accept**
(90.3)

Submitter: Terry Peters, The Society of the Plastics Industry
Comment on Proposal No: 1-35
Recommendation: Continue to reject this proposal.
Substantiation: This proposal is similar to proposal 1-7 for the previous cycle of the NEC. We submitted a comment to continue rejecting that proposal and we recommend continuing to reject this proposal for the same reasons.
Code-Making Panel 16, in developing requirements for optical fiber and communications systems, takes into account applicable requirements in other areas of the NEC, and specifically references them where appropriate. An example is the grounding requirements of Article 250 (Chapter 5) that have been referenced over many Code cycles, and are now excerpted, as applicable, in Article 770. Requiring that Chapter 8 be subject to the requirements of Chapters 1 through 7 unless the requirements are specifically excluded in Chapter 8 will require a tremendous, unnecessary reworking of the NEC.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-35 Log #518 NEC-P01 **Final Action: Accept**
(90.3)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-35
Recommendation: Continue to reject this proposal.
Substantiation: The submitter has provided no technical justification to eliminate the independent status of Chapter 8, *Communications Systems*. Communications systems are uniquely and significantly different from power systems. Communications systems cables, conductors and equipment operate at current and power levels much less than those of power circuits and are power-limited, thereby greatly reducing the likelihood of electrical fire. The grounding requirements of Chapter 8 have been in place for many years, yielding an exemplary safety record. Many grounding and bonding considerations are unique to Chapter 8; it is appropriate that communications systems have their own grounding requirements. However, where the requirements of Article 250 apply, they are referenced (see for example 800.100(B)(1), 800.100(B)(2), 800.100(C), 800.106(A) and similar sections in 820 and 830). The submitter cites Network-Powered Broadband Communications Systems power as support for his position. The power levels of these circuits (see Table 830.15) are nominal power source ratings; the actual power available on the network is greatly reduced by the resistance of the network conductors. The submitter implies that electrical safety considerations exceed the capabilities of Panel 16 members. Panel 16 contains a broad, balanced representation from the electrical industry including enforcement (electrical inspection), manufacturing, installation, labor, power distribution, research/testing and communications, and is well suited to the task. The proposed revision is over simplified. To do as the submitter proposes will result in total confusion. Each and every requirement in Chapters 1 through 6 would need to be considered by Panel 16 and all that do not apply identified and referenced as such in Chapter 8.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-36 Log #2849 NEC-P01 **Final Action: Reject**
(90.5)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 1-38
Recommendation: The Panel should accept this proposal.
Substantiation: While the panel disagrees that adding the proposed annex will improve usability, I recommend that the panel actually refer to the following sections of the Code to understand the need to consolidate duplicative FPN references into an informative annex.
[725.179(A), 725.179(B), 725.179(C), 725.179(D), 725.179(E), 725.179(F), 725.179(H), 725.179(J), 725.179(K), 760.176(C), 760.176(D), 760.176(E), 760.176(F), 760.179(D), 760.179(E), 760.179(F), and 760.179(G)]
Panel Meeting Action: Reject
Panel Statement: The panel continues to disagree that the proposed annex will improve usability.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-37 Log #2859 NEC-P01 **Final Action: Reject**
(90.8)

Submitter: Louis Barrios, Shell Global Solutions / Rep. American Chemistry Council
Comment on Proposal No: 1-44
Recommendation: The panel action should have been to Accept in Principle, with the principle being to delete both 90.8 (A) and (B).
Substantiation: Section 90.8 should be removed or relocated. It is out of place in Article 90. Sections 90.2-90.9 cover administration of the code such as scope, arrangement, enforcement, explanation of mandatory and permissive material, interpretations, units of measure. 90.8 which covers general information for wiring planning has nothing to do with the objective of administering the code and therefore doesn't belong here.
Panel Meeting Action: Reject
Panel Statement: Deletion of 90.8 would not improve the content of the Code.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
Comment on Affirmative:
FISKE, W.: We agree with CMP-1 that both 90.8(A) and 90.8(B) should not be removed from the NEC. We offer the following comment in hopes that someone will take the initiative to submit a better proposal (than 1-44) in the 2014 Code cycle. 90.8(A) is unenforceable as written. At the time of installation, no one can foresee what "future expansion" may require of a building's wiring system. In view of the current trend toward more energy-efficient equipment, it is even conceivable that a given building's electrical infrastructure could become less heavily loaded in the future, rather than more so. 90.8(B) is entirely explanatory in nature, and it should not be a Code rule. The most logical action seems to be changing both 90.8(A) and 90.8(B) to explanatory notes; however, it would appear that the Rules Governing Committee Projects preclude such action at this stage in the Code cycle.
LABRAKE, JR., N.: For a future proposal to the 2014 NEC, sections 90.6 through 90.8 could be reorganized into a single section along with the information suggested by the Submitter on this Comment. Since there are no requirements specified in these sections, they could be considered all as general information.

1-38 Log #1979 NEC-P01 **Final Action: Accept**
(90.10 (New))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 1-46
Recommendation: Continue to reject.
Substantiation: This would be too restrictive and the existence of detailed construction documents or the lack there of does not impact the safety of the installation.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.

ARTICLE 100 — DEFINITIONS

3-1 Log #25 NEC-P03 **Final Action: Reject**
(100.Air Duct)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 3-3
Recommendation: Accept this proposal.
Substantiation: The term "air duct" is used in Article 100 in the definition of a plenum in Article 100 and in sections 250.104(B), 454.58, 551.56(F) and 552.57(F).
It needs to be defined in the NEC.
Apparently NFPA staff has decided that panel 3 is the appropriate panel to handle this proposal notwithstanding the fact that the term is not used in any of the articles under its jurisdiction. If panel 3 is responsible for the definition of a plenum, (which uses the term "air duct") it might logically follow that it should also be responsible for the definition of an air duct.
Panel Meeting Action: Reject
Panel Statement: The phrase "air duct" is not used in any of the articles under the jurisdiction of Panel 3. In addition, the proposed definition uses the word "conduit" to describe the transfer of air from one location to another which could be mistakenly be applied as a type of raceway, such as rigid metal conduit and intermediate metal conduit.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

6-1 Log #2473 NEC-P06 **Final Action: Accept**
(100.Ampacity)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-3
Recommendation: Accept the proposal in part. Insert the word "maximum" ahead of the word "current" in the definition. Do not insert the word "allowable".
Substantiation: The word "allowable" is technically incorrect. Ampacity is governed solely by thermodynamics, and not by a tabulated value in a code table, however well substantiated. For example, look at 3-conductor 2 AWG XHHW aluminum in a SEU configuration buried in cellulose insulation. Research in the 1980s clearly demonstrated that this cable would operate above 90°C when carrying approximately 65 amperes of current (and literally incinerate itself at the nominally allowable ampacity of 100 amperes). The true ampacity of this wire, in accordance with the definition and as reflected in 310.10, is about 60 amperes under the stipulated conditions of use.
This, in turn, is why the ampacity tables all include the term "allowable" in their titles. The numbers therein are the allowed numbers for installation and inspection purposes, and they work unless some anomaly (thermal insulation in this case) leads to a different result (and thereby invokes 310.10). The Code would be unusable without those allowable ampacity tables. The definition as written is essentially correct and differs from prescriptively established values, as it should. "Ampacity" reminds one of "capacity" (from which it is derived) and is generally understood to be a maximum value just as capacity is inherently a maximum value. Adding the word "maximum" does no harm; adding the word "allowable" on the other hand would do great harm.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
PICARD, P.: The Panel should have noted that it did not agree with all of the submitter's substantiation. In particular, the "research" referred to is unavailable to the Panel.

1-39 Log #1980 NEC-P01 **Final Action: Accept**
(100.Arc Flash Hazard)

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 1-52
Recommendation: Continue to reject.
Substantiation: Leave the installation rules to the NEC and keep the electrical safe work rules in NFPA 70E. The rules and definitions in NFPA 70E are not required to install an electrical system that is in full compliance with rules that are found in the NEC.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-40 Log #1382 NEC-P01 **Final Action: Reject**
(100.Area Lighting (New))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-53
Recommendation: Edison Electric Institute recommends Proposal 1-53 be accepted and supports the proposed text in Mr. LaBrake's negative ballot statement for the change to include it as a new Informational Annex to describe general information regarding utility electric supply to premises wiring.
Substantiation: Refer to the Informational Annex provided with companion comment submitted on Proposal 1-12 that would contain this proposal's recommendation along with companion comments on Proposals 1-79, 1-101, 1-104, and 1-106.

Panel Meeting Action: Reject
Panel Statement: Since the panel has rejected the inclusion of the Informational Annex, the addition of a definition is a moot point.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comments 1-6 and 1-25.

18-1 Log #1465 NEC-P18 **Final Action: Reject**
(100.Attachment Plug (Plug Cap) (Plug))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-3
Recommendation: Accept the proposal.
Substantiation: Present wording implies a connection to an attached cord but does not specify it. Attachment plugs are also used with cord connector bodies and flanged surface outlets. Whether a flanged surface outlet is a code-defined term, is irrelevant; the term is sued in several places in the NEC. Many terms are not NEC defined: locknut, bushing, etc. While cord connector bodies and flanged surface outlets serve similar functions as receptacles, they are distinct separate devices.
Panel Meeting Action: Reject
Panel Statement: The submitter has again failed to provide reasoning sufficient to convince the panel to change this definition. The submitter is encouraged to review the definition of a receptacle in Article 100 which states: "A receptacle is a contact device installed at the outlet for the connection of an attachment plug." This definition covers his recommended changes.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
WELLS, J.: The Panel rejected the comment. While I concur with the action, I believe a portion of the proposal improves the definition. The reference to "flanged surface outlet" is not necessary because such devices are already covered under the definition in Article 100 for "receptacle".

16-1 Log #49a NEC-P16 **Final Action: Reject**
(100.Barrier (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-8
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panels 3 and 16 for action within their respective Articles.
This action will be considered by Code-Making Panels 3 and 16 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Reject
Panel Statement: The panel accepts the direction of the TCC to consider Proposal 9-8 as it relates to Articles 770, 800, 820 and 830.
The panel agrees with the action of CMP 9 to reject this proposal. Barriers used within the scope of CMP 16 responsibilities are in accord with dictionary definitions, and therefore do not need to be defined in Article 100.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

3-2 Log #49 NEC-P03 **Final Action: Accept**
(100.Barrier (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-8
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panels 3 and 16 for action within their respective Articles.
This action will be considered by Code-Making Panels 3 and 16 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the NEC Technical Correlating Committee to act on Proposal 9-8 as it relates to articles under the jurisdiction of Panel 3 and continue rejecting the proposal.
There are over 55 references to "barrier" throughout the NEC with many of these "barriers" used for different applications, such as fixed barriers in the cable trays used in 230.44, Exception and the permanent barriers in boxes used in 314.28(D). The proposed definition does not provide any more information of what constitutes a barrier for separation between power conductors and Class 2 or Class 3 circuit conductors than the definition of a barrier in Webster's Dictionary. Each individual section references require a barrier for specific purposes and specific construction. For example "to physically separate" and "of non-conductive material." Establishment of a general definition will not address the specific barriers for respective sections of articles.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

2-1 Log #1949 NEC-P02 **Final Action: Accept in Part**
(100.Bathroom)

Submitter: D. Jerry Flaherty, Electrical Inspection Service, Inc. / Rep. New York Solar Industries Association (NYSEIA) & Long Island Solar Industries Association (LISEIA)
Comment on Proposal No: 2-6
Recommendation: Revise text to read as follows:
Bathroom. An area including ~~a basin with one~~ two or more of the following: a basin, a toilet, a tub, or a shower, a urinal, ~~a foot bath~~, or a bidet.
Substantiation: The above changes better define a modern bathroom, but "a foot bath" should not be included. Foot baths are most often located in nail salons along with a basin for washing hands. This proposed change would redefine many nail salons as bathrooms. This is not the intent of this change.
Panel Meeting Action: Accept in Part
In the text of the Report on Proposals, the panel Accepts the deletion of the words "a foot bath" and Rejects the remainder of the comment.
Panel Statement: The panel agrees that the addition of the words "foot bath" could be interpreted to include locations beyond that intended by the panel.
The remainder of the comment is rejected because it would expand the definition of bathroom to areas where there was no basin. The fundamental basis for the definition of bathroom and the associated requirements is related to having a basin.
For example, with the change proposed by the submitter a location in a dwelling with only a toilet and a shower would now be a bathroom - 210.52(D) requires a receptacle in the bathroom within three feet of the basin which would not exist in this instance.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-2 Log #2747 NEC-P02 **Final Action: Reject**
(100.Bathroom)

Submitter: Mark Lambert, Farmington, NH
Comment on Proposal No: 2-6
Recommendation: Add new and revise text to read as follows:
Bathroom. An area including ~~a basin with one~~ two or more of the following: a basin, a toilet, a tub, or a shower basin., a urinal, a foot bath, or a bidet.
Substantiation: The definition is restrictive to the items that would define a
Bathroom. The intent of the change is to extend the definition to cover all items
that one might encounter in a room that would make a bathroom. This revision would ultimately aid in the placement of receptacles, especially if a bathtub was considered as a basin.
Panel Meeting Action: Reject
Panel Statement: The fundamental basis for the definition of bathroom and the associated requirements is related to having a basin. For example, with the change proposed by the submitter a location in a dwelling with only a toilet and a shower would now be a bathroom - 210.52(D) requires a receptacle in the bathroom within three feet of the basin which would not exist in this instance. A "basin" is well defined in the construction industry and the panel sees no basis for interpreting the bathtub as a basin as stated in the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

5-1 Log #2329 NEC-P05 **Final Action: Accept in Principle in Part**
(100.Bonder Jumping, Supply-Side (SSBJ))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-5
Recommendation: Revise this definition as follows:
Bonding Jumper, Supply-Side (SSBJ). A ~~reliable~~ conductor installed on the supply side of a service, or between a separately derived system and the first disconnecting means of such system, ~~to~~ that ensures the required electrical conductivity between metal parts required to be electrically connected.
Substantiation: The deletion of the word "reliable" is for the same reason CMP-5 deleted "effectively grounded." The change regarding separately derived systems is based on the fact that the SSBJ is not on the supply of the SDS (the primary winding), but rather it is between the SDS and its first disconnecting means. The commas were added to help clearly differentiate the service location and the SDS location of the SSBJ.
Panel Meeting Action: Accept in Principle in Part
Accept the deletion of the word reliable. The panel did not accept the added wording as it provides no clarity to the definition.
Panel Statement: See panel action and statement on Comment 5-4. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-2 Log #50 NEC-P05 **Final Action: Accept**
(100.Bonding Jumper, Equipment)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-5
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting and clarify whether it is the Panel's intent to replace the definition "Bonding Jumper-Equipment" with "Supply-Side Bonding Jumper (SSBJ)".
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel action was reconsidered and as evidenced by the action on Comment 5-3 the definition for the Supply Side Bonding Jumper was intended to be a new definition and not a replacement for the Equipment Bonding Jumper.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-3 Log #1718 NEC-P05 **Final Action: Accept**
(100.Bonding Jumper, Equipment)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-5
Recommendation: Retain the existing text of the 2008 NEC as follows:
Bonding Jumper, Equipment. The connection between two or more portions of the equipment grounding conductor.
Substantiation: This action will restore the existing definition of equipment bonding jumper to Article 100. In creating the definition of Supply Side Bonding Jumper, I do not believe it was the intent of CMP-5 to delete the definition of Equipment Bonding Jumper.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-4 Log #1716 NEC-P05 **Final Action: Accept in Principle**
(100.Bonding Jumper, Supply-Side)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-5
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
Bonding Jumper, Supply-Side (SSBJ). A reliable conductor installed on the supply side of a service or for a separately derived system to ensure the required electrical conductivity between metal parts required to be electrically connected.
Move the definition of "Supply-Side Bonding Jumper (SSBJ) to 250.2.
Substantiation: The addition of the words "for a" is proposed to be added for separately derived systems to clarify the application of the definition. It seems less clear what the supply side of a separately derived system is than for services. Is the supply side of a transformer-type separately derived system the primary?
The term is used in only Article 250 and thus should be located in 250.2 to comply with the NEC Style Manual.
Panel Meeting Action: Accept in Principle
Revise ROP draft text as follows:
"Bonding Jumper, Supply Side. A conductor installed on the supply side of a service or within a service equipment enclosure(s), or for a separately derived system, that ensures the required electrical conductivity between metal parts required to be electrically connected."
Panel Statement: The text revisions add clarity that this is a specific conductor, wire or metal raceway and its function. The panel agrees this definition should be relocated from Article 100 to Section 250.2.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-4a Log #2895 NEC-P05 **Final Action: Accept in Principle**
(100.Bonding Jumper, System (New))

Submitter: Gregory P. Bierals, Samaritan's Purse World Medical Mission
Comment on Proposal No: 5-6
Recommendation: Add definition to read as follows:
Bonding Jumper, System - The connection between the grounded circuit conductor and the equipment grounding conductor at any single point on a separately derived system from the source to the first system disconnecting means or overcurrent device or at the source of a separate derived system that has no disconnecting means of overcurrent devices.
Substantiation: I am aware that a similar definition appears in 250.2, but it would be more appropriate and helpful if located in Article 100.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-37.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

2-3 Log #2475 NEC-P02 **Final Action: Accept**
(100.Branch Circuit, Individual)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-9
Recommendation: Continue to reject the proposal.
Substantiation: The proposal submitter cites a valid concern relative to continuing controversies regarding duplex receptacles being installed where individual branch circuits are required. The new requirement in 422.16(B)(4)(5) is a case in point, where a receptacle is to be installed in a kitchen cabinet over a range. Only one utilization equipment would be connected initially, but who knows what use might be made of the additional receptacle. Some inspectors will allow this and others won't. This topic provoked considerable discussion at the 2008 IAEI Eastern Section meeting, resulting in an overwhelming vote that the duplex receptacle was not permitted for this application. I have suggested that the only use of a duplex receptacle that would clearly meet the terms of the definition would be one supplying a single utilization equipment equipped with two supply cords, which would be rare but not impossible. Clarification is in order.
Unfortunately, the required clarification cannot be achieved within the boundaries of a definition. The clarification must occur through additional language within Article 210, presumably by slightly broadening the scope of 210.21(B)(1). Unfortunately, there is no suitable proposal available that would provide the required public review, so this will have to wait for the 2014 NEC cycle.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-40a Log #CC100 NEC-P01 **Final Action: Accept**
(100. Building)

Submitter: Code-Making Panel 1,
Comment on Proposal No: 1-55
Recommendation: Reject Proposals 1-55 and 1-56.
Substantiation: After reconsideration of the actions taken on Proposals 1-55 and 1-56, the panel has determined that the definition of "Building" as it appears in the 2008 NEC is more appropriate and adequately addresses the uses of the term in the NEC.

The panel has carefully reviewed the recommendation in Comment 1-44, and has determined that the proposed text of the comment would be in conflict with the intended use of the definition in the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

(Note: Sequence 1-41 was not used)

1-42 Log #2239 NEC-P01 **Final Action: Reject**
(100.Building)

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 1-55
Recommendation: Revise the submitter's recommended wording as follows: "BUILDING. A structure that stands alone or that is cut off from adjoining structures by firewalls (~~or fire barriers~~) with all openings therein protected by approved fire doors." Alternatively, as suggested in the panel statement for Proposal 1-56, simply use the preferred definition from NFPA 220 which states as follows: "A permanent structure having a roof and walls and used to enclose an occupancy."
Substantiation: A companion and preferred comment has been submitted for companion Proposal 1-56. The NFPA 220 definition closely mirrors the definition of "Building" in the 2006 International Building Code as follows: "Building. Any structure used or intended for supporting or sheltering any use or occupancy." The NEC needs to have a generic definition for buildings in support of electrical authorities having jurisdiction for those areas where the NEC has been adopted, but where a building code has not been adopted. However, for those areas where a building code has been adopted over and above or in addition to the NEC, the building code, not the NEC, should be used for determining whether or not a particular structure is a building, a portion of a building, an occupancy within a building, or similar. Fire barriers, fire partitions, fire doors, occupancy separations, and other construction elements are used for increasing the allowable height of a building, for increasing the allowable area of a building, to stop or mitigate the spread of fire and smoke, and for other purposes, but they generally do not create "separate buildings" for the purpose of supplying a building with more than one electrical supply in the form of a service drop or service lateral. Generally, separate buildings are not created until such time that "exterior wall protection" requirements in the building code have been met, where those walls must meet stringent fire resistive requirements, they cannot have any openings, they are vertical not horizontal construction elements, and where those walls follow real or assumed property lines. The NEC would have improved usability with a simplified definition that does not compete with the definitions and concepts found in building codes. In other words, it's better to have a simple definition in the NEC that can be interpreted by the local authority having jurisdiction, than for the NEC to now specifically dictate building code concepts and what constitutes separate buildings.

When it comes to allowing only one service drop or lateral to a building, the rules in 230.2 are restrictive for good reason. However, the rules in 230.40 for service-entrance conductors are more permissive and offer numerous opportunities for electrical installations to be configured in a variety of ways and yet provide the necessary electrical safety for persons and property.
Panel Meeting Action: Reject
Panel Statement: See the panel action and substantiation on comment 1-40a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-43 Log #2240 NEC-P01 **Final Action: Reject**
(100.Building)

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 1-56
Recommendation: Revise the panel's recommended wording as follows: A permanent structure having a roof and walls that stands alone or that is cut off from adjoining structures by fire walls ~~or fire barriers with all openings there in protected by approved fire doors~~ and used to enclose an occupancy. Alternatively, simply use the preferred definition from NFPA 220 which states as follows: "A permanent structure having a roof and walls and used to enclose an occupancy."
Substantiation: A companion comment has been submitted for companion Proposal 1-55. The NFPA 220 definition closely mirrors the definition of "Building" in the 2006 International Building Code as follows: "Building. Any structure used or intended for supporting or sheltering any use or occupancy." The NEC needs to have a generic definition for buildings in support of electrical authorities having jurisdiction for those areas where the NEC has been adopted, but where a building code has not been adopted. However, for those areas where a building code has been adopted over and above or in addition to the NEC, the building code, not the NEC, should be used for determining whether or not a particular structure is a building, a portion of a building, an occupancy within a building, or similar. Fire barriers, fire partitions, fire doors, occupancy separations, and other construction elements are used for increasing the allowable height of a building, for increasing the allowable area of a building, to stop or mitigate the spread of fire and smoke, and for other purposes, but they generally do not create "separate buildings" for the purpose of supplying a building with more than one electrical supply in the form of a service drop or service lateral. Generally, separate buildings are not created until such time that "exterior wall protection" requirements in the building code have been met, where those walls must meet stringent fire resistive requirements, they cannot have any openings, they are vertical not horizontal construction elements, and where those walls follow real or assumed property lines. The NEC would have improved usability with a simplified definition that does not compete with the definitions and concepts found in building codes. In other words, it's better to have a simple definition in the NEC that can be interpreted by the local authority having jurisdiction, than for the NEC to now
specifically dictate building code concepts and what constitutes separate buildings.

When it comes to allowing only one service drop or lateral to a building, the rules in 230.2 are restrictive for good reason. However, the rules in 230.40 for service-entrance conductors are more permissive and offer numerous opportunities for electrical installations to be configured in a variety of ways and yet provide the necessary electrical safety for persons and property.
Panel Meeting Action: Reject
Panel Statement: See the panel action and substantiation on comment 1-40a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-44 Log #2474 NEC-P01 **Final Action: Reject**
(100.Building)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-56
Recommendation: Accept the panel action in principle. Reorganize the wording so as to be closer to the NFPA Glossary, as follows:

"A permanent structure having a roof and walls that are used to enclose an occupancy and that stands alone, or that is cut off from adjoining structures by fire walls or fire barriers with all openings therein protected by approved fire doors."
Substantiation: The "permanent structure" opening, the "roof and walls" provision, and the occupancy enclosure provision all hang together to describe the overall structure. The description of how the overall structure is separated from other structures is a separate consideration. This rewording groups the concepts properly. The fire doors and fire barriers have nothing to do with the occupancy enclosure parameter, only the integrity of the separation. When I first read the new definition, I couldn't figure out how a fire door could enclose an occupancy. Then I read the panel statement that reiterated the NFPA Glossary definition and realized what was intended. For further clarification, this rewording includes a comma after "stands alone", which clarifies that the cut-off provision is self-contained.
Panel Meeting Action: Reject
Panel Statement: See the panel action and substantiation on comment 1-40a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-1 Log #431 NEC-P08 **Final Action: Reject**
(100.Cable Tray)

Submitter: Terry Peters, The Society of the Plastics Industry
Comment on Proposal No: 8-4
Recommendation: Accept this proposal.
Substantiation: SPI requests that the panel reconsider and accept this proposal because the definition of a cable tray is not in Section 392.2. Section 392.2 defines a "cable tray system", not a "cable tray". "Cable tray" is not defined anywhere in the NEC.
Panel Meeting Action: Reject
Panel Statement: The definition found in Section 392.2 is adequate. Cable tray is installed as a system whether it consists of a single piece or multiple sections as defined in Section 392.2.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

5-5 Log #1986 NEC-P05 **Final Action: Reject**
(100.Common Neutral (New))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 5-7
Recommendation: The proposal should be accepted in principal with the following wording change.
Common Neutral: A neutral conductor used in circuits with two or more ungrounded conductors having no potential between them.
Substantiation: The term is used in two current code articles and may be used in a third if proposal 5-49 is accepted. In the field the term common neutral is most often used for the neutral conductor of a multi-wire circuit. That is not its use in 215.4 and 225.7(B), where the common neutral is used with more than one multi-wire circuit. There are also field installations where two or more conductors of the same phase or leg are used with an oversized grounded conductor. (example: two #12s from 20 amp circuit breakers on "A" phase with a #8 grounded conductor). This type of installation is not prohibited by the current code. The combination of this new definition and the new rule in 200.8 would prohibit this type of common neutral circuit.
Panel Meeting Action: Reject
Panel Statement: The panel concludes that a definition of a common neutral is not necessary as the proper usage of a common neutral is adequately covered in 215.4 and 225.7(B). The panel reaffirms that Section 215.4 deals with multiple feeder circuits using one neutral and not one circuit as implied in the proposed definition. See panel action and statement on Comment 5-33.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

1-45 Log #2476 NEC-P01 **Final Action: Accept**
(100.Concealed Space (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-58
Recommendation: Continue to reject the proposal.
Substantiation: In addition to the issues raised in the panel statement where increased limitations are expected to apply to areas within suspended ceiling cavities, there are also unique permissions that apply to these areas. By virtue of the wording of the definition of "exposed", the new definition would turn those allowances on their heads. For example, 250.52(A)(1) Exception permits the remote connection to water piping being used as a grounding electrode in certain occupancies contingent on it being exposed. This word was specifically chosen so as to recognize this permission even where the water piping was not immediately visible, particularly including where it ran above a suspended ceiling.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-2 Log #1464 NEC-P09 **Final Action: Reject**
(100.Conduit Body)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-22
Recommendation: Accept the proposal.
Substantiation: A conduit body complies with the definition of fitting. Conduit bodes are not always attached to a raceway as stated by the panel. A cord may enter a conduit body attached to a motor, box, or other enclosure where Code compliant, without involvement of a raceway.
Panel Meeting Action: Reject
Panel Statement: CMP 9 disagrees that a conduit body performs a primarily mechanical function as opposed to an electrical function, and therefore the terms of the definition of a fitting are not met. It is true that until the 1990 NEC, the scope of what is now Article 314 included a final sentence that read "Fittings such as capped elbows and service-entrance elbows are not classified as conduit bodies." This sentence was removed in the 1993 NEC because these items in fact met the conduit body definition, and a new section (314.5) was created to cover their use. With respect to a conduit body attached to a motor terminal housing or other enclosure as described in the substantiation, such a conduit body would almost necessarily be connected using a chase or close nipple, which for these purposes would still qualify as a raceway. The paragraph proposed for change by this comment has been in the NEC without modification since the 1975 edition, and there is no evidence that it is causing confusion or difficulties in the field.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-4 Log #1462 NEC-P02 **Final Action: Reject**
(100.Connected Load (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-12
Recommendation: Accept the proposal.
Substantiation: Connected load and calculated load are not distinguished. Connected load implies actually connected to a supply conductor; while computed load may be applied to outlets for receptacles, lighting or square foot area where no load is actually connected.
Panel Meeting Action: Reject
Panel Statement: The submitter's revision does not add any clarity to the application of the rules within the NEC. A search of the NEC for the term "connected load" shows that the usage of the term is consistent with the context of the rule and is not confused with calculated load.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-5 Log #1463 NEC-P02 **Final Action: Reject**
(100.Continuous Load)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-13
Recommendation: Accept the proposal.
Substantiation: A continuous load requires a 125 percent ampacity factor. Continuous duty motors already require this ampacity factor. Without exempting a motor the ampacity factor is 250 percent since there is nothing that exempts a continuous duty motor operating for 3 hours or more. "Likely" although a term to be avoided is used many times in the NEC and is specific to the condition of 3 hours or more.
Panel Meeting Action: Reject
Panel Statement: The definition is clear as currently written. The factors for calculating continuous loads are specifically identified in Article 220 and other parts of the NEC.
For example, 220.14(C) clearly points to 430.22 and 430.24 for calculation of motor loads.
In addition, 210.2 makes it clear that Article 430 is followed for motors.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-6 Log #2187 NEC-P02 **Final Action: Reject**
(100.Continuous Load)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-13
Recommendation: Accept revised as follows:
Equipment, other than motors, that is supplied by its uninterrupted rated full-load current for 3 hours or more.
Substantiation: Many motors operate for 3 hours or more; their supply conductors are required to have an ampacity not less than 125 percent of the motor full-load current. If they are included as "continuous" load the 125 percent factor for such loads is in addition to the 125 percent factor specified in 430.22(A) and requires excessive conductor ampacity. Conductors rated for 125 percent of the largest motor or continuous load, whichever is larger, will accommodate the temporary 125 percent overload current permitted by the overload device and reduce heating effect at terminals of overcurrent devices. The term being defined should not be used in the definition (load).
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-7 Log #2477 NEC-P02 **Final Action: Accept**
(100.Continuous Load)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-13
Recommendation: Continue to reject the proposal.
Substantiation: The panel statement is correct as far as it goes, but it may lead some readers to believe that if a motor operates routinely for more than three hours at a time, then a double deduction applies to sizing the circuit components. Sections 430.22 and 430.24 (as applicable) apply, and only the 25 percent imposed within Article 430 affects the circuit components. This correlation is achieved through the operation of 210.2 and Table 210.2, and it is the reason that the motor loads in Annex D, Example 3(a) are (1) not categorized as noncontinuous loads, but (2) grouped with noncontinuous loads for that part of the feeder load calculations.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-2 Log #1461 NEC-P18 **Final Action: Reject**
(100.Cord Connector (Body))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-4
Recommendation: Accept the proposal.
Substantiation: Cord connector is a term used many times in the NEC and should be distinguished from a connector used to secure a cord to a box or other enclosure.
Panel Meeting Action: Reject
Panel Statement: The substantiation for this proposal simply stated that this definition should be added because there presently is none. In the panel statement in rejecting the proposal, the panel indicated that there was no statement of the problem nor was there any justification as to why a definition is needed. The substantiation for this comment is similarly lacking. What is the problem? How are people confused? What hazard results from the confusion?
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

1-46 Log #1257 NEC-P01 **Final Action: Reject**
(100.Disconnect Means, Lockable (New))

Submitter: Stanley J. Folz, Morse Electric, Inc.
Comment on Proposal No: 1-63
Recommendation: Disconnect Means, (Lockable): A disconnecting means ~~with provisions for~~ capable of being locked in the open position ~~by either a keyed or combination lockout device in which the~~ with provisions for applying a ~~the~~ lockout device that remains ~~in place~~ on the disconnecting means whether a lock is installed or not. ~~and the disconnecting means remains operable until the lockout device is applied.~~
Substantiation: The panel's rejection of this new definition was based on 2.2.2 of the NEC NFPA Style Manual (Definitions shall not contain requirements or recommendations.). I have revised the new definition to mimic the wording of similar definitions that seem to have specific "requirements". Such as Bathroom, Cabinet, Ground Fault Protection of Equipment, Guest Room, Guest Suite, In Sight From, Kitchen, etc. All of these items are specific in nature and cannot be defined without using some terms that may be construed as requirements. The same would hold true for Lockable Disconnecting Means. This term would replace "Lockable Disconnect" and its many different definitions throughout the NEC with one single codified definition that could be understood and practiced by all.
This proposal would also provide a reduction in words from the current NEC. An Example would be ROP 18-190 which is one of the many companion proposals to this proposal.
Please reconsider and approve this proposal.
Panel Meeting Action: Reject
Panel Statement: The proposed text places requirements in a definition that is in violation of 2.2.2 of the NEC Style Manual.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-47 Log #1458 NEC-P01 **Final Action: Reject**
(100.Disconnecting Means)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-60
Recommendation: Accept the proposal with the following revisions:
A device, or group of devices identified as suitable for the purpose of isolating electric conductors or equipment from the electric supply.
Substantiation: Where not indicated to be "approved" or a specific type, disconnecting means can include wire connectors, terminal lugs, attachment plugs, links, etc.
Panel Meeting Action: Reject
Panel Statement: The comment is not supported by substantiation as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-48 Log #1460 NEC-P01 **Final Action: Reject**
(100.Disconnecting Means, Lockable)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-63
Recommendation: Accept the proposal with the following revisions:
A device, or group of devices provided with approved permanent provisions for locking in the open (off) position or closed (on) position.
Substantiation: Acceptance would permit deletion of unnecessary similar requirements throughout the NEC and provide specifics for the locking means.
Panel Meeting Action: Reject
Panel Statement: The comment is not supported by adequate substantiation and fails to justify why the term must be defined.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-49 Log #2478 NEC-P01 **Final Action: Hold**
(100.Disconnecting Means, Lockable (New))

TCC Action: The Technical Correlating Committee will appoint a Task Group to study this issue for the 2014 Code cycle.
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-63
Recommendation: Accept the proposal in principle. Relocate this material as 110.20 (now vacated as per the action on Proposal 1-172, so this location is now a vacant location in Part I of the article), reworded as a requirement as follows:
110.20 Disconnecting Means, Lockable. Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied.
Substantiation: This comment addresses the formatting errors in the original proposal, which included requirements in a definition. CMP 1 was correct to reject this formulation, as was it correct to suggest that it was within the scope of Article 110. This requirement should fall within the general part of Article 110, and now there will be an open location. This rewording allows other panels to address the unique issues that may apply to this concept within their articles if required, and allows a default wording that will be accurate in the overwhelming majority of cases. As an example of specialized requirements which this wording would not disturb, 490.46 addresses some unique features of drawout mechanisms for medium voltage circuit breakers; because this wording slightly modifies the general requirement, the proposed wording in this comment takes care to not interfere.
Panel Meeting Action: Hold
Panel Statement: The panel is holding the comment in accordance with 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.
As pointed out in the submitter's substantiation, the revised requirement may have unintended consequences with "unique issues" that appear in other articles. The Code-Making Panels with the responsibility for those other articles have not had time to review this matter.
The panel is not holding Proposal 1-63 as it was rejected.
The panel requests that the Technical Correlating Committee appoint a Task Group to review this as a general requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-50 Log #2192 NEC-P01 **Final Action: Reject**
(100.Distribution Equipment (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-64
Recommendation: Accept revised as follows:
Electrical apparatus such as switchboards, motor control centers, control centers, switchers, circuit breakers, overcurrent devices, generators, transformers, and the like where a branch circuit(s), or feeder(s) originate.
Substantiation: The term should be defined. Conductor, raceways, cable, boxes, and fittings are equipment that "distributes" electrical power.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.
In addition, the substantiation fails to justify why the term must be defined.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-51 Log #1456 NEC-P01 **Final Action: Reject**
(100.Enclosed)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-69
Recommendation: Accept the proposal with the following revisions:
Surrounded by a case, housing, fence, or wall(s) designed and intended to protect equipment, to deter accidental contact by persons, animals, or objects, and prevent unauthorized access to equipment.
Substantiation: Enclosures may be designed and intended to prevent contact, but do not always do so as shown by electrocutions of persons and animals that climb or penetrate fences around high-voltage installations. Enclosures are also used to deter or prevent unauthorized access.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any technical substantiation for the proposed change.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-52 Log #2193 NEC-P01 **Final Action: Reject**
(100.Enclosed)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-69
Recommendation: Accept revised as follows: A case, housing, fence, wall(s), screen, raceway, cable covering, or other means designed and intended to prevent accidental contact with energized parts.
Substantiation: An enclosure can be designed and intended to prevent accidental contact, but not necessarily actually prevent such contact, as evidenced by reports of electrocutions where persons have cut or climbed fences at high voltage installations or cut or drilled into raceways.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any technical substantiation for the proposed change.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-53 Log #47 NEC-P01 **Final Action: Reject**
(100.Engineering Supervision (New))

Submitter: Paul Guidry, Fluor Enterprises, Inc.
Comment on Proposal No: 1-72
Recommendation: Accept the proposal.
Add new definition:
Engineering Supervision. The direct work by, or under the direct supervision of a qualified, licensed, professional engineer who is engaged primarily in the design or maintenance of electrical installations.
Substantiation: The term "Engineering Supervision" is used many places throughout the Code. Per the Style Manual the term should be included in Art. 100. Ref. Style Manual Section 2.2.2.1: "Article 100. In general, Article 100 shall contain definitions of terms that appear in two or more other articles of the NEC."
There are several reasons I propose the term "engineering supervision" to define that the person must be a qualified, licensed, professional engineer engaged primarily in electrical work.
1) There are some states that do not state "Electrical Engineer" on the P.E. stamp. I've seen cases in the field where engineering work was stamped by a P.E. yet after researching why the drawings were in error, it was discovered that the P.E. was actually a civil engineer.
2) There are professional electrical engineers that do primarily electronic circuit board design, for instance, that have no business designing a high voltage substation, if they're not experienced and qualified to do such.
3) Anybody, either qualified, licensed or not, can "engineer" something and supervise the installation, but that doesn't make it safe.
I believe that if the NEC tightens the definition on what "engineering supervision" means, it'll help the inspection community greatly and provide for better, safer installations.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 1-55.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-55.

1-54 Log #1383 NEC-P01 **Final Action: Reject**
(100.Engineering Supervision (New))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-69a
Recommendation: Change original proposed text as follows:
Engineering Supervision: The technical oversight by an individual having practical skills for applying scientific principles and practices in the design, construction, maintenance, operation and performance of an installation, equipment, or system.
Informational Note: By law, many governmental jurisdictions require individuals to be licensed to practice engineering.
Substantiation: Edison Electric Institute commends the panel for addressing this definition of the term "engineering supervision". We believe it is needed and we recommend the proposed text contained in Mr. LaBrake's negative ballot statement as a recommended result of the panel discussion. This definition is necessary as it recognizes the need for the term "engineering supervision" to be defined for consistent and uniform application of its meaning used throughout the NEC in such articles as 240, 250, 310, 500, 501, 505, 625, and 708.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 1-55.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-55.

1-55 Log #2864 NEC-P01 **Final Action: Reject**
(100. Engineering Supervision)

Submitter: Louis Barrios, Shell Global Solutions / Rep. American Chemistry Council
Comment on Proposal No: 1-71
Recommendation: The panel action should have been Accept in Principle with "Engineering Supervision" defined as "Technical oversight by one thoroughly familiar with ~~scientific~~ engineering principles and practices in the design, construction, maintenance, operation and performance of an installation, equipment, or system."
Substantiation: I agree with Mr. Floyd's affirmative ballot comment that the term "engineering principles" is more appropriate and more restrictive than "scientific principles".
Panel Meeting Action: Reject
Panel Statement: "Engineering Supervision" is highly situational. All proposals relating to the A2010 NEC "Engineering Supervision", including Proposal 1-71 have one thing in common, none has substantiated that people or property would be "more safe" if "Engineering Supervision" were defined than if it were left undefined.
The term "Engineering Supervision" is more appropriately defined by applicable jurisdictions.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
LABRAKE, JR., N.: One of the desires of the electrical community is the consistent application of any requirements such as the NEC. The Panel statement that a term such as "Engineering Supervision" is "more appropriately defined by [multiple] applicable jurisdictions" is a direct contradiction of the need for consistency. The fact that some form of the term is used in several locations in the NEC (e.g. 225.32, Exception #1, 230.72(C), Exception, Article 240, Part VIII) indicates that there is a need for a common term and a common definition in Article 100 and avoid conflicts within the Code.
Comment on Affirmative:
BARRIOS, L.: During the past two code cycles, individual panels and multi-panel task groups have struggled with establishing a definition for "Engineering Supervision" that is acceptable for the NEC as a whole. CMP1's panel statement that the term "is more appropriately defined by applicable jurisdictions" is an important statement which may explain why the panels have failed to establish a single applicable definition.

1-56 Log #2860 NEC-P01 **Final Action: Accept**
(100. Equipment)

Submitter: Louis Barrios, Shell Global Solutions / Rep. American Chemistry Council
Comment on Proposal No: 1-73
Recommendation: The panel action should have been to Accept in Part, accepting the deletion of the word "material" and not accepting the remainder of the proposal.
Substantiation: The term "material" is too vague and should not be considered as "equipment". For example, pulling compound used to simplify pulling conductors and cable through a conduit could be referred to as material used in the electrical installation, but I'm not sure the compound could be referred to as "equipment".
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
HICKMAN, P.: We are concerned with the implications associated with the removal of the word "material" from the definition in that its removal is too broad and far reaching.

17-1 Log #51 NEC-P17 **Final Action: Accept**
(100.Equipotential Plane (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-8
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel's 17 and 19 for action to decide whether or not the definition should stay in the individual articles or be moved to Article 100.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: CMP 17 accepts the direction of the TCC to act on Proposal 5-8, and the panel rejects the proposal.
A characterizing definition identifies cause and effect (objective). The proposed definition addresses the cause ("difference in voltage") but the effect (safety objective), missing in the definition, differs from Article to Article. Equipotential bonding in Articles 680 and 682 is concerned about the LETHALITY of drowning due to loss of muscle control and of shock due to stray earth currents. Equipotential bonding in Article 547 is concerned about PRODUCTIVITY LOSSES in dairy operations and animal husbandry. Equipotential bonding in Articles 501 and 505 (overlooked by the TCC Comment but also contains equipotential bonding reference) is concerned about IGNITION and EXPLOSION of combustibles. These differences in objectives for equipotential bonding render a common definition in Article 100 for "Equipotential plane" as inadequate and as misleading generalization.
"Equipotential plane" is used in Article 682. "Equipotential bonding" rather than "Equipotential plane" is the term used throughout Article 680. A PLANE is defined as a TWO-dimensional (i.e., flat) surface consisting of a point and two vectors lying on the surface. Unlike floors in agricultural buildings, pool surfaces (shells, walls, decks, etc.) are seldom flat and are frequently highly contoured shapes (3-dimensional) other than planes.
Required equipotential bonding in Articles 680 and 682 is not limited to CONCRETE surfaces or even to paved surfaces.
Equipotential bonding MITIGATES voltage gradients rather "PREVENTS a difference in voltage" in absolute terms.
The mitigation of voltage gradients is not limited to WITHIN THE PLANE but also benefits ADJACENT TO (above, aside of, below). If this were not the situation, then the stepping or touch surfaces above (not "WITHIN the plane") the buried or embedded equipotential bonding method would not provide safety benefits.
When the equipotential bonding method is a loop or ring of copper conductor, "within the plane" is confusing and ambiguous at best. The same is true relative to metal fittings [680.26(B)(5)] located outside of the plane and to pool water [680.26(C)].
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-1 Log #51a NEC-P19 **Final Action: Accept**
(100.Equipotential Plane (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-8
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel's 17 and 19 for action to decide whether or not the definition should stay in the individual articles or be moved to Article 100.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the TCC direction to take action on whether or not the definition should stay in Article 547 or be moved to Article 100. Panel 19 reaffirms the Panel 5 action to Reject Proposal 5-8.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

17-2 Log #52 NEC-P17 **Final Action: Accept**
(100.Equipotential Plane (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-9
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel's 17 and 19 for action to decide whether or not the definition should stay in the individual articles or be moved to Article 100.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: CMP 17 accepts the direction of the TCC to act on Proposal 5-9, and the panel rejects the proposal. See panel action and statement on Comment 17-1.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-2 Log #52a NEC-P19 **Final Action: Accept**
(100.Equipotential Plane (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-9
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel's 17 and 19 for action to decide whether or not the definition should stay in the individual articles or be moved to Article 100.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the TCC direction to take action on whether or not the definition should stay in Article 547 or be moved to Article 100. Panel 19 reaffirms the Panel 5 action to Reject Proposal 5-9.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

1-57 Log #523 NEC-P01 **Final Action: Accept**
(100.Exclusive Control)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-79
Recommendation: Continue to reject this proposal.
Substantiation: In the case of communications utilities, the facility under "exclusive control" and "restricted access" may not necessarily be owned by the communications utility. It is typically an area of a building (e.g., closet), capable of being locked, that is set aside for communications equipment and accessible only by authorized and qualified communications personnel. The term "service point" is inappropriate in the context of communications.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-6.

1-58 Log #1384 NEC-P01 **Final Action: Reject**
(100.Exclusive Control (New))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-79
Recommendation: Edison Electric Institute recommends Proposal 1-79 be accepted and supports the proposed text in Mr. LaBrake's negative ballot statement for the change to include it as a new Informational Annex to describe general information regarding utility electric supply to premises wiring.
Substantiation: Refer to the Informational Annex provided with companion comment submitted on Proposal 1-12 that would contain this proposal's recommendation along with companion comments on Proposals 1-53, 1-101, 1-104, and 1-106.
Panel Meeting Action: Reject
Panel Statement: Since the panel has rejected the inclusion of the Informational Annex, the addition of a definition is a moot point.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-6.

14-1 Log #2194 NEC-P14 **Final Action: Reject**
(100.Explosionproof Apparatus (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-5
Recommendation: Accept the proposal with the following revisions:
A listed enclosure or fitting designed and intended to withstand an explosion of a specified gas or vapor that occurs within it and prevents the ignition of a gas or vapor outside the enclosure or fitting.
Substantiation: Apparatus is defined as equipment. The proposal used the word being defined, in the definition. (See panel statement for Proposal 1-75, Article 100, Equipment. Most (or all explosionproof equipment is required to be listed. For most equipment (other than some conduits and couplings) the AHJ should not be responsible to determine if equipment is explosionproof. Rigid metal conduit couplings, conduit unions, conduit bodies, boxes, are enclosures but not "cases". Listed apparatus for specified gas or vapor will be evaluated for ignition of surrounding atmosphere. "May" is the term reserved for discretionary use by the AHJ per the Style Manual.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

1-59 Log #1457 NEC-P01 **Final Action: Reject**
(100.Externally Operable)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-82
Recommendation: Accept the proposal with the following revisions:
Having integral permanent provisions for being manually operated without exposing the operator to contact with live parts.
Substantiation: Many definitions have requirements (necessarily), but they are not requirements in the sense that they are NEC "rules".
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-60 Log #2479 NEC-P01 **Final Action: Accept**
(100.Field Installed (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-83
Recommendation: Continue to reject the proposal.
Substantiation: This proposal, presumably unknowingly, invades the scope of electrical qualifications and therefore local electrical licensing and/or registration issues. One dramatic example is what is encompassed in the new Article 606, now accepted (subject, of course, to actions following public comments) for the 2011 code cycle. Is wiring accomplished at a remote location and still under the control of a manufacturer, field assembled within the meaning of the language submitted as part of this proposal? It will be subject to listing, apparently. This is a very difficult question, and one better left to local licensing authorities. The NEC should, to the extent possible, stay out of this thicket for the foreseeable future.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BOYCE, K.: Addition of the proposed definition would promote usability of the Code.
HICKMAN, P.: See our explanation of negative on Comment 1-61.

1-61 Log #2457 NEC-P01 **Final Action: Reject**
(100.Field Installed (Field Installation) (New))

Submitter: John R. Kovacik, Underwriters Laboratories Inc.
Comment on Proposal No: 1-83
Recommendation: Accept the proposal.
Substantiation: In addition to the substantiation submitted by Mr. Mello, it is important to note that NFPA has undertaken a project to create standards for field evaluations. The technical committee has been established and the draft documents are being developed. The standards to be developed are NFPA 790, Standard for Competency of Third Party Field Evaluation Bodies, and NFPA 791, Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation. The technical committee responsible for these standards will report to the NEC Technical Correlating Committee. The proposed definition is taken from the draft standards. Ultimately, the NEC will need to recognize the existence of these standards since it uses the terms Field Installed and Field Installation and coordination of definitions between the documents will be necessary.
Panel Meeting Action: Reject
Panel Statement: The submitter has based the substantiation on two proposed NFPA standards (790 and 791) that have not yet been approved. The fact that the NFPA has undertaken a project to create standards for field evaluations does not necessitate the need for this definition.
The panel reiterates that the proposed definition could have unintended consequences as the term is used in several articles throughout the code and not always intended to mean "assembled and installed" at the final utilization site as proposed.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BOYCE, K.: See my Explanation of Negative on Comment 1-60.
HICKMAN, P.: We continue to support the recommendation in Proposal 1-83 and agree that he addition of this definition would enhance the clarity and usability and provide practical information related to the use of the terms throughout the Code.

5-6 Log #2260 NEC-P05 **Final Action: Reject**
(100.Ground Fault (New))

Submitter: Scott Cline, Monterey Park, CA
Comment on Proposal No: 5-10
Recommendation: Revise as follows:
Ground Fault. An unintentional, electrically conducting connection between ~~an ungrounded~~ any conductor of an electrical circuit and ~~the~~ any normally non-current carrying ~~conductors~~, metallic enclosures, metallic raceways, metallic equipment, or earth. conductor, such as: metallic electrical system components, metallic piping, metallic structural elements, bodies of water, and earth. The fault mayor may not electrically connect to the source.
Substantiation: An unintentional connection from a grounded circuit conductor to any alternate pathway which may connect back to the source's grounded connection is also a Ground Fault for NEC uses. The fault is a connection which can present hazardous conditions through actual conduction, or through presenting touch potential (pools, etc). Even a neutral ground fault may result in a hazard, and possibly the tripping of a GFCI, or even a GFP. It seems to me that movement to Article 100 requires a more inclusive definition.
Panel Meeting Action: Reject
Panel Statement: The definition of "Ground Fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:
MOHLA, D.: The Comment has merit but the wording needs revision. A ground fault should include a fault from a grounded conductor (whether neutral or not) and any non current carrying grounded material.

2-8 Log #1033 NEC-P02 **Final Action: Reject**
(100.Ground-Fault Circuit Interrupter (GFCI))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-18
Recommendation: The Proposal should be Accepted in Principle in Part.
Renumber the existing Informational Note (formerly FPN) as Informational Note No. 1.
Add: "Informational Note No. 2: This device will not provide personnel protection from electrocution resulting from line-to-line contact since the nature of line-to-line loads cannot be distinguished."
Continue to Reject the remainder of the Proposal.
Substantiation: Addition of Informational Note No. 2 provides valuable safety information.
The Panel is correct regarding the hyphenation and the retention of the existing FPN.
Panel Meeting Action: Reject
Panel Statement: The addition of the FPN is not necessary for the NEC, and the function of the GFCI is well understood in the context of the NEC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-9 Log #53 NEC-P02 **Final Action: Accept**
(100.Ground-Fault Circuit Interrupter (GFCI), Portable (as applied to grund-fault circuit interrupters) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 3-4
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 2 for action.
This action will be considered by Code-Making Panel 2 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee.
After consideration, the panel rejects the proposal as the addition of the definition is unnecessary.
Portable GFCIs are a subset of a specific type of GFCI and do not need to be defined separately. The product standards have the appropriate requirements to describe the functionality.
The submitter's concern about the use of other devices for portable applications would be better addressed by requiring a listed portable GFCI.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
KING, D.: While I agree that the product standards have the requirements to describe the functionality of portable GFCI devices, there are requirements in the NEC for "portable" GFCI protection without clarifying to the installer and the AHJ what is required above and beyond conventional GFCI protection for hard wiring. GFCI protection that the user assumes is present is in fact unavailable. As noted in the panel statement, I encourage the submitter to continue to attempt to bring clarity to this issue by suggesting a requirement for a listed portable device in those areas that require portable GFCI.

5-7 Log #520 NEC-P05 **Final Action: Reject**
(100.Grounding Conductor)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 5-13
Recommendation: Reject this Proposal.
Substantiation: The term "grounding electrode conductor" (GEC) has historically and traditionally both distinguished and identified the specific conductor that connects the grounded conductor (neutral) and equipment grounding conductor from within the power service equipment to the grounding electrode/grounding electrode system at the premises. This distinction must remain in place to identify the unique purpose of the GEC and to avoid confusion and misapplication of the numerous grounding requirements throughout the NEC.
There are very specific requirements for the material (250.62), installation, sizing and accessibility (250.64) of the GEC that are not specific to other 'grounding conductors'. It is often the access and connection point for other systems/equipment required to be grounded to the premises grounding electrode/grounding electrode system, and has the physical and electrical attributes for this function. Connection of other systems/equipment to a conductor designated as a GEC but not meeting the criteria of 250.62 and 250.64 may result is an unsafe installation.
The term "Grounding Conductor" is used over 120 times in Articles 770, 800, 810, 820 830, and proposed new Article 840. The term "Grounding Conductor" has proven a useful and well understood term within the optical fiber and communications articles and the definition should be retained in Article 100.
Neither a technical rational nor electrical safety issue has been presented to substantiate the proposed change. Without such substantiation the proposed revision becomes editorial, does not enhance NEC usability and cannot be justified.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action taken at the ROP meeting to delete the term grounding conductor. The panel understands the proposed actions of Panel 16 at the ROC meeting have addressed the concerns about the technical accuracy of terms and the issue of consistency across the code by revising language in Article 770 and Chapter 8 and adding explanatory information.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:
BOWMER, T.: Affirmative Comment ---- This affirmative ballot for the Panel action on Comment 5-7 assumes that the coordinating changes under Panel 16 proposed actions on ~70 other Comments are all accepted. In particular, it is critical that the proposed Panel 16 action on 16-84a for addition of an informational note be accepted along with affirmative votes be achieved to Panel 16 proposed actions on comments 16-22, -32, -125, -135, -190, -194, -197, -220, -224, -230, -277, -282, -290, -293 and -334. If these other actions are not successful then the deletion of the definition of "grounding conductor" will cause confusion and inconsistency within the code and for users.

5-8 Log #521 NEC-P05 **Final Action: Reject**
(100.Grounding Conductor)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 5-15
Recommendation: Reject this Proposal.
Substantiation: The term "grounding electrode conductor" (GEC) has historically and traditionally both distinguished and identified the specific conductor that connects the grounded conductor (neutral) and equipment grounding conductor from within the power service equipment to the grounding electrode/grounding electrode system at the premises. This distinction must remain in place to identify the unique purpose of the GEC and to avoid confusion and misapplication of the numerous grounding requirements throughout the NEC.
There are very specific requirements for the material (250.62), installation, sizing and accessibility (250.64) of the GEC that are not specific to other 'grounding conductors'. It is often the access and connection point for other systems/equipment required to be grounded to the premises grounding electrode/grounding electrode system, and has the physical and electrical attributes for this function. Connection of other systems/equipment to a conductor designated as a GEC but not meeting the criteria of 250.62 and 250.64 may result is an unsafe installation.
The term "Grounding Conductor" is used over 120 times in Articles 770, 800, 810, 820 830, and proposed new Article 840. The term "Grounding Conductor" has proven a useful and well understood term within the optical fiber and communications articles and the definition should be retained in Article 100.
Neither a technical rational nor electrical safety issue has been presented to substantiate the proposed change. Without such substantiation the proposed revision becomes editorial, does not enhance NEC usability and cannot be justified.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-7.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-9 Log #1819 NEC-P05 **Final Action: Accept**
(100.Grounding Conductor)

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 5-13
Recommendation: Continue to accept this proposal.
Substantiation: Continue to accept the deletion of the defined term "grounding conductor." Two definition and terms for the same component of the grounding and bonding system are unnecessary and lead to inconsistency. CMP-5 has responsibility for words and terms related to grounding and bonding as determined in the 2008 NEC cycle. Such words include bonding, grounding, and intersystem bonding termination, which are defined in Article 100 and used in Chapter 8. The term grounding conductor used in Chapter 8 should be revised to "grounding electrode conductor" as recommended in coordinated proposals. The revised definition of the term grounding electrode conductor (resulting from accepted Proposal 5-18) provides additional justification for changing the term "grounding conductor" to "grounding electrode conductor" where it is used throughout the Chapter 8 Articles. This comment is part of a broad effort to improve consistency in the use of defined terms related to grounding and bonding throughout the Code. Coordinated proposals have been provided to adjust rules within Chapter 8 and Article 770 where the term is used.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-10 Log #1885 NEC-P05 **Final Action: Accept**
(100.Grounding Conductor)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-13
Recommendation: Continue to delete the definition of "Grounding Conductor" in Article 100.
Substantiation: The CMP-5 and CMP-16 Task Groups have prepared comments for the individual sections of Articles 770, 800, 810, 820, 830, and 840, where the term "grounding conductor" is used in the 2008 NEC or 2011 ROP Draft and concludes the definition of "Grounding Conductor" should be deleted in Article 100.

Those from CMP-5 who voted in favor of this comment were Paul Dobrowsky, Phil Simmons, and Dave Williams. Those representing CMP-16 on the Task Group who voted against the comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-11 Log #1887 NEC-P05 **Final Action: Accept**
(100.Grounding Conductor)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-14
Recommendation: Continue to reject the Proposal.
Substantiation: The recommendation for expanding the application of the term "Grounding Conductor" is not appropriate as the term was deleted by CMP-5 by its action on Proposal 5-13. CMP-5 also expanded the definition of Grounding Electrode Conductor to include installations made in accordance with Articles 770, 800, 810, 820, 830 and 840.

The CMP-5 and CMP-16 Task Group has prepared Comments for the individual Sections of Article 770, 800, 810, 820, 830 and 840 where the term "grounding conductor" is used in the 2008 NEC or 2011 ROP Draft and concludes the definition of Grounding Conductor should be deleted in Article 100 Articles.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-12 Log #1888 NEC-P05 **Final Action: Accept**
(100.Grounding Conductor)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-15
Recommendation: Continue to delete the definition of "Grounding Conductor" in Article 100.
Substantiation: The CMP-5 and CMP-16 Task Group has prepared Comments for the individual Sections of Article 770, 800, 810, 820, 830 and 840 where the term "grounding conductor" is used in the 2008 NEC or 2011 ROP Draft and concludes the definition of Grounding Conductor should be deleted in Article 100 Articles.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-13 Log #2090 NEC-P05 **Final Action: Accept**
(100.Grounding Conductor)

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 5-13
Recommendation: Continue to Accept this proposal.
Substantiation: The term Grounding Conductor has been misapplied mostly in the Chapter 7 and Chapter 8 articles. Proposals have been submitted to CMP-16 to correct the misapplied term Grounding Conductor that presently exists. CMP-5 task groups have worked to change the instances in the code when the term grounding conductor were improperly used. The change will make the document and the many terms involving grounding easier to understand for the user.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-14 Log #519 NEC-P05 **Final Action: Accept**
(100.Grounding Electrode Conductor)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 5-18
Recommendation: Reject this proposal.
Substantiation: The panel action fails to accommodate all communications hardware that may be encountered and fails to accommodate the listing requirements associated with the communications grounding conductor. Neither a technical rational nor electrical safety issue has been presented to substantiate the proposed change. NEC usability is not enhanced. See my comment to Proposal 5-13.
Panel Meeting Action: Accept
Panel Statement: See panel statement on Comment 5-16. The panel does not necessarily agree with all the substantiation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:

BOWMER, T.: Affirmative Comment - -- This affirmative ballot for the proposed actions on Comments 5-14 returns the definition of "grounding electrode conductor" to the 2008 NEC code language. The return to 2008 language is appropriate as long as the coordinating changes under Panel 5 actions on comments 5-15, 5-16, 5-17, and 5-18 as well as the Panel 16 proposed actions on other Comments are all accepted. In particular, it is critical that the proposed Panel 16 action on 16-84a for addition of an informational note be accepted to help avoid inconsistency within the code and confusion for users.

5-15 Log #1820 NEC-P05 **Final Action: Reject**
(100.Grounding Electrode Conductor)

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 5-18
Recommendation: Continue to accept the proposal.
Substantiation: The revisions to the term "grounding electrode conductor" clarify its use in connecting equipment and systems covered in Chapter 8 to a grounding electrode. The term grounding conductor used in Chapter 8 should be revised to "grounding electrode conductor" as recommended in coordinated proposals. The revised definition of the term grounding electrode conductor (resulting from accepted Proposal 5-18) provides justification for changing

the term "grounding conductor" to "grounding electrode conductor" where it is used throughout the Chapter 8 Articles and Article 770. Rules should mean what they imply based on the defined terms in those requirements. This comment is part of a broad effort to improve consistency in the use of defined terms related to grounding and bonding throughout the Code. Coordinated comments have been provided to adjust rules within Chapter 8 where the term is used.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-16.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-16 Log #1889 NEC-P05 **Final Action: Reject**
(100.Grounding Electrode Conductor)

TCC Action: The Technical Correlating Committee understands that the term "Grounding Electrode Conductor" is to remain as defined in the 2008 NEC.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-18
Recommendation: Revise text to read as follows:
Grounding Electrode Conductor (GEC). A conductor used to connect the system grounded conductor, equipment, optical fiber cables and raceways, communications system protectors, antenna discharge units, communications cables, or network interface units to a grounding electrode or to a point on the grounding electrode system.
Substantiation: It is recommended that "optical fiber cables and raceways" be added to the list of applications for "grounding electrode conductor" as these provisions are included in Article 770. We are not recommending adding new Article 840 to the definition as a reference is made in 840.100 to 770.100, 800.100 and 820.100 for grounding methods.

The CMP-5 and CMP-16 Task Group has prepared Comments for the individual Sections of Article 770, 800, 810, 820, 830 and 840 where the term "grounding conductor" is used in the 2008 NEC or 2011 ROP Draft and concludes the definition of Grounding Conductor should be deleted in Article 100 Articles.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Reject
Panel Statement: The term as presently defined in 2008 NEC covers a conductor from any system grounded conductor or any equipment, including all types of communications equipment, to the grounding electrode or a point on the grounding electrode system.

The panel understands the proposed actions of Panel 16 at the ROC meeting have addressed the concerns about the technical accuracy of terms and the issue of consistency across the code by revising language in Article 770 and Chapter 8 and adding explanatory information.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:

BOWMER, T.: Affirmative Comment - --- This affirmative ballot for the proposed action on Comments 5-16 along with Panel 5 action on Comment 5-14 returns the definition of "grounding electrode conductor" to the 2008 NEC code language. The return to 2008 language is appropriate as long as the coordinating changes under Panel 5 actions on comments 5-14, 5-15, 5-17, and 5-18 as well as the Panel 16 proposed actions on other Comments are all accepted. In particular, it is critical that the proposed Panel 16 action on 16-84a for addition of an informational note be accepted to help avoid inconsistency within the code and confusion for users.

5-17 Log #2404 NEC-P05 **Final Action: Reject**
(100.Grounding Electrode Conductor)

Submitter: Marcus R. Sampson, Lysistrata Electric
Comment on Proposal No: 5-18
Recommendation: Revise text to read as follows:

Grounding Electrode Conductor (GEC). A conductor used to connect the system grounded conductor, equipment, communications system protectors, antenna discharge units, grounding blocks, communications cables, or network interface units to a grounding electrode or to a point on the grounding electrode system.
Substantiation: "Antenna discharge unit" is defined in ANSI/UL 452 and consists of a gap, a fixed resistance or other discharge element, or a combination of such features, connected between each antenna lead-in terminal and a grounding terminal. While these devices may still be commercially available, they are no longer used in the antenna industry – they use a simple "ground block" (which technically is not an antenna discharge unit) and which is connected to the grounding electrode system, via a GEC.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-16.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

1-62 Log #1454 NEC-P01 **Final Action: Reject**
(100.Guarded)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-88
Recommendation: Accept the proposal with the following revisions:

Covered, fenced, enclosed, or otherwise protected by means of rails, screens, posts, or other approved means, or located on platforms or heights to minimize the likelihood of accidental contact by persons and objects.
Substantiation: Panel agrees guarding does not remove possibility of contact to zero. Present wording removes the likelihood of close approach by qualified and authorized persons for the purpose of adjustment, inspection, and servicing of guarded equipment.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided sufficient technical substantiation for the change according to the panel's action and statement on Proposal 1-88.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-63 Log #1453 NEC-P01 **Final Action: Reject**
(100.Identified (as applied to equipment))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-90
Recommendation: Accept the proposal.
Substantiation: Equipment may be suitable for more than one purpose, function, or use. Application and environment should be covered in provisions that are not NEC requirements, per se.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects. In addition, the panel reaffirms its position as stated in the panel statement of Proposal 1-90.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-64 Log #1579 NEC-P01 **Final Action: Accept**
(100.Interrupting Capacity (New))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 1-93
Recommendation: Continue to reject this proposal.
Substantiation: The action to reject this proposal was correct, but let me suggest two additional reasons for doing so.

First, the words "interrupting capacity" were changed to "interrupting rating" in 110.9 in the 1978 NEC, recognizing that this is the correct terminology. Attempts were made in the 1993 and 1996 cycles to introduce a difference between "interrupting rating" and "interrupting capacity" in Article 240. Both attempts failed, with CMP10 stating, "The equipment is marked for its usage with its interrupting rating, as defined and required in the Code. Ratings, as marked, are developed by recognized testing requirements."

Second, no overcurrent protective device (OCPD), with the exception of those that have no "instantaneous" trip function, has the "capacity" to interrupt currents at the level of its interrupting rating. This is especially true of current limiting fuses. In order to test to see if an OCPD has an interrupting "capacity" equal to its interrupting "rating," the device would have to remain closed until the test current reached its peak, then the circuit breaker contacts would have to open or the fuse link melt. But of course this is not how OCPDs work, with the exception of those circuit breakers that have a short time withstand rating equal to their interrupting rating. In other words, a fuse with a 200kA interrupting "rating" never actually interrupts 200kA, particularly if it is current limiting. An examination of the peak current let-through curves for OCPDs makes this obvious. What the interrupting rating of an OCPD actually means is that the device has the capacity to interrupt a "prospective" fault current equal to its interrupting rating, but with the previously stated exception, the actual peak current interrupted will be less, and in most cases, far less.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

5-18 Log #54 NEC-P05 **Final Action: Accept**
(100.Intersystem Bonding Termination)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-21
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the submitter's proposed text that did not intend to delete "bonding" from the definition.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 5-19.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-19 Log #522 NEC-P05 **Final Action: Accept in Principle**
(100.Intersystem Bonding Termination)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 5-21
Recommendation: Revise CMP 5's proposed text to read: "**Intersystem Bonding Termination.** A device that provides a means for connecting communications systems intersystem bonding conductors to the power grounding electrode system."
Substantiation: In revising the submitter's original text, CMP 5 has lost the concept of the bonding of communications systems to power to equalize potentials in the event of lightning or power fault events to one or both systems. Without the bond, it is possible for a difference in potential to exist between the two systems during such events, posing a potential shock hazard.
Panel Meeting Action: Accept in Principle
Revise definition to read as follows:
Intersystem Bonding Termination. A device that provides a means for connecting bonding conductors for communications systems to the grounding electrode system.
Panel Statement: The panel accepts the recommendation in principle but makes editorial revisions. The addition of the word "power" is not accepted as the term "power grounding electrode systems" is not included in any Articles under CMP 5's jurisdiction.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

2-10 Log #1569 NEC-P02 **Final Action: Reject**
(100.Kitchen)

Submitter: Lorenzo Adam, City of Mason/Building-Electrical Inspector / Rep. International Association of Electrical Inspectors
Comment on Proposal No: 2-22
Recommendation: Kitchens. An area with a sink and permanent facilities for food preparation and/or cooking.
Substantiation: Understanding the Committee reasoning for rejecting the proposal, the intention was to differentiate the relation between food preparation and cooking. The food preparation or cooking areas will not comply with the requirements of 210.8(B)(2), due to the fact that these areas are for either "food preparation" or "cooking", not both, as intended by the NEC. Examples of these locations include, food packing facilities, industrial cooking facilities (without food preparation), etc.
Panel Meeting Action: Reject
Panel Statement: The panel reiterates the panel statement in Proposal 2-22 that the definition is intended to have "both" food preparation and cooking. The panel does not intend to include the areas noted in the submitter's substantiation unless they include both cooking and food preparation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: What would constitute "food preparation"? A commercial "food packing facilities" could include facilities where no food preparation (cooking) takes place. These types of situations include areas where pre-packaged food items are packed into smaller packages for grocery stores sales.

2-11 Log #1570 NEC-P02 **Final Action: Reject**
(100.Kitchen)

Submitter: Lorenzo Adam, City of Mason/Building-Electrical Inspector / Rep. International Association of Electrical Inspectors
Comment on Proposal No: 2-22
Recommendation: Kitchens. An area with a sink and permanent facilities for food preparation and/or cooking. Food preparation or cooking areas include, but are not limited to, food packing facilities, industrial cooking establishments, or similar areas.
Substantiation: Understanding the Committee reasoning for rejecting the proposal, the intention was to differentiate the relation between food preparation and cooking. The food preparation or cooking areas will not comply with the requirements of 210.8(B)(2), due to the fact that these areas are for either "food preparation" or "cooking", not both, as intended by theNEC. Examples of these locations include, food packing facilities, industrial cooking facilities (without food preparation), etc.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: A commercial "food packing facilities" could include facilities where no food preparation (cooking) takes place. These types of situations include areas where pre-packaged food items are packed into smaller packages for grocery stores sales.

1-65 Log #1459 NEC-P01 **Final Action: Reject**
(100.Lighting Outlet)

TCC Action: The Technical Correlating Committee directs that this definition be reassigned to Code-Making Panel 18.
Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-94
Recommendation: Accept the proposal.
Substantiation: The connection permitted by 410.62(C)(1), (2), and (3) (attachment plug) is not a direct connection to a lighting outlet. Many receptacle outlets in dwellings are considered outlets for general lighting (no "direct" connection).
Panel Meeting Action: Reject
Panel Statement: Receptacle outlets in dwellings used for general lighting are not lighting outlets, but are receptacle outlets that are permitted in lieu of lighting outlets in accordance with 210.70(A)(1), Exception No. 1. 410.62(C) (1), (2), and (3) do not state that the receptacle to which the electric-discharge fixture is connected by cord and plug is a "lighting outlet". This outlet is a switched receptacle outlet.
An outlet becomes a lighting outlet when a luminaire is directly wired to the branch circuit at the outlet, i.e., not connected to the branch circuit through a plug/receptacle connection.
The panel requests that the Technical Correlation Committee consider reassigning this definition to the Code-Making Panel with more direct responsibility for this definition.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-66 Log #2195 NEC-P01 **Final Action: Reject**
(100.Likely (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-95
Recommendation: Accept the proposal.
Substantiation: "Likely" is a term used over 80 times in the NEC. Without a definition, it is open to various subjective interpretations.
Panel Meeting Action: Reject
Panel Statement: The NEC does not define commonly used terms.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-2 Log #2304 NEC-P08 **Final Action: Reject**
(100.Multioutlet Assembly)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 8-208
Recommendation: Please move all wiring method definitions from their respective 3.xx.2 sections to Article 100.
Substantiation: If the definition of Multioutlet Assembly remains in Article 100, then all 3.xx.2 definitions should be in Article 100. Perhaps the panel can "hold" this comment for next cycle and also forward to CMP-7? Of course, a simpler solution would be to accept ROP 18-7.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 8-92. A Multioutlet Assembly is a unique wiring method that serves code applications other than the raceway function. The inclusion of "Multioutlet Assembly" in Article 100 is appropriate. See 2.2.2.1 of the NEC Style Manual.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

5-20 Log #1018 NEC-P05 **Final Action: Reject**
(100.Neutral Conductor)

Submitter: John Stuckwisch, Barth Electric / Rep. IEJATC Local 481
Comment on Proposal No: 5-23
Recommendation: Neutral Conductor. The conductor connected to the neutral point of the system that is intended to carry <u>*unbalanced*</u> current under normal conditions.
(The word *unbalanced* is added to the definition).
- Or -
Neutral Conductor. The conductor connected to and intended to carry current <u>*away*</u> from the neutral point of the system under normal conditions.
(Rearranged current wording to accommodate the word *away*).
Substantiation: The problem with the current definition of a Neutral Conductor is that it does not differentiate between a Grounded and a Neutral conductor. If someone said: "The grounded conductor is the conductor connected to the neutral point of a system that is intended to carry current under normal conditions." This statement is most certainly true, because a grounded conductor can carry current to the neutral point under normal conditions, it can be connected to the neutral point as well. It is also the 2008 NEC definition of a Neutral Conductor. Because the neutral conductor is a grounded conductor the definition of a neutral conductor needs to further define what makes a neutral conductor unique. The words "unbalanced current" or "unbalanced load" found in 310.15(B)(4)(a) and in 220.61 define the difference between a grounded and neutral conductor. A grounded conductor cannot carry unbalanced current, it either carries all the current or none. Only a Neutral Conductor can carry and unbalanced current under normal conditions. This is why the word "unbalanced" should be added to this definition. The other possible fix is to state that the neutral conductor is the conductor that carries current **away** from the neutral point. This change would also clarify the difference between the neutral and grounded conductor.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The addition of the term "unbalanced" is only correct in parts of the application such as a home run in a multiwire circuit. In other parts, the neutral conductor as defined carries the full circuit current. The neutral current neither flows to or away from the neutral point. A/C current flows alternately in the circuit based on the frequency.
The substantiation regarding differentiating the grounded conductor from the neutral conductor is incorrect. The neutral conductor is generally a "grounded conductor" but "grounded conductors" exist in systems that do not have a "neutral".
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

1-67 Log #2480 NEC-P01 **Final Action: Accept**
(100.Nonlinear Load)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-99
Recommendation: The proposal should be rejected.
Substantiation: In today's electrical environment, the majority of loads are nonlinear to a greater or lesser degree, and any attempt to maintain a list will result in ever increasing confusion as users draw improper inferences from what will inevitably be omitted from such a list. The comment in the voting is correct.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BOYCE, K.: The action taken in the ROP Phase was appropriate. Addition of the proposed text would promote usability of the Code.

1-68 Log #2861 NEC-P01 **Final Action: Accept**
(100. Nonlinear Load)

Submitter: Louis Barrios, Shell Global Solutions / Rep. American Chemistry Council
Comment on Proposal No: 1-99
Recommendation: The panel action should have been to Reject the proposal.
Substantiation: Adding additional lighting examples are not necessary to improve the understanding of the term "nonlinear loads". The present FPN includes "electronic equipment, electronic/electric-discharge lighting, adjustable-speed drive systems, and similar equipment" as examples of non-linear loads. The panel action on this proposal establishes a precedence that the development of any new type of lighting or other non-linear load in the future needs to be added to this list. Panel 1 tends to do a good job rejecting the addition of lists when they do not add additional clarity to the Code. The panel's action on this proposal is an exception.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BOYCE, K.: See my Explanation of Negative on Comment 1-67.

10-1 Log #1324 NEC-P10 **Final Action: Hold**
(100.Overcurrent Protective Device, Branch Circuit)

Submitter: Glossary of Terms Technical Advisory Committee / Marcelo Hirschler,
Comment on Proposal No: 10-2a
Recommendation: Overcurrent Protective Device, Branch-Circuit. A device capable of providing protection for service, feeder, and branch circuits and equipment over the full range of overcurrents between its rated current and its interrupting rating. ~~Branch-circuit overcurrent protective devices are provided with interrupting ratings appropriate for the intended use but no less than 5,000 amperes.~~
<u>FPN: Branch-circuit overcurrent protective devices are provided with interrupting ratings appropriate for the intended use but no less than 5,000 amperes.</u>
Substantiation: The NFPA Technical Advisory Committee on Glossary of Terminology (GOT) was formed by Standards Council to ensure consistency in definitions within the NFPA system.
The Manual of Style requires that definitions be in single sentences and that they not contain requirements. The second sentence of this definition is further clarification or discussion but should not be part of the definition. Moreover it contains a requirement which should not be included in the definition.
CMP 10 might consider revising the definition to make it into a single sentence while eliminating requirements.
It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Hold
Panel Statement: The proposed revision was not suggested or addressed in the proposal stage. In accordance with the RGCP 4.4.6.2.2, this comment is held for process in the next cycle where it will receive the necessary public review.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-2 Log #1325 NEC-P10 **Final Action: Hold**
(100.Overcurrent Protective Device, Supplementary)

Submitter: Glossary of Terms Technical Advisory Committee / Marcelo Hirschler,
Comment on Proposal No: 10-6
Recommendation: Overcurrent Protective Device, Supplementary. A device intended to provide limited overcurrent protection for specific applications and utilization equipment such as luminaires and appliances. ~~This limited protection is in addition to the protection provided in the required branch circuit by the branch circuit overcurrent protective device.~~
<u>FPN: This limited protection is in addition to the protection provided in the required branch circuit by the branch circuit overcurrent protective device.</u>
Substantiation: The NFPA Technical Advisory Committee on Glossary of Terminology (GOT) was formed by Standards Council to ensure consistency in definitions within the NFPA system.
The Manual of Style requires that definitions be in single sentences and that they not contain requirements. The second sentence of this definition is further clarification or discussion but should not be part of the definition. Moreover it contains a requirement which should not be included in the definition.

CMP 10 might consider revising the definition to make it into a single sentence while eliminating requirements. An example follows:

Overcurrent Protective Device, Supplementary. A device intended to provide limited overcurrent protection, beyond that provided by the branch circuit overcurrent protection device, for specific applications and utilization equipment such as luminaires and appliances.

—It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Hold

Panel Statement: The proposed revision was not suggested or addressed in the proposal stage. In accordance with the RGCP 4.4.6.2.2, this comment is held for process in the next cycle where it will receive the necessary public review.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-69 Log #1455 NEC-P01 **Final Action: Reject**

(100.Physical Damage (New))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 1-100

Recommendation: Accept the proposal.

Substantiation: Physical damage is an often used term in the NEC but has no defining criteria to establish what constitutes physical damage to allow uniform conclusions, and allows for widely different interpretations. A slight nick, dent, or scratch constitutes physical damage. Such minor damage that doesn't impair functional qualities, should not be considered physical damage for Code purposes.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its original position of the action taken on Proposal 1-100. The submitter has not provided any evidence that a problem exists with the term as it is currently used in the code.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-70 Log #1495 NEC-P01 **Final Action: Reject**

(100.Physical Damage (New))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 1-100

Recommendation: Accept the proposal with the following revisions:

An occurrence to equipment that impairs its functional qualities such as, but not limited to, protection of conductors or equipment, grounding or bonding, insertion or withdrawal of conductors or cables, proper operation, watertightness, and other functions for which it is designed or intended.

Substantiation: Physical damage can be a nick, scratch, or slight dent. What constitutes physical damage in the NEC sense is subject to wide interpretation, criteria should be provided to promote uniform interpretation.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its original position of the action taken on Proposal 1-100. The submitter has not provided any evidence that a problem exists with the term as it is currently used in the code.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

4-1 Log #55 NEC-P04 **Final Action: Accept**

(100.Power Production Equipment (New))

TCC Action: The Technical Correlating Committee understands that acceptance of this comment recognizes the panel's acceptance of the definition contained in Proposal 15-3 and concurs with its location in 705.2 per panel comment 4-124a.

The Technical Correlating Committee directs that the second sentence of the definition become an Informational Note.

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 15-3

Recommendation: The Technical Correlating Committee directs that this proposal be forwarded to Code-Making Panel 4 for action in Article 705.

This action shall be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

Comment on Affirmative:

ROGERS, J.: I agree with the Panel's action on this comment, however, after further review it is my opinion that the second sentence of the original proposal should either be deleted or moved to an Informational Note as it only provides examples and does not include any enforceable language.

2-12 Log #2695 NEC-P02 **Final Action: Reject**

(100.Power Safe Protector (PSP))

Submitter: Michael Baxter, Energy Safe Technologies Inc.

Comment on Proposal No: 2-27

Recommendation: Same as originally submitted.

Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such

as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent

injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The claims associated with the product are related to the construction of the receptacle itself and its ability to detect thermal failures at the receptacle and related to the "power off" features functioning as a way to meet the tamper resistant receptacle requirements. As such, unless Code-Making Panel 18 accepts comments that would require receptacles be constructed in this manner, the definition is unnecessary.

See the panel actions and statements on Comments 2-46 and 2-55.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-71 Log #1385 NEC-P01 **Final Action: Reject**

(100.Premises (New))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force

Comment on Proposal No: 1-101

Recommendation: Edison Electric Institute recommends Proposal 1-101 be accepted-in-principle and supports the proposed text in Mr. LaBrake's negative ballot statement for the change to include it as a new Informational Annex to describe general information regarding utility electric supply to premises wiring.

Substantiation: Refer to the Informational Annex provided with companion comment submitted on Proposal 1-12 that would contain this proposal's recommendation along with companion comments on Proposals 1-53, 1-79 1-104, and 1-106.

Panel Meeting Action: Reject

Panel Statement: Since the panel has rejected the inclusion of the Informational Annex, the addition of a definition is a moot point.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

ANTHONY, M.: Please refer to my statement on Comment 1-6.

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-6.

1-72 Log #2462 NEC-P01 **Final Action: Reject**

(100.Premises Wiring (System))

Submitter: Michael Hyland, American Public Power Association / Rep. IEEE NESC Committee

Comment on Proposal No: 1-102

Recommendation: Maintain the proposed text of Proposal 1-102 to read as follows:

"**Premises Wiring (System).** Interior and exterior wiring, including power, lighting, control, communication and other signal circuit wiring together with all their associated hardware, fittings, and wiring devices, both permanently and temporarily installed. ~~This includes~~ either (a) ~~wiring~~ from the service point or premises power source to the outlets or (b) where there is no service point, ~~wiring~~ from and including the power source to the outlets ~~where there is no service point.~~

Such wiring does not include wiring internal to appliances, luminaires, motors, controllers, motor control centers, and similar equipment, nor does it include utility equipment and wiring on the utility side of the service point."

Substantiation: Proposal 1-102 should have been accepted and the IEEE NESC Committee supports Mr. LaBrake's negative ballot statement. In addition, the proposed new NESC definition (CP3476) for premises wiring (system) for the 2012 NESC reads as follows:

"premises wiring (system). Interior and exterior wiring, including power, lighting, control, communication and other signal circuit wiring together with all their associated hardware, fittings, and wiring devices, both permanently and temporarily installed either (a) from the service point or premises power source to the outlets or (b) where there is no service point, from and including the nonutility power source to the outlets. Such wiring does not include wiring internal to appliances, luminaires, motors, controllers, motor control centers, and similar equipment, nor does it include utility equipment and wiring on the utility side of the service point."

The IEEE NESC Committee anticipates an altruistic approach in this regard toward harmonization of the two codes. Like the NEC, the NESC is in the process of a public comment period and comments from all concerned parties are invited and needed. See the preprint draft of the 2012 NESC now available for public comment at http://standards.ieee.org/nesc/nesc_preprint.html.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action and statement taken on Proposal 1-102.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

ANTHONY, M.: Please refer to my statement on Comment 1-6.

LABRAKE, JR., N.: The comment and related proposal 1-102 do provide clarity and usability for the Code relative to premises wiring beginning where the utility supply ends at the service point. By accepting this comment, there will be common definitions of this term in the NEC and NESC toward harmonization of these ANSI documents.

8-3 Log #432 NEC-P08 **Final Action: Reject**
(100.Raceway)

Submitter: Terry Peters, The Society of the Plastics Industry
Comment on Proposal No: 8-7
Recommendation: Accept this proposal.
Substantiation: SPI requests that the panel reconsider and accept this proposal in order to incorporate changes that were made in the 2008 NEC. Specifically, Article 352 has changed Rigid Nonmetallic Conduit to Rigid Polyvinyl Chloride Conduit. Also please note the word "metal" appears to have been omitted from Liquidtight Flexible Metal Conduit.

Acceptance of this proposal will correlate with the proper names for the above mentioned raceways and in addition add mention of other raceways that have not been included. Why would the panel want to mention only selected (mostly metallic) raceways in its list of raceway types and not mention all the newer plastic raceways?

Panel Meeting Action: Reject

Panel Statement: The change proposed does not improve usability or clarity. It is not the intent of the definition to provide a list of every possible example of a raceway. The definition clearly defines a raceway and provides some examples to facilitate the users understanding of the definition.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-4 Log #1436 NEC-P08 **Final Action: Reject**
(100.Raceway)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-10
Recommendation: Accept the proposal.
Substantiation: Please reconsider the substantiation. The wiring methods are or are not raceways since the definition of raceway is not limited to the items listed, and interpretations whether these wiring methods constitute a raceway can vary.

Panel Meeting Action: Reject

Panel Statement: The change proposed does not improve usability or clarity. It is not the intent of the definition to provide a list of every possible example of a raceway. Additionally, attempting to list wiring methods that are not raceways would create an unwieldy list that would likely generate more confusion than clarity. The definition as it stands clearly defines a raceway and provides some examples to facilitate the users understanding of the definition.

As stated in the panels response to ROP 8-10 while cablebus and auxiliary gutters are used in some ways like raceways, their restriction of use prevents them from automatically being grouped with raceways.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-5 Log #2481 NEC-P08 **Final Action: Accept**
(100.Raceway)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-10
Recommendation: Continue to reject the proposal.
Substantiation: The panel statement is correct, and some historical information may prove useful to readers. The clear implication presented by the choice of wiring methods listed in the current definition is that raceways are for extended lengths of run, and that more limited enclosed channels such as those within equipment are not to be so classified. This interpretation has been thoroughly tested. If any such enclosed channel were classified as a raceway, then surely an auxiliary gutter would be so classified. In the 1993 NEC cycle CMP 8 initially accepted a proposal to place "auxiliary gutters" into the list, and then unanimously reversed course in the face of negative comments from this comment submitter, NEMA, and others. The issues of auxiliary gutters and panelboard gutter spaces is particularly pressing because 230.7 forbids the sharing of raceways between service conductors and other conductors. If such enclosures are deemed to be raceways, then much service wiring as we know it could be construed as contrary to the NEC.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

1-73 Log #1386 NEC-P01 **Final Action: Reject**
(100.Restricted Access (New))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-104
Recommendation: Edison Electric Institute recommends Proposal 1-104 be accepted and supports the proposed text in Mr. LaBrake's negative ballot statement for the change to include it as a new Informational Annex to describe general information regarding utility electric supply to premises wiring.
Substantiation: Refer to the Informational Annex provided with companion comment submitted on Proposal 1-12 that would contain this proposal's recommendation along with companion comments on Proposals 1-53, 1-79, 1-101, and 1-106.

Panel Meeting Action: Reject

Panel Statement: Since the panel has rejected the inclusion of the Informational Annex, the addition of a definition is a moot point.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

ANTHONY, M.: Please refer to my statement on Comment 1-6.

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-6.

5-21 Log #1435 NEC-P05 **Final Action: Accept in Principle**
(100.Separately Derived System)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-28
Recommendation: Accept the proposal.
Substantiation: Please reconsider the substantiation. Direct electrical connections between separately derived systems and other systems are provided by metal covered cables and metal raceways between the two where connected to metal enclosures which are grounded and connected to a grounding electrode which is an electrical connection between the two systems. How can this provision be accomplished without requiring nonmetallic wiring methods between systems and separate grounding electrode systems not bonded together?

Panel Meeting Action: Accept in Principle

Revise the definition of Separately Derived System, in Article 100, to read as follows:

Separately Derived System. A premises wiring system whose power is derived from a source of electric energy or equipment other than a service. Such systems have no direct connection from circuit conductors of one system to circuit conductors of another system, other than connections through the earth, metal enclosures, metallic raceways, or equipment grounding conductors.

Panel Statement: The panel included the submitter's concerns into the revised definition to simplify it and add clarity.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

4-2 Log #1327 NEC-P04 **Final Action: Accept**
(100.Service Conductors, Underground)

TCC Action: The Technical Correlating Committee notes that the NEC Style Manual does not require that definitions be a single sentence.
Submitter: Glossary of Terms Technical Advisory Committee / Marcelo Hirschler,
Comment on Proposal No: 4-15
Recommendation: Service Conductors, Underground. The underground conductors between the service point and the first point of connection to the service-entrance conductors in a terminal box, meter or other enclosure, inside or outside the building wall. ~~Where there is no terminal box, meter, or other enclosure, the point of connection is considered to be the point of entrance of the service conductors into the building.~~
FPN: Where there is no terminal box, meter, or other enclosure, the point of connection is considered to be the point of entrance of the service conductors into the building.
Substantiation: The NFPA Technical Advisory Committee on Glossary of Terminology (GOT) was formed by Standards Council to ensure consistency in definitions within the NFPA system.
The Manual of Style requires that definitions be in single sentences and that they not contain requirements. The second sentence of this definition is further clarification or discussion but should not be part of the definition. Moreover it contains a requirement which should not be included in the definition.
CMP 4 might consider revising the definition to make it into a single sentence while eliminating requirements.
It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-3 Log #2256 NEC-P04 **Final Action: Accept in Principle**
(100.Service Drop)

Submitter: Roger D. McDaniel, Georgia Power Company
Comment on Proposal No: 4-8
Recommendation: Revise as follows:
Service Drop. The overhead conductors between the utility **distribution** electric supply system and the service point.
Substantiation: The panel action should have been "Accept in Part in Principle", to change "utility distribution" system to "utility electric supply" system
The term "distribution" restricts application of this definition to overhead services supplied from utility distribution systems, which typically operate at voltages up to an including 34.5 kV. The term "distribution" excludes services operating at voltages above 34.5 kV. The term "electric supply" is more general, and will include utility overhead services supplied from both distribution and transmission systems.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
Service Drop. The overhead conductors between the utility ~~distribution~~ electric supply system and the service point.
Panel Statement: The panel changed the comment text to reflect the original intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-4 Log #1809 NEC-P04 **Final Action: Reject**
(100.Service Drop, FPN)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 4-5
Recommendation: Revise as follows:
FPN: For further information, see ANSI/UL 1203~~2006~~ 1999
Substantiation: The panel action should have been to accept in part as there was no justification presented in the proposal addressing the FPN document update change from the 1999 referenced document to the 2006 referenced document.
Panel Meeting Action: Reject
Panel Statement: The submitter did not submit material that relates to the current edition of the Code.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-5 Log #2257 NEC-P04 **Final Action: Accept**
(100.Service Lateral)

Submitter: Roger D. McDaniel, Georgia Power Company
Comment on Proposal No: 4-16
Recommendation: Revise as follows:
Service Lateral. The underground conductors between the utility ~~distribution~~ electric supply system and the service point
Substantiation: The panel action should have been "Accept in Principle", to change "utility distribution" system to "utility electric supply" system. The proposed definition of "Service Lateral" should read as follows:
The term "distribution" restricts application of this definition to underground services supplied from utility distribution systems, which typically operate at voltages up to and including 34.5 kV. The term "distribution" excludes services operating at voltages above 34.5 kV. The term "electric supply" is more general, and will include utility underground services supplied from both distribution and transmission systems.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

10-3 Log #1719 NEC-P10 **Final Action: Reject**
(100.Short-Circuit Current Rating)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 10-5
Recommendation: Revise the text of the 2008 NEC as follows:
Short-Circuit Current Rating. The prospective symmetrical fault current at a nominal voltage the ~~to which an~~ apparatus or system is identified ~~able~~ to be supplied by ~~connected~~ without sustaining damage exceeding defined acceptance criteria.
Substantiation: This Comment intends to respond to the Panel Statement in rejecting the Proposal as well as include portions of the negative vote by Mr. Cook and Hidaka with the effort to improve the definition.
The Panel states "A component, such as a contactor, or a system, such as an industrial control panel, has a short-circuit current rating." So, the proposed revision is intended to recognize the information provided by the Panel. The phrase "identified to be supplied by" seems much more correct than "able to be connected." Mr. Hidaka states the word "able" should be replaced with the word "identified" as "able" suggests any application where a connection can be made which ignores the rating of the device. I agree!
Panel Meeting Action: Reject
Panel Statement: The proposed use of the word "identified" introduces confusion into the definition and the existing text adequately defines the term. There are a number of components that are not "identified" with a short circuit current rating such as those noted in the UL 508A SB Table 4.1. This table is used by control panel builders to assign industry accepted ratings to components that are not identified with a short circuit current rating. Panel reaffirms their rejection and statement on proposal 10-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
COOK, D.: I disagree with Panel action and Panel Statement. Panel indicates the use of the defined term "identified" introduces confusion based on the fact that some components of a control panel are not identified with a short circuit current rating. The UL White Book indicates "components" are incomplete in construction or restricted in performance capabilities and not recognized for use as field-installed components. The NEC is an installation code, not a product standard. The components without short circuit current ratings appear to become part of an overall product that will have a short circuit current rating. In the NEC context, the submitted text proposed in Comment 10-3 is clear and improves clarity.

1-74 Log #1387 NEC-P01 **Final Action: Reject**
(100.Supervised Installation (New))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 1-106
Recommendation: Edison Electric Institute recommends Proposal 1-106 be accepted-in-principle and supports the proposed text in Mr. LaBrake's negative ballot statement for the change to include it as a new Informational Annex to describe general information regarding utility electric supply to premises wiring.
Substantiation: Refer to the Informational Annex provided with companion comment submitted on Proposal 1-12 that would contain this proposal's recommendation along with companion comments on Proposals 1-53, 1-79, 79, 1-101, and 1-104.
Panel Meeting Action: Reject
Panel Statement: Since the panel has rejected the inclusion of the Informational Annex, the addition of a definition is a moot point.
Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: Please refer to my statement on Comment 1-6.
LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-6.

1-75 Log #2117 NEC-P01 **Final Action: Reject**
(100.Supervised Installation (New))

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facility Executives
Comment on Proposal No: 1-105a
Recommendation: Accept the proposal in Principle in Part. Define "*supervised installation*" as follows:
Supervised installation. A facility, or portion of a facility where each of the following conditions are met:
(1) Conditions of design and installation are provided under engineering leadership and guidance.
(2) Qualified persons with documented training and experience provide maintenance, monitoring, and servicing of the system.
(3) Where electric service and electrical maintenance is continuously provided by a single building management.
Substantiation: The concept of a supervised installation is embedded in many NFPA documents and needs to be integrated into the NEC in order for the NEC users to balance risks across a broad array of installation types.

Our industry would like to leverage the advantage it has in its highly trained, 7/24/365 operations and maintenance staffs with respect to capital outlay; an extension of the "constantly attended location" concept seen in other life safety infrastructure.

A common understanding of a supervised installation will build the foundation for harmonization between the NEC and NESC.
Panel Meeting Action: Reject
Panel Statement: The proposed text in the comment places requirements in a definition that is in violation of 2.2.2 of the NEC Style Manual.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

ANTHONY, M.: Even if I had suggested to the committee the revision shown below-- to correct the self-referencing error in the proposed definition--the committee would not have approved this proposal.

[(1) Conditions of design and installation construction are provided under engineering leadership and guidance.]

The self-referencing error is minor in comparison to the opportunity lost. The distinction between a supervised, and an unsupervised installation is a significant concept--especially in a document where both prescriptive and performance-based language appears.

We see "supervised industrial installation" explicitly defined in Article 240. My proposal was intended to accumulate all the references to a more general type of supervised installation that is not necessarily of an industrial nature. We have appearances of the term in Section 215.2(B)(3), in Section 685.1, in Section 396.10(B), and in many other places in the NEC.

The presence of supervision (i.e. hands-onmanagement) or absence of it, is significant in mediating the trade-off between first cost versus operations and maintenance; between a fully trained, on-site 7/24/365 maintenance staff and an off-site, on-call contract maintenance staff. Users of the NEC, educational facility managers among them, have to make decisions about staffing every day. They need to know whether these staffing decisions cause them to fall out of compliance with the NEC. Conversely, they need to know how NEC requirements affect their staffing. A definition like this would have helped.

A version of this proposal will be submitted to the NFPA 70B technical committee

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12-1 Log #56 NEC-P12 **Final Action: Accept**
(100.Uninterruptible Power Supply (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-3
Recommendation: The Technical Correlating Committee directs that the action on this proposal be rewritten to comply with 2.2.2 of the NEC Style Manual.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to rewrite the proposal to comply with 2.2.2 of the NEC Style Manual.

See panel action on Comment 12-2.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-2 Log #1326 NEC-P12 **Final Action: Accept**
(100.Uninterruptible Power Supply)

Submitter: Glossary of Terms Technical Advisory Committee / Marcelo Hirschler,
Comment on Proposal No: 12-3
Recommendation: Uninterruptible Power Supply. A power supply used to provide power to a load for some period of time in the event of a power failure. ~~In addition, it may provide a more constant voltage and frequency supply to the load, reducing the effects of voltage and frequency variations.~~

FPN: In addition, it may provide a more constant voltage and frequency supply to the load, reducing the effects of voltage and frequency variations.
Substantiation: The NFPA Technical Advisory Committee on Glossary of Terminology (GOT) was formed by Standards Council to ensure consistency in definitions within the NFPA system.

The Manual of Style requires that definitions be in single sentences and that they not contain requirements. The second sentence of this definition is further clarification or discussion but should not be part of the definition.

CMP 12 might consider revising the definition to make it into a single sentence while not including requirements.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

MARCOVICI, S.: The proposed definition must be revised to reflect the definitions used by the industry and found in the technical literature. One such definition, found in the Webster's dictionary and in the PC Magazine encyclopedia reads as follows: "A devise that provides battery backup when the electrical power fails or drops to an unacceptable voltage level."

12-3 Log #2458 NEC-P12 **Final Action: Accept in Part**
(100.Uninterruptible Power Supply (New))

Submitter: John R. Kovacik, Underwriters Laboratories Inc.
Comment on Proposal No: 12-3
Recommendation: Revise the definition in the Panel Meeting action as follows inserting the words "alternating current" which were in the original proposal.

Uninterruptible Power Supply. A power supply used to provide alternating current power to a load for some period of time in the event of a power failure. In addition, it may provide a more constant voltage and frequency supply to the load, reducing the effects of voltage and frequency variations.
Substantiation: An Uninterruptible Power Supply, as defined in the scope of UL 1778 and IEC 62040-1, Standards for Uninterruptible Power Systems, provides only alternating current power. Products which provide DC power in the event of a power failure are categorized as standby power supplies, and are covered under UL 1012, the Standard for Power units Other Than Class 2 or UL/IEC 60950-1, the Standard for Information Technology Equipment.
Panel Meeting Action: Accept in Part
Panel Statement: The panel accepts insertion of the words "alternating current" as provided by the submitter.

The panel does not accept the remainder of the submitter's text. This addition of the text "alternating current" will modify the 1st sentence of the definition in Comment 12-2.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-76 Log #2878 NEC-P01 **Final Action: Reject**
(100.Voltage Drop (New))

Submitter: Paul A. Keleher, Paul Keleher Electrical Services
Comment on Proposal No: 1-108
Recommendation: Accept Proposal 1-108.
Substantiation: If the inclusion of common electrical terms is not needed in the NEC, then why does it contain 3 separate definitions of the word, "voltage"? Is there any more common electrical term than that? This proposal would simply add a fourth definition to follow the other three
Panel Meeting Action: Reject
Panel Statement: The submitter has not cited any instances of persons being confused over what voltage drop is.

In addition, the comment does not conform to 4.4.5(d) of the NFPA Regulations Governing Committee Projects.

The panel also reiterates that the Scope of Article 100 excludes "commonly defined" terms.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-77 Log #48 NEC-P01 **Final Action: Reject**
(100.Voltage, Low; Voltage, Medium; Voltage, High (New))

Submitter: Paul Guidry, Fluor Enterprises, Inc.
Comment on Proposal No: 1-109
Recommendation: Accept the proposal.
Add new definitions to Article 100 as follows:
Voltage, Low. A class of nominal system voltages less than 1,000 V.
Voltage, Medium. A class of nominal system voltages equal to or greater than 1,000 V and less than 100,000 V.
Voltage, High. A class of nominal system voltages equal to or greater than 100,000 V.
Substantiation: I agree with the panel that the terms for high voltage and medium voltage are inconsistent within various standards. But, since the NEC is expanding the scope to more medium voltage and high voltage applications, I think Article 100 should define what these terms mean at least in the NEC. I think anyone on the panel would agree that "high voltage" does not start at 600V as is defined in 490.2.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.
The panel reaffirms its panel statement on Proposal 1-2.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
ANTHONY, M.: Voltage classifications--riddled with contextual paradoxes as they are--can be regarded, if not justified, as "terms of art".

ARTICLE 110 — REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

1-79 Log #498 NEC-P01 **Final Action: Reject**
(110.3(A), FPN)

Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 1-111
Recommendation: Reconsider and reject this proposal.
Substantiation: The term "may be" leads the inspector to believe he must accept a certificate. This revised wording only confuses the present requirements in 110.3(A)(1). Current language is better. Reject this proposal.
Panel Meeting Action: Reject
Panel Statement: The submitter has presented no evidence to support the claim that "may be" leads an inspector to accept a certificate, or that it leads an inspector to do anything at all.
The proposed FPN only states that special conditions of use may be found on a certificate. This is certainly not new. Such conditions have been shown on equipment, on certificates, and in user manuals for decades.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-80 Log #1587 NEC-P01 **Final Action: Accept in Principle in Part**
(110.3(A)(1), FPN 2)

Submitter: Jim Pauley, Schneider Electric
Comment on Proposal No: 1-111
Recommendation: Revise the second sentence of the informational note as follows:
Special conditions of use or other limitations ~~and other pertinent information~~ may be marked on the equipment, included in the product instructions or included in the appropriate listing and labeling guide information. ~~or on an accompanying certificate.~~
Substantiation: As Mr. Boyce points out in his negative vote, the use of the term "certificate" creates unneeded confusion because of how the term is used with respect to some conformity assessment schemes. The suggested revision in this comment would remove that term and replace it with the more direct ways that limitations are provided. The following substantiates the changes:
- add "or other limitations" in place of "other pertinent information" to follow "special conditions of use" to specifically note that the information sources are important because they may contain limitations on the use of the product that are not evident unless the sources are consulted.
- remove the words "or on an accompanying certificate" and replace them with a reference to the product instructions and to the listing and labeling guide information. These are the two additional sources (in addition to the product markings) where the information on limitations can be found.
Panel Meeting Action: Accept in Principle in Part
In the recommended wording, revise the second sentence of the Informational Note as written in the comment to read as follows:
"Special conditions of use or other limitations and other pertinent information may be marked on the equipment, included in the product instructions or included in the appropriate listing and labeling information."
The panel does not Accept the deletion of the wording "other pertinent information".
Panel Statement: The panel accepts the revision to add "included in the product instructions or included in the appropriate listing and labeling information", and to delete "or on an accompanying certificate".
The panel deleted the use of the word "guide" as it is too restrictive.
The panel rejects the deletion of "and other pertinent information", because this phrase includes conditions such as "limitations" and allowances that may not be evident, unless the sources are consulted.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-81 Log #2455 NEC-P01 **Final Action: Accept in Principle**
(110.3(A)(1), FPN 2 (New))

Submitter: John R. Kovacik, Underwriters Laboratories Inc.
Comment on Proposal No: 1-111
Recommendation: Reject the proposal.
Substantiation: The addition of new text in the FPN to address "certificates" is not needed based on the existing text in the FPN and/or 110.3(B). The proposed new FPN is extraneous and provides no added benefit to code users.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 1-80.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-82 Log #1262 NEC-P01 **Final Action: Accept**
(110.3(B))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 1-118
Recommendation: We support the panel's action of rejection of this proposal.
Substantiation: Removing the wording "listing and labeling" will have many additional consequences.
An example of what could be at issue is found in Proposal 2-80, item six (6) "Many manufactures continue to stipulate in their owner's use and operation manuals that the appliance is not to be connected to GFCI-protected outlet." This would allow a manufacture's document to circumvent the National Electrical Code section 210.8(A)(2).
Instructions for listed and labeled equipment are reviewed for compatibility with the NEC. Code users are never "required" to violate Code requirements and 90.4, 110.2 and 110.3(A) clearly support this. In the event an error in instructions is identified, it should be brought to the attention of the manufacturer, the listing or labeling body, and the standards developing organization.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-83 Log #1263 NEC-P01 **Final Action: Accept**
(110.3(B))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 1-117
Recommendation: We support the panel's action of rejection this proposal.
Substantiation: Removing the wording "listing and labeling" will have many additional consequences.
An example of what could be at issue is found in Proposal 2-80, item six (6) "Many manufactures continue to stipulate in their owner's use and operation manuals that the appliance is not to be connected to GFCI-protected outlet." This would allow a manufacture's document to circumvent the National Electrical Code section 210.8(A)(2).
Instructions for listed and labeled equipment are reviewed for compatibility with the NEC. Code users are never "required" to violate Code requirements and 90.4, 110.2 and 110.3(A) clearly support this. In the event an error in instructions is identified, it should be brought to the attention of the manufacturer, the listing or labeling body, and the standards developing organization.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-84 Log #1434 NEC-P01 **Final Action: Reject**
(110.3(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-118
Recommendation: Accept the proposal with the following revisions:
Equipment covered by this Code shall be installed and used in accordance with the listing or labeling or manufacturers' instructions, if any, provided they do not constitute a violation of Code provisions.
Substantiation: This provision should also apply to unlisted and unlabeled equipment, provided there is no code violation.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.
See the panel action on Comments 1-82 and 1-83.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-85 Log #1433 NEC-P01 **Final Action: Reject**
(110.8)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-123
Recommendation: Accept the proposal with the following revisions:
The wiring methods covered in this Code if identified for the uses shall be permitted to be installed in or on any type of
(1) Building or other structure
(2) Occupancy
(3) Premises, except as otherwise provided in this Code.
Substantiation: "Recognized" is not NEC defined. Many of the "recognized" (covered in this Code, presumably) are not suitable or permitted for all installations. Structures other than "buildings" should be noted, also, "on" buildings or other structures, and on premises where there is no occupancy or structures.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-86 Log #1720 NEC-P01 **Final Action: Reject**
(110.9)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 1-126
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
110.9 Interrupting Rating. Equipment intended to interrupt current at fault levels shall have an interrupting rating not less than the current that is available, at the nominal circuit voltage, ~~and the current that is available~~ at the line terminals of the equipment. Equipment intended to interrupt current at other than fault levels shall have an interrupting rating not less than the current that must be interrupted at the nominal circuit voltage ~~not less than the current that must be interrupted~~.
Informational Note: See 240.86 that permits the downstream circuit breaker in a series combination to have a rating lower than the available short-circuit current.
Substantiation: Since the Panel objected to including the permitted application of the lower rated circuit breaker installed in a series combination, the concept is included in a proposed Informational Note. The suggested reorganization of the sentences is intended to give emphasis to the current that must be interrupted rather than the voltage. When short circuit studies are performed, it is the current, at the operating nominal voltage, that requires emphasis.
Note also that the definition of "Interrupting Rating" in Article 100 emphasizes the current at the rated voltage.
Panel Meeting Action: Reject
Panel Statement: The proposed change does not enhance clarity or usability. In addition, the submitter has not adequately substantiated a need for revising the language.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ANTHONY, M.: The submitters's definition of interrupting rating is more accurate--though all Ohmic quantities during a fault vary along a continuum. For practical purposes, this is a better definition, in my view.

1-87 Log #1053 NEC-P01 **Final Action: Reject**
(110.9, FPN)

Submitter: Gregory P. Bierals, Samaritan's Purse World Medical Mission
Comment on Proposal No: 1-128
Recommendation: Accept this proposal to add text as follows:
Providing devices that are capable of interrupting current at fault levels does not assure conductor and equipment protection.
Substantiation: The present wording of 110.9 first paragraph is very misleading. Even though the NEC is not intended as a design specification, this section indicates, that providing equipment which has an interrupting rating that is sufficient for the voltage and current that is available at the line terminals of the equipment is acceptable. This does not assure proper protection.
Panel Meeting Action: Reject
Panel Statement: The comment is not supported by adequate substantiation.
In addition, the panel directs the submitter to the stated purpose of the NEC as it appears in 90.1(A).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
HICKMAN, P.: We agree with the submitters substantiation in Proposal 1-128. To achieve proper conductor and equipment protection, it is necessary to have a detailed system analysis of fault current, the operating characteristics of the overcurrent protective device and provide equipment and conductors with suitable short-circuit ratings. The addition of the FPN would alert the user of the Code that more factors must be in place to assure a safe installation that is stated in 110.9.

1-88 Log #42 NEC-P01 **Final Action: Accept**
(110.10)

Submitter: Code-Making Panel 5,
Comment on Proposal No: 1-129
Recommendation: Revise the text of 110.10 by modifying the second sentence of 110.10 as follows (first and third sentences remain as is): The overcurrent protective devices, the total impedance, the component short-circuit current ratings, and other characteristics of the circuit to be protected shall be selected and coordinated to permit the circuit-protective devices used to clear a fault to do so without extensive damage to the electrical components of the circuit. *This fault shall be assumed to be either between two or more of the circuit conductors or between any circuit conductor and the equipment grounding conductor(s) permitted in 250.118.* ~~or enclosing metal raceway~~. Listed products applied in accordance with their listing shall be considered to meet the requirements of this section.
Substantiation: CMP-5 concurs with the CMP-1 action to accept the addition of term "equipment" in the second sentence and not to include the added phrase "or metal cable tray" as proposed by the submitter. CMP-5 recommends making the term "conductor" dual plural by adding "(s)" as there may be more than one equipment grounding conductor involved in the circuit and return ground fault current path.
CMP-5 recommends deleting the existing code text "or enclosing metal raceway" and replacing it with "permitted in 250.118". 250.118 states "The equipment grounding conductor run with or enclosing the circuit conductors …. " and includes enclosing raceways and cable trays as well as others such as auxiliary gutters.
Addition of reference to 250.118 eliminates the need to create a list of menu items such as enclosing metal raceway or metal cable tray in this section since these are already included in 250.118 along with listed auxiliary gutters and metal tubing.
CMP-5 notes that the proposal as submitted and accepted in principle by CMP-1 appears to create a perception of deleting the first and third sentences. CMP 1 intent seems to be to modify current sentence two only. There was no technical substantiation provided in the proposal 1-129 by the submitter for deletion of the first and the third sentence in 110.10.
The proposed text by CMP 5 is complete for section 110.10 to ensure that first and third sentence remain in the NEC as is and only the second sentence is modified based on proposal 1-129 Log# 617.
This Comment was developed by a CMP-5 Task Group and balloted through the entire panel with the following ballot results:
16 Eligible to Vote
14 Affirmative (Alternate P.J. LeVasseur for Principal D. Hammel and Alternate P.R. Picard for Principal R. Temblador)
2 Ballots Not Returned (D. Brender and G.S. Harding)
No Comments on Affirmative Vote were received.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-89 Log #2189 NEC-P01 **Final Action: Accept in Principle**
(110.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-129
Recommendation: Accept revised as follows:
This fault shall be assumed to be between two or more circuit conductors, or between any circuit conductor, grounding or bonding conductor, grounded metal raceway, grounded metal cable, or other grounded metal enclosures.
Substantiation: A ground fault can occur to other grounded equipment. Overcurrent devices do not detect a fault to ungrounded equipment.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 1-88.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-90 Log #2812 NEC-P01 **Final Action: Accept**
(110.10)

Submitter: Jay Tamblingson, Rockwell Automation
Comment on Proposal No: 1-130
Recommendation: Revise accepted new text as follows:
110.10 Circuit Impedance, Short-Circuit Current Ratings, and Other Characteristics. The branch circuit protective devices, the total impedance, the ~~component~~ equipment short-circuit current ratings, and other characteristics of the circuit to be protected shall be selected and coordinated to permit the branch circuit protective devices used to clear a fault to do so without extensive damage to the electrical ~~components~~ equipment of the circuit. This fault shall be assumed to be either between two or more of the circuit conductors or between any circuit conductor and the grounding conductor or enclosing metal raceway. Listed ~~products~~ equipment applied in accordance with their listing shall be considered to meet the requirements of this section.
Substantiation: The present use of the term "component" and "product" may be interpreted as requiring evaluation of individual internal components of equipment even when the equipment is marked with an overall short circuit current rating as required by other articles or product standards. Changing to the defined term "equipment" provides needed clarity and consistency.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-91 Log #7 NEC-P01 **Final Action: Accept**
(110.12)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 1-139
Recommendation: Continue to reject this proposal.
Substantiation: Panel 12 rejected similar proposals 12-114, 12-146 with the statement. "The requirement is unenforceable. Disposition of removed materials is not a code responsibility. The remaining installation is required to be in accordance with 110.3, which is enforceable."
Panel 3 rejected similar proposals 3-173 and 3-253 with the statement. "The submitter has not provided technical substantiation for the proposed change, and compliance with this requirement would be unenforceable. This is already covered under 90.4 and 110.2.
Panel 16 rejected similar proposals 16-24, 16-122, 16-241 and 16-305 with the statement. "This is an unenforceable requirement. Removing abandoned cable involves pulling unused cable and wiring from conduit, raceways, ducts, shafts and drop ceilings. The objective of the original text is directed at the final installation, that it be "neat and workmanlike", not necessarily the installation (in this case, removal) process. The submitter has provided no substantiation for additional requirements during the removal process."
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-92 Log #8 NEC-P01 **Final Action: Accept**
(110.12)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 1-146
Recommendation: Continue to reject this proposal.
Substantiation: Panel 12 rejected similar proposals 12-114, 12-146 with the statement. "The requirement is unenforceable. Disposition of removed materials is not a code responsibility. The remaining installation is required to be in accordance with 110.3, which is enforceable."
Panel 3 rejected similar proposals 3-173 and 3-253 with the statement. "The submitter has not provided technical substantiation for the proposed change, and compliance with this requirement would be unenforceable. This is already covered under 90.4 and 110.2.
Panel 16 rejected similar proposals 16-24, 16-122, 16-241 and 16-305 with the statement. "This is an unenforceable requirement. Removing abandoned cable involves pulling unused cable and wiring from conduit, raceways, ducts, shafts and drop ceilings. The objective of the original text is directed at the final installation, that it be "neat and workmanlike", not necessarily the installation (in this case, removal) process. The submitter has provided no substantiation for additional requirements during the removal process."
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-93 Log #525 NEC-P01 **Final Action: Accept**
(110.12)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-139
Recommendation: Continue to reject this proposal.
Substantiation: Removing abandoned cable involves pulling unused cable and wiring from conduit, raceways, ducts and drop ceilings that, by its very nature, cannot realistically be performed in a "neat" manner. The objective of the original text is that the final installation be "neat and workmanlike", not necessarily the installation process. The affirmative comment by Mr. Anthony encouraging the submitter to consider proposing a new NEC section to deal with "… demolition hazards, workmanlike electrical demolition with emphasis on abandoned cables …" is inappropriate. The NEC "… covers the installation of electrical conductors, equipment …" [see 90.2(A)] for the purpose of "… safeguarding of persons and property from hazards arising from the use of electricity" [see 90.1(A)]. It is not intended as an instruction manual [see 90.1(C)] for either the installation or the demolition processes.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-94 Log #1432 NEC-P01 **Final Action: Reject**
(110.12)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-135
Recommendation: Accept the proposal.
Substantiation: "Neat and workmanlike" are not NEC defined, are subjective, and per the NEC Style Manual to be avoided without further specifics. If an installation fully complies with the NEC, it is presumed to be safe which is the stated purpose in 90.1. Aesthetics should not be a safety code requirement.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on Proposal 1-135.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-95 Log #1204 NEC-P01 **Final Action: Accept**
(110.12(A))

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 1-141
Recommendation: This proposal should have been Rejected.
Substantiation: This comment supports the "Explanation of Negative Vote" by panel members Mr. Hickman, Mr. Hittinger, and Mr. Labrake for this proposal. Panel 1 removed language for 110.12(A) that protected the user from electrical shock without any substantiation to ensure a safe installation. Metal plugs or metal plates can become energized by incidental contact when installed in nonmetallic enclosures.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-96 Log #2357 NEC-P01 **Final Action: Reject**
(110.12(A))

Submitter: Marcus R. Sampson, Lysistrata Electric
Comment on Proposal No: 1-141
Recommendation: The panel should continue to reject this proposal.
Substantiation: Metal covers and cover plates on non-metallic boxes are required to be bonded to the equipment grounding conductor because of the possibility of becoming energized by a conductor or splice failure within the enclosure. If metal plugs or plates are used to close unused openings and they are not bonded to the equipment grounding conductor, they need to at a minimum, be recessed 1/4-inch to help avoid shock hazard.
Panel Meeting Action: Reject
Panel Statement: The intent of the submitter is unclear. The recommendation is to continue to reject Proposal 1-141, however, the action on this proposal was to accept.
See the panel action on Comment 1-95.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-97 Log #2482 NEC-P01 **Final Action: Accept**
(110.12(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-141
Recommendation: The proposal should be rejected.
Substantiation: The comments in the voting are correct. Until the 2002 NEC the requirement was within the scope of CMP 9, and has actually been in the NEC for over 72 years. When CMP 9 entrusted this requirement to CMP 1, it did so because the centralization in one location of a general requirement served code usability. It never imagined that provisions would be unraveled without technical substantiation. This particular requirement is reflected in the relevant product standards, and directly applies to the common usage of metal cable clamps in fiberglass boxes; if no cable enters the box at such an opening, the metal clamp secures the opening and must not be exposed to routine contact because it would be liable to become energized (defined as capable of energization upon the failure of a single element of insulation). There are many NEC requirements that have stood the test of time and therefore are not the subject of proposals for change; to suggest that a requirement be removed for this reason stands the usual understanding that code changes follow technical substantiation on its head.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-98 Log #2483 NEC-P01 **Final Action: Reject**
(110.12(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-142
Recommendation: The proposal should be accepted.
Substantiation: How can a proposal that adds an additional permission (to add weep holes in the field) be "too restrictive" when such proposals are necessarily less restrictive than the existing text? The panel statement makes no sense. Electricians have added weep holes in the field since electrical enclosures were first used in wet locations, and will continue to do so. Their use improves the safety and durability of electrical installations. How many times have we seen the inside of cast aluminum boxes thoroughly degraded over time when moisture condensed within the enclosure; experienced electricians routinely provide weep holes in the underside that provide enough ventilation to avoid such damage. The rule in 230.53 is merely one example, albeit one with an express code mandate. The Code should say what it means and mean what it says.

As noted in the comment by this submitter on Proposal 1-141, this section was originally within the scope of CMP 9. In the 1996 code cycle (Proposal 9-33) CMP 9 limited the unused opening provision to cable and raceway openings precisely to accommodate weep holes. The submitter of that proposal, the late Creighton Schwan, was one of the greatest participants in the code process in the history of the document. He correctly pointed out that such opening should be clearly permitted, and it is frankly astonishing that CMP 1 is now resisting fixing this oversight. If this is not done, this submitter will seriously consider restoring this allowance through proposals directed at Articles 312 and 314 in the 2014 code making cycle.
Panel Meeting Action: Reject
Panel Statement: Acceptance of the proposed text without any parameters placed on field installed drain holes would result in inconsistent or impossible enforcement of 110.12, e.g.: a 1/2 in. hole could be drilled into an enclosure and called a drain hole by the installer.

In addition, adding a blanket allowance for weep holes in enclosures could inadvertently encourage violation of other code provisions regarding drainage, such as 501.15(F).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-99 Log #524 NEC-P01 **Final Action: Accept**
(110.12(C) (New))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 1-146
Recommendation: Continue to reject this proposal.
Substantiation: Removing abandoned cable involves pulling unused cable and wiring from conduit, raceways, ducts and drop ceilings that, by its very nature, cannot realistically be performed in a "neat" manner. The objective of the original text is that the final installation be "neat and workmanlike", not necessarily the installation process. The affirmative comment by Mr. Anthony (see his comment to Proposal 1-139) encouraging the submitter to "… consider proposing a new NEC section to deal with "… demolition hazards, workmanlike electrical demolition with emphasis on abandoned cables …" is inappropriate. The NEC "… covers the installation of electrical conductors, equipment …" [see 90.2(A)] for the purpose of "… safeguarding of persons and property from hazards arising from the use of electricity" [see 90.1(A)]. It is not intended as an instruction manual [see 90.1(C)] for either the installation or the demolition processes.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-78 Log #1431 NEC-P01 **Final Action: Reject**
(110.13)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-147
Recommendation: Accept the proposal.
Substantiation: This provision should also apply to equipment which is not surface mounted, e.g., flush mounted, chain supported, suspended pushbuttons and other control stations. Firmly attached is not necessarily the same as firmly supported.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-100 Log #2484 NEC-P01 **Final Action: Accept in Principle**
(110.14)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-148
Recommendation: Accept the proposal in principle, using the text as proposed but changing the word "listed" to "identified."
Substantiation: This wording improves on the panel action taken under Proposal 1-149 in two ways. First, it is correctly located as part of the parent text in 110.14, ahead of 110.14(A). This is because the guide card limitations

apply to both "terminal connectors" and "splicing wire connectors" and there is no technical reason to limit the application of this rule to one or the other. Second, the proposed language expressly cites the stranding to be addressed, as requested (correctly) in the NEMA comment in the voting.

CMP 1 may want to consider a delayed effective date for this, the fact that these rules are already enforceable under 110.3(B) notwithstanding. The electrical industry is not remotely prepared for routine enforcement. There are almost no mechanical connectors that meet the guide card limitations, only crimping connectors or ferrules. Most motor leads use finer stranding than Class C concentric, and they are made up by the millions with mechanical connections in the terminal housings. Flexible cords exclusively use fine stranding for obvious reasons and when they land in cord caps and receptacle bodies, they do so in devices that do not have the required markings for stranding class, even on the boxes they come in. All of this can be fixed, and the panel action to go to "identified" as the standard of product acceptance helps in this regard, but it will take some time to get everything in place.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 1-101.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

MONIZ, G.: See My Explanation of Negative to NEMA vote on 1-101.

1-101 Log #1588 NEC-P01 **Final Action: Accept in Principle (110.14(A))**

Submitter: Jim Pauley, Schneider Electric

Comment on Proposal No: 1-149

Recommendation: Replace the 3rd paragraph of 110.14(A) in the ROP draft with the following:

"Connectors and terminals for conductors more finely stranded than Class B and Class C stranding as shown in Chapter 9, Table 10 shall be identified for the specific conductor class or classes and the number of strands."

Add a new Table 10 in Chapter 9 as follows:

Table 10 – Conductor Stranding

Conductor Size		Number of strands		
		Copper		Aluminum
AWG or kcmil	(mm^2)	Class B	Class C	Class B
24 – 30	0.20 – 0.05	[a]	–	–
22	0.32	7	–	–
20	0.52	10	–	–
18	0.82	16	–	–
16	1.3	26	–	–
14 – 2	2.1 – 33.6	7	19	7 [b]
1 – 4/0	42.4 – 107	19	37	19
250 – 500	127 – 253	37	61	37
600 – 1000	304 – 508	61	91	61
1250 – 1500	635 – 759	91	127	91
1750 – 2000	886 – 1016	127	271	127

[a] Number of strands vary.

[b] Aluminum 14 AWG (2.1 mm^2) is not available.

Substantiation: The term "fine stranded conductor" has no meaning in the NEC or in the product standards. If the panel is intent on adding a rule for specification of terminals for other than the standard conductor stranding, it will be necessary to use the same terminology as the product standard. This comment would revise the added paragraph to specifically reference Class B and C stranding. The added paragraph is consistent with 10.12 of UL 486A-B which requires that connectors for other than Class B or C stranding be marked with the conductor class and the number of strands.

In order to define Class B and C stranding, it is necessary to add a table to the NEC that is consistent with the product standards. A new Table 10 to Chapter 9 is proposed. This table comes from UL 486A-B - Table 14. Without this table, Class B and C stranding will have no meaning unless you have a copy of the product standard.

Without providing the full details that can be applied in the field and by the AHJ, the requirement should not appear at all in the NEC.

Panel Meeting Action: Accept in Principle

The panel accepts the placement of the additional text to address fine stranded conductors.

The panel moves the text of the comment from 110.14(A) to the parent paragraph of 110.14 following the existing paragraph.

In addition, the existing FPN will follow the newly recommended text.

Table 10 will be placed in Chapter 9 as proposed by the submitter.

Panel Statement: The recommended text improves clarity and enhances usability.

The placement of this information in 110.14 is more appropriate as it pertains to electrical connections generally.

The panel notes that "Table 10 - Conductor Stranding" is the copyrighted property of UL, and permission for usage has been requested.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

MONIZ, G.: Both the comment and the proposal to which it refers should be rejected. ANSI class designations can include more than one stranding count, and this can create confusion.

1-102 Log #2485 NEC-P01 **Final Action: Accept in Principle (110.14(A))**

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 1-149

Recommendation: Accept the panel action in principle. Use the location and wording from this submitter as set forth the companion comment on Proposal 1-148.

Substantiation: This is a housekeeping comment correlating the panel action in 110.14(A) with that suggested for 110.14.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 1-101.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-103 Log #716 NEC-P01 **Final Action: Accept (110.14(C)(1))**

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 1-153

Recommendation: The Proposal should be accepted in principle and "Table 310.16" should be revised to read "Table 310.15(B)(16)".

Substantiation: Panel 6 Accepted in Principal Proposal 6-52 and renumbered Table 310.16 as Table 310.15(B)(16). Acceptance of this Comment will provide correlation.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-104 Log #1049 NEC-P01 **Final Action: Reject (110.14(C)(1)(b)(3))**

Submitter: Gregory P. Bierals, Samaritan's Purse World Medical Mission

Comment on Proposal No: 1-155

Recommendation: Accept this proposal to add the following new text t:

Conductors extended between devices that have terminals which have differing temperature ratings shall have an ampacity that is based on the lowest temperature rating.

Substantiation: The revised wording is definitely more direct than the present wording and easier to understand and apply.

Panel Meeting Action: Reject

Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

ANTHONY, M.: This is a clean cut, "silver bullet" statement, in an industry that is in need of silver bullets.

1-105 Log #57 NEC-P01 **Final Action: Accept**
(110.16)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 1-164
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Per the actions taken on Comments 1-106 and 1-107, the final wording of 110.16 is to read as follows:
"110.16 Arc-Flash Hazard Warning. Electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that are in other than dwelling units, and are likely to require examination,
adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc flash hazards. The marking shall be
located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment."
Panel Statement: The panel accepts the direction of the Technical Correlating Committee. The term "dwelling unit" refers to a single dwelling that may be within a two-family or multifamily dwelling.
The panel reaffirms its action on Proposal 1-162. Thus, Proposal 1-164 was "Accepted in Principle".
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-106 Log #438 NEC-P01 **Final Action: Accept**
(110.16)

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 1-166
Recommendation: Recommendation is to Accept in Part Proposal 1-166.
Revise the title of the section to "Arc-Flash Hazard Warning" as proposed for subdivision (A) in this proposal.
Reject the remainder of the proposal for the reasons stated by CMP-1 in their original action.
Substantiation: The current title of this section is not accurate. This section does not deal with all aspects of Flash Protection. This section provides a requirement for a warning label on equipment. The proposal introduced a more accurate term in subdivision (A) that is consistent with the requirement in this section.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-107 Log #1721 NEC-P01 **Final Action: Reject**
(110.16)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 1-165
Recommendation: Revise the existing text of the 2008 NEC as follows:
110.16 Flash Protection. For other than one and two-family dwellings, electrical ~~Electrical~~ equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that ~~are in other than dwelling occupancies, and~~ are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.
Substantiation: This section, as revised in the ROP by replacing the term "dwelling occupancies" with "dwelling units," can still lead to varying interpretations. The term "dwelling units" can be interpreted to include, one-family, two-family, and multifamily dwellings as all contain one or more dwelling units. Thus, the phrase "For other than one and two-family dwellings" should be used as shown in the Proposal and in this Comment. These terms are defined in Article 100 and thus the application of the rule is much less likely to be misinterpreted.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action on Proposal 1-162. The term "dwelling unit" refers to a single dwelling that may be within a two-family or multifamily dwelling.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-108 Log #2486 NEC-P01 **Final Action: Accept**
(110.17 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-167
Recommendation: Continue to reject the proposal.
Substantiation: In addition to the panel statement, this subject is fully covered in 300.12 and need not be duplicated in Article 110. As general provision covering wiring methods it does belong in Article 300, the opening article in Chapter 3.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-109 Log #494 NEC-P01 **Final Action: Accept**
(110.22(B))

Submitter: Code-Making Panel 10,
Comment on Proposal No: 1-177
Recommendation: CMP-10 supports the CMP-1 action to Accept in Principle in Part Proposal 1-177.
Substantiation: The Accepted editorial revisions add clarity to the text.
This comment was developed by a CMP-10 Task Group and balloted through the entire panel with the following ballot results:
12 Eligible to vote
12 Affirmative (S.E. Townsend for D.M. Darling)
The following Affirmative Comment on Vote was received:
D.R. Cook stated: "The proposed text from the submitter, nor the CMP-1 action, addressed the substantiation related to questions about what value is required to be provided in the existing blank. A review of NEC text; panel statements, and substantiation for the evolving text since the 1990 NEC, seems to indicate the ampere value that should be included in the blank, is that of the "series combination system". I agree with the submitter, based on field experience as an AHJ, that it is not apparent what is to be field marked in the blank."
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-110 Log #1722 NEC-P01 **Final Action: Reject**
(110.22(B))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 1-177
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:

CAUTION — ENGINEERED SERIES COMBINATION SYSTEM. COMPLY WITH ENGINEER'S INSTRUCTIONS DATED ~~RATED~~ _____ ~~AMPERES~~. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.
Substantiation: The marking requirements of engineered series-combination systems need to be clarified. The previously accepted markings are far too general to be of value to those who are likely to be replacing components after the original installation or modification.
The engineer will include a requirement for a specific overcurrent device, often by make and model or operating characteristic that must be used at both ends of the series-combination. The simple "RATED ____ AMPERES" does not require or provide the information needed for proper replacement of component(s) to ensure the safety contemplated in this rule.
Panel Meeting Action: Reject
Panel Statement: The proposed additional language would be redundant to "Identified replacement components required".
The prescriptive requirements for documentation and marking of the rating are contained in 240.86(A).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-111 Log #493 NEC-P01 **Final Action: Accept**
(110.22(C))

Submitter: Code-Making Panel 10,
Comment on Proposal No: 1-178
Recommendation: CMP-10 supports the CMP-1 action to Accept in Principle in Part Proposal 1-178.
Substantiation: The Accepted editorial revisions add clarity to the text.

This comment was developed by a CMP-10 Task Group and balloted through the entire panel with the following ballot results:

12 Eligible to vote
12 Affirmative (S.E. Townsend for D.M. Darling)

The following Affirmative Comment on Vote was received:

D.R. Cook stated: "The proposed text from the submitter, nor the CMP-1 action, addressed the substantiation related to questions about what value is required to be provided in the existing blank. A review of NEC text; panel statements, and substantiation for the evolving text since the 1990 NEC, seems to indicate the ampere value that should be included in the blank, is that of the "series combination system". I agree with the submitter, based on field experience as an AHJ, that it is not apparent what is to be field marked in the blank."

Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-112 Log #648 NEC-P01 **Final Action: Hold**
(110.23)

TCC Action: The Technical Correlating Committee will appoint a Task Group to study this issue for the 2014 Code cycle.
Submitter: Edward G. Kroth, Verona, WI
Comment on Proposal No: 1-62
Recommendation: Renumber existing 110.23 as 110.24, and install new 110.23 to read as follows:
110.23 Lockable Disconnecting Means. If a disconnecting means is required to be lockable in the open (off) position it shall have the provision for locking or adding a lock to the disconnecting means remain in place at the switch or circuit breaker whether the lock is installed or not. Portable means for adding a lock to the switch or circuit breaker do not meet the standard of this rule and shall not be permitted.
Substantiation: I have to agree with the Code-Making Panel 1's statement that the proposed definition is not appropriate for Article 100. I believe that the present wording and location in Article 110 should be accepted as held for the 2014 NEC code cycle. It is still my opinion that this will allow elimination of repetition in at least 27 code sections over three chapters. Article 110 and its Part I are both titled "General" so including this rule here would allow it to apply to Chapters 1 through 7 inclusive, unless otherwise modified by Chapters 5, 6, and 7.
Panel Meeting Action: Hold
Panel Statement: See the panel action and statement on Comment 1-49.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

FISKE, W.: The comment is being held. This action by CMP-1 makes the comment a proposal for NEC 2014 Code cycle. We note that the proposed Code rule - as expressed in Comment 1-112 - conflicts with the OSHA lockout/tagout rule, as expressed in 29CFR1910.147. In employee workplaces, 29CFR is national law. A different proposal, better aligned with 29CFR1910.147, would better serve Code users.

1-113 Log #1713 NEC-P01 **Final Action: Reject**
(110.23)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-179
Recommendation: Accept the proposal.
Substantiation: For safety reasons, current transformers that are not being used should be short-circuited; personnel may not be aware when a circuit may be energized. Refer to the statement by Mr. McMahill.
Panel Meeting Action: Reject
Panel Statement: It is clear that "potentially" refers to the possibility of becoming energized.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-114 Log #487 NEC-P01 **Final Action: Reject**
(110.24)

Submitter: Pete Baldauf, City of Vandalia
Comment on Proposal No: 1-183
Recommendation: CMP-1 should reject Proposal 1-183 in its entirety.
Substantiation: Proposed 110.24 as written does not increase electrical safety. Fault current is not a static value for two primary reasons:

1. Electrical utilities seldom inform the end user of changes to the distribution system. Routine utility maintenance procedures will often change the available fault current, invalidating a previously posted value.
2. Relatively minor changes to the premises wiring system will often change the available fault current, invalidating a previously posted value.

The proposed text is not retroactive and doesn't address utility changes or changes in the premises wiring. Without provisions requiring re-calculating and re-posting when these types of changes are made, the posted value of the available fault current will often be inaccurate providing a false sense of security. This severely compromises electrical safety.

The ROP for the 2005 edition of the NEC contained a proposal (1-172a) for a similar label to be field applied. This labeling, if it had been approved, would have required that it contain the incident energy available or the level of PPE to be selected to perform work on electrical equipment. The change was proposed to 110.16. It was rejected by the CMP at that time.

Here are some of the explanations for the negative from the panel members at that time:

TROGLIA: EEI agrees that this proposal does identify a safety issue for the electric industry. However, the proposed approach is flawed in that it requires equipment to be marked based on a particular calculation of incident energy made at one moment in time and then expect it to be valid at some future time. This proposed labeling is not reasonable, practical, nor does it provide for adequate personnel safety. In addition, it may result in a false sense of security and a safety hazard in the future. In fact, any calculation or determination of work conditions, as required by the proposal, actually needs to be made and assessed each time and immediately prior to conducting work on energized equipment if personnel safety is to be assured. The current proposal raises several critical questions, for example.

1. Who is responsible for ensuring accurate calculations are made initially and in the future (i.e., AHJ)?
2. Is relabeling required each time the utilities or the customer's system is modified?
3. Is the customer responsible for recalculating the value every time they want to work on an energized system?
4. What obligation does the qualified worker have to verify that the posted values are current and accurate?
5. What obligation does the employer or the qualified worker have to verify their safety and the accuracy of the label?

The issue that is actually raised by this proposal is Safe Work Practices and Procedures; something the utility industry is readily familiar with and for which it has adopted standards for its employees who may be subject to similar or the same work conditions. The millions of existing electrical installations worldwide will not benefit from the labeling of incident energy. Only safe work practice and procedures will assure the safety of the qualified worker for both new and existing installations. While some persons may advocate prohibiting the practice of working on energized equipment, it is realized that it is not practical as there will be some situations where that practice is unavoidable. It is time for the electric industry to establish a good and reasonable set of Safe Work Practices and Procedures for personnel working on energized equipment; practices that, based on evidence provided by the proposer; it has evidently failed to do. The requirements are identified in NFPA 70E and it is a good document to provide and to enforce to accomplish the recognition and use of these Safe Work Practices and Procedures. Some may argue that the work practice requirements would not be applicable for all cases, or may be extreme for some cases, but a good field standard needs to be developed and used. It should be considered reasonable and appropriate to develop a general standard practice to be used instead of trying to "tailor" requirements on a specific basis. While it may be considered extreme for some situations, it would provide a general level of safety for all situations. This is similar to what utilities have done for some time. For example, utility work practices and procedures are the same for its personnel whether they are working on an urban or rural installation of the same type. Therefore, the use, application, reference to or extraction of the requirement of NFPA 70E is recommended either as a stand-alone document or for development of industry wide safe work practices and procedures, especially for working on energized equipment.

STAUFFER: Requiring detailed arc-flash hazard information on electrical distribution equipment is not practical because the incident energy available depends on many factors. It is also subject to change over time due to modifications of the electrical distribution system, or changes by the supplying utility. I addition, the proposed revisions to 110.16 do not specify who is responsible for calculating the incident energy, labeling the equipment, and verifying the available incident energy and labeling. This proposal creates potential legal liability problems for designers, installers, owners, and authorities having jurisdiction.

MINICK: NEMA is a strong supporter of NFPA 70E and safe work practices. However, the proposed revision will create an untenable situation in the context of the NEC. NFPA 70E is only useful if the ENTIRE document is understood and followed. Adding a label to equipment will only serve as a means for individuals to "short-cut" the process and assume they know more than they really do about proper work practice.

The NEC is an installation code and NOT a work practice document. Inspectors cannot reasonably inspect to this requirement. Is the value of the label correct? Which calculation is acceptable? What if the value is wrong? Has the installing contractor and approving inspector taken on the liability for a work practice issue that is not normally in their domain? What if the transformer is changed and the fault current goes up?

Proper work practice requires that the worker understand the present situation he or she is faced with and develop a work plan that is appropriate. Part of that work practice is to do analysis and calculations before you perform the work. The information proposed for the label may make sense for a large industrial that has complete control over their system and has procedures in place to properly utilize the information. But the NEC is not a document just for large industrials, it is applied everywhere. It is difficult to understand, what a typical installer is going to do for the panelboard installed at a convenience store to apply the proper labeling, or if that labeling will mean anything to the individual that may do maintenance work in such a location.

The revision is not appropriate for the NEC.

Although Incident Energy and Available Fault Current are two separate considerations it should be recognized that neither value is static. The values are subject to change and the change can, and usually does, take place without anyone's knowledge.

The logic applied by the panel members in their explanation of the negative vote for the proposal to 110.16 for the 2005 NEC is synonymous to the logic that the panel members should apply to the proposed 110.24. The concerns for safety haven't changed.

Panel Meeting Action: Reject
Panel Statement: The panel continues to support the concepts in Proposal 1-183 as evidenced by its action on Comment 1-115.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-117.

Comment on Affirmative:

ANTHONY, M.: See my statement on Comment 1-115.

1-115 Log #605 NEC-P01 **Final Action: Accept**
(110.24)

Submitter: Donald R. Cook, Pelham, AL
Comment on Proposal No: 1-183
Recommendation: Accept this proposal in principle.

The task group identified in the following substantiation recommends rejection of Proposal 10-72 to achieve correlation with Proposal 1-183. The task group recommends the proposal be accepted in principal as follows:

110.24 Available Fault Current.

(A) Marking. Service equipment in other than dwelling units shall be legibly marked in the field with the maximum available fault current. The field marking(s) shall include the date the fault current calculation was performed and be of sufficient durability to withstand the environment involved.

(B) Modifications. When modifications to the electrical installation occur, that affect the maximum available fault current at the service, the maximum available fault current shall be verified or recalculated as necessary to ensure the service equipment ~~interrupting~~ ratings are sufficient for the maximum available fault current at the line terminals of the equipment. The required field markings(s) in (A) above shall be adjusted to reflect the new level of maximum available fault current.

Exception: The field marking requirements in (A) and (B) shall not be required in industrial installations where conditions of maintenance and supervision ensure that only qualified persons service the equipment.

Substantiation: Proposals 1-183 and 10-72 propose an available short circuit current marking requirement for electrical equipment. Both were Accepted in Principle by CMP-1 and CMP-10, respectively. The Technical Correlating Committee directed a Task Group be formed to determine if comments could be submitted to correlate the two actions. The Task Group was made up of Neil LaBrake, Michael Anthony, Mike Johnston, Vince Saporita, Alan Manche, Carl Fredericks, Jim Dollard, Gil Moniz, and Donny Cook. The task group compared the two Panel Actions and developed Public Comments for each action. The Task Group recommends the marking requirement be located in 110.24 rather than 240.35 based on short circuit current requirements that currently exist in 110.9 and 110.10 and marking requirements that currently exist in 110.22. Based on that consensus, the Task Group recommends Proposal 1-183 be accepted with recommended modifications. The word "maximum" was added in an attempt to clarify the requirements as an equipment rating consideration and not for use in conjunction with arc flash hazard analysis. The other revisions suggested are an attempt by the Task Group to include areas of general agreement into this section after reviewing the actions of both CMP-1 and CMP-10. The Task Group encourages CMP-1 to take all public comments and the CMP-10 action on Proposal 10-72 (copy provided) into consideration in developing this section. See the companion comment for Proposal 10-72.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-117.

Comment on Affirmative:

ANTHONY, M.: Considerable thought has been given to the consequences of our industry's acceptance of this proposal. Educational facility electrical professionals have been polled on this issue several times over the past 10 years. APPA.ORG has entered abstentions for the past three code cycles and now the time is right to submit a clear Yes or No.

These previous abstentions were significant because our vote was the determining vote in forestalling the mandatory requirement for calculating incident energy numbers and placing them on every piece of electrical equipment over 50V, in every building, in every school and campus in America. Even if we could afford it, and electrical safety was the only safety issue we had to deal with, the undertaking was incomprehensibly large.

We also found electrical professional in our industry divided; with opinions lining up pretty much along the same 7-4-1 voting pattern as the interest groups on CMP-1 itself. Flash hazard analysis, asserted through NFPA 70E and carried through on a label required in 110.16, was appreciated -- if for no other reason than it was a way to justify a budget for get circuit diagrams drawn and maintained.

Now comes a proposal with more modest aims (i.e., scalable, more affordable) but with pitfalls of its own. We have had plenty of time -- since about 1999 -- to adjust to the budget impact. It is our hope that acceptance of this proposal will serve the purpose of accelerating development of real-time impedance instrumentation that can be a point on a smart grid just as easily as ammeters and voltmeters. Please refer to the attachment, and IEEE paper, authored by Thomas L. Baldwin, Michael J. Hittel, Lynn F. Saunders and Frank Renovich Jr. titled, "Using a Microprocessor-Based Instrument to Predict the Incident Energy From Arc-Flash Hazards". In case the attachment cannot be duplicated in the ROC document itself, the abstract of this paper is reproduced below:

"To assess the potential arc hazards of a workspace, workers must rely on engineering fault studies to provide vital fault-current data. An instrument, based on a network impedance analyzer, determines the maximum flash-arc incident-energy exposure at a worksite within a few seconds. The digital analyzer measures the power system source impedance, ratio, and the system voltage to predict the bolted fault current and incident energy, while the power distribution system is energized and in normal operation. The instrument computes the incident energy for standard electrical workspaces of an open-air arc and an enclosed box with one open side. Experiments have been conducted to verify the accuracy of the impedance and ratio measurements."

How many of these instruments do we need to build before they become economical enough to include in a standard metering package? Related to the matter or scale is whether an impedance measuring instrument, applied where fault current varies widely, is more cost effective than IEEE 1584 calculation methods. As a respected voice in our industry writes in Comment 119 regarding the practicality of a label for fault current that varies widely: "…The single group of users that might actually be able to have a full understanding of system changes over time is the large industrial users – yet, the panel has exempted them from the requirement. They are actually the ONLY group that could benefit from a label…"

This is an accurate observation, one that applies to many of 100+ small and medium sized district energy cogeneration systems run by the education and health care facilities industry. In other words, where dynamic impedance measuring instrumentation would be most likely to be applied is where it may least be needed because of the knowledgeable staffs that run low and medium voltage installations of about 1-100 megawatts.

The relevance of the NEC as an asset to our industry can be no greater than the new ideas we try to drive through it every three years. The "impedance meter" seems credible enough for a broader industry discussion. We have seen solutions-looking-for-problems in the past. Zone-selective interlocking (ZSI), for example. ZSI's first applications were intended to reduce fault current stress on a bus. Applications were generally sparse. In retrospect, it seems that ZSI-variants have been more widely adapted to solve the electrician safety problem.

In prospect, the NFPA 70-series of documents are on the verge of needing to adapt to greater public focus on the last mile of power distribution, so-called smart grid technology, a re-scaling of the normal and backup power system availability on either side of what, for the moment, is agreed as the demarcation point between serving utility and building premises wiring.

The electrical industry needs to roll in these innovations at greater pace. We'll still need a budget for keeping circuit diagrams up to date, though.

The IEEE document has been submitted to the NFPA 70 staff as part of this proposal is available for public review.

BARRIOS, L.: Although a label will not ensure compliance with the requirements of 110.9, the ACC supports this comment because it includes necessary changes to the language accepted in Proposal 1-183 during the proposal stage. Failure of this comment, developed by a TG consisting of CMP1 and CMP10 members, would result in acceptance of the language approved during the proposal stage, which is not desirable. Additional modifications that would address some of the concerns stated in the numerous comments on this proposal include 1) locating the proposed language in 110.9, which would clarify that the labeled fault current applies to the interrupting rating of equipment only and therefore not appropriate to use in arc flash calculations, and 2) limiting the scope to services 600V nominal or less.

NEWMAN SCEARCE, S.: While I support the work of the task group, I also feel there is a need to specify the label type, size and location of the information required.

1-116 Log #1222 NEC-P01 **Final Action: Reject**
(110.24)

Submitter: Ron Shapiro, HP Critical Facilities Services Delivered by EYPMCF
Comment on Proposal No: 1-183
Recommendation: Delete text as follows:

~~**110.24 Available Fault Current**~~

~~**(A) Field Marking. Service equipment in other than dwelling units shall be legibly marked in the field with the available fault current. The field marking(s) shall include the installation date and be of sufficient durability to withstand the environment involved.**~~

~~**(B) Modifications. When modifications to the electrical installation occur, that affect the available fault current at the service, the available fault current shall be verified or recalculated as necessary to ensure the service equipment interrupting ratings are sufficient for the available fault current at the line terminals of the equipment. The required field marking(s) in (A) above shall be adjusted to reflect the new level of available fault current.**~~

Substantiation: If available fault current is marked on equipment, it will almost always be established conservatively, so that the value is artificially high. Often it will be calculated using an infinite primary transformer calculation. This is satisfactory for interrupting capacity and withstand comparisons for equipment selection, but could result in death to an electrical worker that uses this information to determine incident energy values. When marked fault current is artificially high, it will often result in theoretically faster acting inverse time overcurrent protective device; lower incident energy and eventually a lower PPE requirement will result. An electrical worker performing testing or other energized work may be hurt or killed from inadequate PPE selection stemming from the use of artificially high fault current values.
Panel Meeting Action: Reject
Panel Statement: The panel continues to support the concepts in Proposal 1-183 as evidenced by its action on Comment 1-115.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-117.

Comment on Affirmative:

ANTHONY, M.: See my statement on Comment 1-115.

1-117 Log #1322 NEC-P01 **Final Action: Reject**
(110.24)

Submitter: Neil F. LaBrake, Jr., National Grid USA
Comment on Proposal No: 1-183
Recommendation: Reject this proposal and delete suggested text.
Substantiation: This proposal should be rejected based on the following rationale.

1. Some utilities publish tables of available fault current at the secondary terminals of the lowest impedance transformers they provide based on an infinite supply bus of radial distribution systems. These are usually for service voltages below 600 volts. For example, see Section 9.3 of our Company's ESB 750 (http://www.nationalgridus.com/electricalspecifications). Higher voltage services, i.e. greater than 1000 volts are engineered where the utility would provide available characteristics at the time of design/installation from the supply at the service point. These two provisions can change, as the utility system is dynamic. Those described for under 600 volts are now being changed in our Company to reflect the new efficiency standards of distribution transformers.

2. With the advent of Smart Grid systems, the available fault current can change very quickly. Posting of the maximum available fault current supports the mistaken belief that that is the worst case. While it is for equipment ratings, it is not for arc hazard analysis. It can be likely that posted values on the equipment would be used for arc hazard energy calculations rather than equipment upgrades. It is better for a customer to be talking with the utility when upgrades are planned rather than assuming the posted values on the equipment can be used.

3. A customer is responsible to consult with their serving utility when working on their service connection that includes the premises service equipment. There are just too many variables that can change when making fault current calculations.

4. For equipment ratings, the maximum available fault current at any location would need to be considered and include motor and parallel generator contributions from the connections to premises wiring on the load side of the service point. This is something the premises owner will need to calculate based on their connected equipment.

5. Field marking equipment whether at the service equipment or elsewhere in the premises wiring would need to consider points 1 and 4 above.

6. Since NEC sections 90.8, 110.9, and 110.10 apply whether it is a new installation or altering of premises wiring, it should be sufficient for enforcement and examination under 90.4 and 90.7 to ensure equipment meets the capability of the maximum available fault current at any location within. Dated field marking is not necessary in this regard and its information could be misapplied in the future if values are not verified or used for other purposes than the intent of the equipment's withstand rating.

Although the concept of the proposal is plausible, it appears this field marking requirement is a design and/or work practice issue that is not covered by the NEC (see 90.1(C) and 90.2(A)).
Panel Meeting Action: Reject
Panel Statement: The panel continues to support the concepts in Proposal 1-183 as evidenced by its action on Comment 1-115.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

LABRAKE, JR., N.: This Comment should have been accepted. There are too many variables for this number to be consistently calculated. As was stated in the Comment and during the Panel discussion, the maximum value of the fault current can change moment to moment. Consider also momentary interrupting and short time duty ratings of equipment. In addition, this is a work practice issue that is not covered by the NEC.

Comment on Affirmative:

ANTHONY, M.: The submitter raises important points about the variability of fault current but the prospect for innovation is worth the risk, in my view. Acceptance of the proposal takes us up onto the other side of the service point; into the realm of that richly interconnected last mile of power distribution, under the purview of state utility commissions, which is part of the present smart metering and energy security zeitgeist. See my statement on Comment 1-115 and Comment 1-118.

Additionally, I have provided the following:

(a) an IEEE paper titled, "Impact of Available Fault Current Variations on Arc-Flash Calculations", and

(b) NEMA's Publication: "Arc Flash Analysis -- Utility System Parameters Critical for Accurate PPE", as part of this comment.

Note: Supporting Material is available for review at NFPA Headquarters.

1-118 Log #1492 NEC-P01 **Final Action: Reject**
(110.24)

Submitter: Timothy M. Croushore, Allegheny Power
Comment on Proposal No: 1-183
Recommendation: Please reconsider these two proposals and reject them.
Substantiation: I would like to commend both CMP-1 and CMP-10 for trying to resolve this issue. We agree that the issue of incident energy poses a potential hazard for electrical workers working on exposed and energized electrical components of electrical equipment. However, marking of the equipment will not resolve this issue. This is because the electrical supply system is a dynamic electrical system and source fault current will not be a constant. With the pressure on the electric utility to have dynamically reconfigurable supply systems through "smart-grid" technologies, the dynamics of the electrical supply system and the resultant changes in source fault current will be occurring. Rather than a marking, which will be wrong and will lead the qualified person into a false situation, we recommend the electrical industry develop a dynamic fault current and incident energy measuring device.

This device could be portable or permanently wired and work very similarly to a SureTest branch circuit analyzer (example Model 61-165). It can measure available short circuit current on a branch circuit without tripping a circuit breaker or operating a fuse. Rather than relying on a "marking" on the equipment, a device such as this one at the service will tell the actual available short circuit current available. Knowing the actual short circuit current available will provide the qualified electrical person the correct information about the potential hazard the individual situation poses.

A companion comment has been sent to Code-Making Panel 10 regarding the rejection of Comment 10-72 to section 240.35.
Panel Meeting Action: Reject
Panel Statement: The panel continues to support the concepts in Proposal 1-183 as evidenced by its action on Comment 1-115.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-117.

Comment on Affirmative:

ANTHONY, M.: See my statement on Comment 1-115 and 1-117

In my research on proposal 1-183 I wanted to explore a hunch -- described in my abstention in the ROP -- that dynamic impedance information required to conform to the intent of Proposal 1-183 a requirement may cause "staffing up" at many serving utilities; a cost claim which would then be conveyed into public utility commissions. The following is a summary of how some of them handle engineering specifics for building a new, or altering, an existing service:

1. Florida Power & Light - Utility will inform Customer of fault current availability.
2. Pacific Gas & Electric - Customer shall inform the Utility of the service equipment interrupting rating.
3. Gulf Power - Utility will inform Customer of available short circuit current
4. Electrical District No. 3 (Arizona) - Fault Current Tables + Utility Guidance
5. City of Fort Collins (Colorado) - Tables + Customer shall inform Utility using Tables
6. City of Mountain Lake Terrace (Washington) - Customer shall compute service equipment interrupting rating assuming Utility infinite bus.
7. Nova Scotia Power - Tables + Utility Consultation assuming Utility infinite bus
8. Arizona Power (APS) - Customer shall request available fault current from the Utility but some tables provide some data assuming Utility infinite bus.
9. Progress Energy (Carolina Service Area)- Utility provides short circuit information for limited class of cases. Utility supplies information to Customer for all others.
10. Ameren Energy - Utility shall inform Customer

It should be plain from this limited sample, that utility practice in delivering fault current information spans across three distinct possibilities depending upon the characteristics of the utility and the customer load. In all cases, its appears that an NEC requirement for fault current availability will raise utility costs -- but the cost for documenting the last mile of distribution would have to have been done anyway in light of regulatory and market initiatives to advance progress of the Smart Grid.

1-119 Log #1589 NEC-P01 **Final Action: Reject**
(110.24)

Submitter: Jim Pauley, Schneider Electric
Comment on Proposal No: 1-183
Recommendation: Reject the proposal.
Substantiation: The panel is accepting a marking that will have no meaning and not serve a useful purpose. Consider the following:

· As the utility members have pointed out on numerous occasions, the marking is only as good as the information being supplied. A marking that states 22,000A today could easily be 30,000A or 15,000A a year later. As such, what good does a specific marking do for the installer, the inspector or the user? What is more important is that the equipment has a proper rating for the available fault current at the time of installation. If the system parameters change later, then everything has to be re-evaluated, including the new available fault current.

· The value provided on the label WILL end up being used in arc flash analysis. As the panel is well aware, using an inaccurate value in the arc flash calculation can result in assumptions regarding personnel protective equipment being wrong. Utilities will generally provide fault current values and parameters that are almost always higher than what is available. In an arc flash calculation, having a lower than expected fault current can actually result in higher arc flash energies due to the longer opening times for the overcurrent devices.

· What value does the label serve? If the inspector is relying on what is written on the label to determine whether the equipment is properly rated, then he/she still has no confidence in the actual value. Why couldn't an installer just write in a value that is always under the equipment rating? If the answer is that the inspector will need to check the calculations that result in the value, then why does it have to be put on a label? The inspector simply needs to check the equipment rating against the calculations. The label serves no value to any "future" user or installer. Why? Because there is absolutely no way for the future person to know if the system parameters are still the same. Even though the label requires an installation date, it still doesn't change the fact that the label may or may not be correct. If the user has to re-verify the fault current a year later in order to add a breaker or do some other work, then what purpose does the label serve?

· The single group of users that might actually be able to have a full understanding of system changes over time is the large industrial users – yet, the panel has exempted them from the requirement. They are actually the ONLY group that could benefit from a label.

I am concerned that the panel may not have a full understanding of the implications of adding these types of labels to products. It exposes the installer, the inspector and the utility to significantly increased liability – and it increases that exposure in a documented manner. Are the numbers correct? Who says they are correct? If they are on the label, the utility, the installer and the inspector have all had a hand in the number and are on the hook for the documented value. Consider a label that says 40,000A because that is what the contractor believed to be correct. Further assume that the actual fault current is 48K. Since the equipment is rated 50K, the installation is actually safe. However, the 40K marking on the equipment can create a decision path that leads to increased exposure. If a future installer relies on the 40,000A marking and installs a device into the equipment that meets 40K, but is under the 48K. That inaccurate marking has now created the path of liability for the utility, inspector and installer.

The marking adds no value to the system. It provides nothing to the initial installer or inspector and its lack of presumed accuracy makes it of no value to the future user or installer.
Panel Meeting Action: Reject
Panel Statement: The panel continues to support the concepts in Proposal 1-183 as evidenced by its action on Comment 1-115.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-117.

Comment on Affirmative:

ANTHONY, M.: See my statement on Comment 1-115.

1-120 Log #1714 NEC-P01 **Final Action: Reject**
(110.24)

Submitter: John Hiller, Omaha, NE
Comment on Proposal No: 1-183
Recommendation: Delete Section 110.24 in its entirety.
Substantiation: 1) Sections 110.9 & 110.10 already address determining the fault current and matching that fault current to the electrical distribution equipment.
Marking the fault current at a given date would decrease safety with respect to future installations, maintenance, and analysis that would use this value as a starting point.

2) What role does the Authority Having Jurisdiction (AHJ) have in verifying the fault current is correct? The AHJ would not have the information or the ability to make these calculations. Enforcement of this proposal would be nearly impossible.

3) There was some question it appears among the CMP as to what fault current should be marked - the available fault current from the utility or the calculated fault current. If this marking can have multiple answers, what value does the marking provide?

4) The marking will represent the fault current on a specific date only and may not truly represent the fault current at another time due to changes to the utility system. What reward does a correct marking provide? What safety risk does an incorrect marking cause? Is the risk worth the reward?

Panel Meeting Action: Reject

Panel Statement: The panel continues to support the concepts in Proposal 1-183 as evidenced by its action on Comment 1-115.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-117.

Comment on Affirmative:

ANTHONY, M.: See my statement on Comment 1-115.

1-121 Log #2266 NEC-P01 **Final Action: Accept in Principle**
(110.24)

Submitter: Michael J. Farrell, III, Lucas County Building Regulations
Comment on Proposal No: 1-183
Recommendation: Continue to Proposal accept 1-183 as modified by the panel.
Substantiation: There has been "discussion" about the potential of people incorrectly using the maximum available short-circuit current for arc-flash hazard calculation purposes. A recent IEEE paper introduced new calculation methods so that this potential is no longer an issue.

An IEEE paper, "Impact of Available Fault Current Variations on Arc-Flash Calculations", by Eaton Electrical, was presented at the Petrochemical Industries Committee (PCIC) meeting in September, in Anaheim, CA. The point of the paper is that accurate arc-flash hazard calculations can be performed without knowing the precise available short-circuit current from the utility. In fact, the calculations work well without knowing anything about the availability from the utility. (This very powerful paper may very well change the way NFPA 70E approaches arc-flash hazards).

As far as Proposal 1-183 is concerned, and with the procedures introduced by this paper, available short-circuit current marking can easily be utilized for equipment ratings only, without worry that someone will mistakenly use the values for arc-flash calculations.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 1-115.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-117.

Comment on Affirmative:

ANTHONY, M.: See my statement on Comment 1-115.

1-122 Log #2487 NEC-P01 **Final Action: Reject**
(110.24 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-183
Recommendation: Reject the proposal.
Substantiation: The proposed text is beyond the scope of the NEC because it addresses grandfathered installations. This is one of the areas where NFPA 70E diverges in scope, and properly so, from the NEC. No NEC provision requires an action to be taken on an electrical installation simply because some external actor (in this case an electrical utility, presumably) changes a parameter. Even 406.3(D)(2), covering receptacle replacements where current NEC rules require GFCI protection, does not invade the domain of grandfathered requirements because the site electrical installation is being worked on in the process covered. The rule proposed here as 110.24(B) would require an action to be taken on an electrical installation even if no activity, by reason of simple maintenance or otherwise, were performed on site. As such, the proposed rule does not fall within 90.1(B), where it is recognized that that the initial installation will be "essentially free from hazard" but that a compliant installation will not be "necessarily efficient, convenient, or adequate for good service or future expansion of electrical use."

This wording is also unenforceable because the labeling that it will require may or may not become obsolete after it is applied, through no fault of any party to the process. The most frequent source of increased available fault currents is utility activities on their networks. If the day after the final inspection the utility upgrades its transformers and primary distribution outside the facility, the labeling will be obsolete from that day forward.
In this case, the obsolescence of the labeling creates a direct hazard, because those servicing the equipment will tend to believe the label; they will have entered a fool's paradise. There does not appear to be any way to make this proposal practicable, unfortunately. There is no substitute for contemporaneous application of 110.9 and 110.10, which in turn requires communication with the utility.

Panel Meeting Action: Reject

Panel Statement: The panel continues to support the concepts in Proposal 1-183 as evidenced by its action on Comment 1-115.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-117.

Comment on Affirmative:

ANTHONY, M.: See my statement on Comment 1-115. The submitter's comment about un-enforceability is not to be taken lightly. When set against the prospect for innovation in predicting flash hazard with cost-effective instrumentation, acceptance of Comment 1-115 is worth the risk in the short run, in my view.

1-123 Log #2885 NEC-P01 **Final Action: Reject**
(110.24 (New))

Submitter: Timothy D. Curry, Curry Electric, Inc.
Comment on Proposal No: 1-182
Recommendation: PLEASE REJECT THIS PROPOSAL.
Substantiation: WAY TOO COSTLY TO IMPLEMENT ON A MINOR MODIFICATION OR SIMPLE ADDED CIRCUIT TYPE JOB. IT CAN BE UpDATED WITHOUT EVEN KNOWING IT, IF THe UTILITY CHANGES A TRANSFORMER. A NEW LOWER FAULT CURRENT COULD IN FACT –PRODUCE A HIGHER RATED ARC FLACH BECAUSE OF THE LENGTH OF TIME NEEDED FOR A DEVICE TO SENSE THE PROBLEM AND OPEN. WHETHER WE LIKE IT OR NOT, OTHERS WILL SEE THIS AND USE IT TO (WRONGLY) CALCULATE ARC FLASH PROTECTION NEEDED, WHEN IT COULD BE VERY VERY WRONG, ALMOST AS SOON AS IT WAS POSTED.

Panel Meeting Action: Reject

Panel Statement: The panel continues to support the concepts in Proposal 1-182 as evidenced by its action on Comment 1-115.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

LABRAKE, JR., N.: See my explanation of negative ballot on Comment 1-117.

1-124 Log #2883 NEC-P01 **Final Action: Reject**
(110.24, FPN)

Submitter: Timothy D. Curry, Curry Electric, Inc.
Comment on Proposal No: 1-183
Recommendation: ADD A FPN to read as follows:

FPN: THIS VALUE SHALL NOT BE USED TO CALCULATE PROPER PPE, PER NFPA 70E.

Substantiation: WHETHER THE PANEL ACCEPTS IT OR NOT, THIS VALUE WILL BE USED TO CALCuLATE "A PARTICULAR LEVEL OF PPE".

THE FPN MAKES IT CLEAR THAT THIS IS NOT THE CASE.

Panel Meeting Action: Reject

Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.

In addition, the comment does not conform with 3.1.3 of the NEC Style Manual that states that Fine Print Notes cannot contain requirements or be written in mandatory language.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-125 Log #2274 NEC-P01 **Final Action: Reject**
(110.24(A))

Submitter: Harold F. Willman, Colorado Code Consulting
Comment on Proposal No: 1-183
Recommendation: Revise to read as follows:

(A) Marking. Electrical equipment such as switchboards, panelboards, industrial control panels, motor control centers, and HVAC equipment, that are in other than dwelling occupancies, shall be field marked with the available short-circuit current and the date the label was applied. The label shall include the available short-circuit as stated by the utility company and the size of the transformer.

Substantiation: Transformers are changed out by the utility company for various reasons. When someone works on the electrical equipment and the transformer has been changed, the label will identify the short-circuit rating and size of the old transformer. Those working on the electrical equipment should realize that the short-circuit rating has also changed for the electrical equipment.
Panel Meeting Action: Reject
Panel Statement: The intent of the submitter's recommendation was unclear to the panel.

In addition, see the panel action and statement on Comment 1-115.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

FISKE, W.: We are in complete agreement with CMP-1 vote to Reject this comment, but make one additional observation about the comment and Proposal 1-183 on which it is based. Proposal 1-183 adds "HVAC equipment" to the originally-proposed list of items needing arc-flash warning, i.e. the same equipment list as appears in 110.16. Neither the proposal nor the comment contains a single word of substantiation for adding HVAC equipment to the list of equipment that could present an arc-flash hazard. Items identified in 110.16 are devices, but HVAC equipment is utilization equipment. That part of the proposal puts an apple into a bowl of oranges, so to speak.

1-126 Log #1703 NEC-P01 **Final Action: Reject**
(110.26)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-186
Recommendation: Delete text.
Substantiation: Access and working space is covered by specific provisions elsewhere in the NEC, including equipment to which it applies. This provision is general, nonspecific, and applies to all equipment such as raceways and cables which do not require personnel access and working space for safe operation.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide the proposed text to be deleted as required by 4.4.5(c) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-127 Log #2118 NEC-P01 **Final Action: Reject**
(110.26 (New))

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facility Executives
Comment on Proposal No: 1-192
Recommendation: Accept the Proposal in Principle. Integrate the illustration into the text as a Fine Print Note at the end of Section 110.26(A) and Section 110.26(A).
FPN: The two distinct indoor installation spaces required by 110.26(A) and 110.26(F): the working space and the dedicated electrical space.
Substantiation: Of the four proposals submitted to this committee suggesting the use of some illustrations for this article, this is the one illustration that would have the most impact illustrating the concepts of working and dedicated space. The submitter and the committee should bear an equal burden of proof for technical substantiation. As the NFPA Regulations Governing Committee Projects makes plain in Section 4.4.4.d, "technical substantiation" is, itself, unsubstantiated.

The NEC Style Manual permits the addition of illustrations as long as they are identified as a Fine Print Note. For the convenience of the Committee, the rules for using illustrations is reproduced below:
2.3.2 Nonmandatory. When the *NEC* is adopted into law, graphics in the text of the document become mandatory. If a Code-Making Panel wishes to use a table or figure to illustrate only a typical situation, not a mandatory requirement, that table or figure shall be identified as a fine print note or be placed in an annex. Each table shall have a title and each figure shall have a caption.

As stated in the original proposal, users should not have to purchase the NEC Handbook in order to understand the NEC. Quite possibly, judicious use of one or two illustrations in this section, leavening the look and feel of the NEC, might provide technical substantiation in terms of market penetration. Illustrations are already present in Figure 410.2, illustrating closet storage space and Figure 515.3, illustrating Marine Terminal Handling Flammable Liquids, for example.
An illustration from the NEC Handbook has been provided.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: No substantiation has been provided as to why this information is necessary in the code. The submitter has indicated that the information is available in the NEC Handbook.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

ANTHONY, M.: I do not think NEC Handbook purchase should be necessary to understand the NEC and the workspace/dedicated space rules of this Article are not easy to visualize without the NEC Handbook. Some argue that because the NEC is not a document for persons untrained in its use, its writers are under no obligation to make such rules easy to visualize. I think a compromise is possible with judicious use of illustrations in Chapter 1.

Some states want to make consensus documents like the NEC "freeware" wherever consensus documents are adopted as public law. They argue that all laws -- even those that promulgate such laws by reference to ANSI consensus documents -- should be available at no cost to the citizenry. Anyone familiar with ANSI processes understands the enormous costs involved in preparing any ANSI-conforming document. New revenue models would have to be put in place. New document, development, delivery and enforcement models would have to be invented.

In the intervening time, it seems that a fair argument can be made that judicious use of illustrations in the NEC could forestall advancement of the freeware position because the laws that reference the NEC would not require yet another document to understand the NEC itself. Rejection of this proposal is an opportunity missed.

1-128 Log #1981 NEC-P01 **Final Action: Reject**
(110.26(A))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 1-196
Recommendation: This proposal should be accepted.
Substantiation: The issue is the use of the word "require" in the existing text. This word limits the enforcement of the working space rules as there is nothing that "requires" someone to "examine, adjust, service, or maintain" electrical equipment while it is energized. In fact there are standards and safety rules that prohibit doing most types of work on energized electrical equipment. The elimination of the word "require" will improve the enforceability of this very important code rule.
Panel Meeting Action: Reject
Panel Statement: The submitter misunderstands use of the word "require" as it is used in 110.26(A). In this context, "require" means "need". If it is probable that examination, adjustment, servicing or maintenance will need to be performed on energized equipment, then 110.26 applies.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-129 Log #2190 NEC-P01 **Final Action: Reject**
(110.26(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-195
Recommendation: Accept revised as follows:

Working space required by 110.26 for switches, (except snap switches), circuit breakers, contactors, motor starters, transfer switches, panelboards, switchboards, motor control centers, control panels, service equipment, and the like, operating at 600 volts, nominal, or less, shall comply with dimensions of 110.26(A)(1)(2) and (3,) unless required or permitted otherwise in this Code.
Substantiation: "Equipment" includes motors and other types of equipment. The equipment in the proposal is almost certain to require examination, adjustment, or maintenance while energized, to check for line voltage, load voltage (open fuses), conductor and terminal temperature, etc. "While energized" has apparently been used to avoid compliance with work space requirements where disconnecting means have been installed for air conditioners, heat pumps with very little space between the two, with an assertion that they can be deenergized by the branch circuit, feeder, or service disconnecting means. This assertion can be applied to service disconnecting means since they can be deenergized by removing a plug-in watt hour meter or a call to the serving utility. "To ground" is superfluous.
Panel Meeting Action: Reject
Panel Statement: Listing examples of the equipment requiring examination, adjustment, servicing, or maintenance while energized does not enhance clarity or usability, but may lead the user of the Code to believe equipment not so listed are not included.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-130 Log #2743 NEC-P01 **Final Action: Reject**
(110.26(A)(2))

Submitter: Randal Hunter, City of Las Vegas
Comment on Proposal No: 1-203
Recommendation: Revise text to read as follows:
(2) Width of Working Space. The width of the working space in front of the electrical equipment shall be the width of the equipment or 762 mm (30 in.), whichever is greater. In all cases, equipment doors or hinged panels shall open at least 90 degrees and the work space shall permit at least a 90 degree opening of equipment doors or hinged panels.
Substantiation: This has been brought forward again at the suggestion of some of the UL staff, after they had expressed disagreement amongst their own staff as to whether or not a door actually has to open 90°. After receiving the official interpretation from the UL PDE that doors don't actually have to open 90 degrees, only the UL standard and the code require the "space" to allow a door to open 90 degrees, I felt the language needed to be made clearer, and less interpretive. The changes above leave no doubt as to the requirement that we must have the doors open 90 degrees.
As to the panel's statement that this requirement belongs in product standards, I agree. However, the basic requirement for 90 degrees should appear in the NEC to allow safe working space for electricians, and the product standard should contain specific information about how the equipment will comply with this requirement.
Panel Meeting Action: Reject
Panel Statement: The requirements in 110.26 address working space rather than product features. The equipment requirement issue is being actively addressed in applicable product standards.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ANTHONY, M.: Product features are implicit in other parts of NEC.

1-131 Log #58 NEC-P01 **Final Action: Accept**
(110.26(A)(3) Exception)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 1-208
Recommendation: The Technical Correlating Committee directs that the panel reconsider the panel action to comply with the NEC Style Manual regarding the word "allowed".
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action and statement on Comment 1-132 that meets the request of the Technical Correlating Committee.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-132 Log #2488 NEC-P01 **Final Action: Accept in Part**
(110.26(A)(3) Exception (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-208
Recommendation: Accept the proposal in principle. Reword as follows:
Exception: Electric meters shall be permitted to extend into a vertical working space more than 150 mm (6 in.).
Substantiation: This wording is simple, resolves the TCC complaint regarding the word "allowed", and corrects another Style Manual issue in that "this section" cannot be used. A meter socket enclosure, covered in Article 312, plainly is subject to the normal requirements in this section, and the verb chosen accentuates this because although a meter might "extend" into a vertical working space (its base would always be within such a space) a meter socket enclosure would not customarily be understood in the field as something that extended or projected in this context. Note that electric meters are plainly "associated with the electrical installation" and therefore this exception only applies to meters that extend more than 6 inches from the face of the meter socket enclosure (or other electrical equipment in a given installation space). The proposed wording makes this context clear.
Panel Meeting Action: Accept in Part
The panel accepts changing "allowed" to "permitted" and rejects the remainder of the proposed wording.
Panel Statement: "Shall be permitted" is the preferred language for permissive rules per 3.1.4.1 of the NEC Style Manual. With the exception of the word change, the panel reaffirms its action on Proposal 1-208.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-133 Log #1702 NEC-P01 **Final Action: Reject**
(110.26(C)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-210
Recommendation: Accept revised as follows: At least one entrance not less than 610 mm (24i.n) wide and 2 m (6[1]/2 ft) high shall be provided to provide access to and egress from the required working space.
Substantiation: The provision should relate to the required space covered by this section. All electrical equipment does not require personnel working space, such as raceways and cables after installation. Working space requirements should apply as specified in the first paragraph of 110.26 (A).
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide adequate technical substantiation for the change.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-134 Log #1754 NEC-P01 **Final Action: Reject**
(110.26(C)(3))

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 1-218
Recommendation: This proposal should be accepted in principle as follows:
110.26(C)(3) Personnel Doors. Where equipment rated 800 A or more that contains overcurrent devices, switching devices, or control devices is installed and there is a personnel door(s) intended for entrance to and egress from the working space less than 7.6 m (25 ft) from the nearest edge of the working space, the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure."
Substantiation: This comment and associated proposal seek to reduce the ampere threshold in 110.26(C)(3) for personnel doors. This comment does not constitute new material as the proposed action is seen in the ROP negative statement of Mr. Hickman. As stated by Mr. Hickman there are serious safety concerns due to the personnel door requirement being tied to the equipment threshold of 1200-amps.
As illustrated in the ROP by Mr. Hickman:
Consider two separate installations; (1) a 277/480-volt, 1200-amp feeder supplying a switchboard and (2) a 277/480-volt, 800-amp feeder supplying a switchboard. The present text would require personnel door(s) to open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure for the 1200-amp feeder but not the 800-amp feeder. The 277/480-volt, 1200-amp feeder would require ground-fault protection of equipment in accordance with 215.10 but the 277/480-volt, 800-amp feeder would not.
It is well understood that the above scenario is a serious safety concern. It is prudent to recognize the GFP provisions of 230.95 and 215.10 at 1000 amps and reduce the personnel door threshold to the next smaller standard OCPD size in 240.6. Reducing this value from 1200-amps to 800-amps enhances safety for the installer/maintainer and is not overly restrictive.
Panel Meeting Action: Reject
Panel Statement: The submitter has not substantiated that there is a need to lower the existing 1200 A threshold, or that, if so, 800 A is the correct threshold.
In addition, the substantiation does not include reports of accidents or near-misses involving switchgear rated less than 1200 A.
The submitter cited 215.10 and 230.95 as precedent for a 1000 A threshold, then without further explanation, recommends 800 A.
The submitter has not established the need for linking the requirement for panic hardware with the need for ground fault protection.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

ANTHONY, M.: The submitter has raised two points worth repeating:

1. It is "common knowledge" that serious injuries and fatalities occur from arc flash/blast in equipment rated 30 to 1000 amps.

2. While the trigger of 1200 amps may be appropriate for the need for two doors, it is not substantiated with respect to personnel safety. Serious injury and fatalities have, and continue to occur in equipment rated at levels far below 1200 amps.

The 800A ampere limit is a reasonable threshold because it tends to be the ampere rating designers select when they want to avoid the cost of ground fault protection. I personally like building distribution feeders in 400A and 800A runs because I have a sense that feeders of this size are most economical. This tendency, not documented but frequently seen, meets the substantiation criterion, in my view.

The committee is asking the submitter to produce data on near-misses. Near misses are hard to count; bodies are not. The Common knowledge that forms the bedrock of the NEC is hardly estimable. It is the sum total of each other's experience that we have to count on when evaluating proposals and comments and I would put the submitter's experience ahead of my own.

One other fine point that was not raised in either the proposal or comment phase is the mounting style of equipment 1200A and below; i.e. free-standing switchboard or wall mounted. For 480V equipment, for example, 800A is the upper limit for wall-mounted equipment. The enclosure construction, the physical space occupied by the enclosure differs, and thus the hazards, differ.

HICKMAN, P.: We believe that this comment should have been accepted. The submitter of Proposal 1-134 and this comment has correctly identified a serious safety concern. Panel 1 correctly asked that additional substantiation be presented in a comment and the submitter has done so.

We agree with the substantiation recognizing the reduction of the 1200-amp threshold to the next level below the industry-recognized 1000-amp threshold for ground-fault protection of equipment (to the next smaller standard OCPD size below 1000 amp in 240.6; 800-amps). This recommendation does not specifically tie the need for panic hardware to the need for GFP but rather identifies an example of a level of equipment ampacity size that is a logical balance between always requiring panic hardware at any ampacity level of equipment (such as on 30 amp equipment) and an ampacity level modestly below the present level of 1200 amps.

HITTINGER, D.: This comment should have been accepted. The submitter has identified a serious safety concern in the original proposal and did submit substantiation in the comment. The Panel can debate the merit of the substantiation and what amperage would be appropriate but listing any amperage may be the problem. To provide a safer work space for building owners, maintenance personnel and employees, door panic hardware would be a benefit to any work space regardless of the amperage threshold so removing this value would make the work space safer. This cannot happen at this stage of the Code development process but establishing the 800 ampere threshold would be a step in the right direction.

Comment on Affirmative:

BOYCE, K.: The concept of reducing the current rating value may have merit. We look forward to reviewing additional technical substantiation to identify and support the reduced value.

NEWMAN SCEARCE, S.: While supporting the work of the committee, I agree with the "Recommendation" and "Substantiation" provided by the submitter of the ROC.

1-135 Log #1701 NEC-P01 **Final Action: Reject**
(110.26(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-225
Recommendation: Accept the proposal revised as follows: A fixed lighting outlet(s) shall be installed to provide illumination for all working spaces about service equipment, switchboards, panelboards, motor control centers, and industrial control panels.
Substantiation: Working space is required for safety; how can it not be required for outdoor equipment when it is required for indoor equipment? Potential hazards would be greater for non-illuminated servicing/maintenance during darkness or inadvertently operating the wrong switching or disconnecting devices.
Panel Meeting Action: Reject
Panel Statement: Adequate technical substantiation has not been provided.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

HICKMAN, P.: We are in general agreement with the recommendation in the Proposal 1-225 and Comment 1-135, but recognize that adequate technical substantiation has not been provided. In addition, the substantiation that was provided primarily discusses the importance of work space rather than illumination (the topic of (D)).

1-136 Log #2382 NEC-P01 **Final Action: Reject**
(110.26(D)(1) (New))

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facility Executives
Comment on Proposal No: 1-188
Recommendation: Accept the proposal with the following modifications:

Illumination Emergency Power. In the event of power supply failure, an emergency system shall automatically illuminate the areas

around electrical **service** panels **greater than 200 amperes**. The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment, or an on-site generator. This requirement is for buildings that are required to have emergency egress illumination by the building code.

Substantiation: The submitter's original proposal has been modified to restrict its application to service panels only. To repeat the submitter's original substantiation for the convenience of the Panel:

"The safety of the electrician has been overlooked in the electrical panel areas in the past. Emergency lighting needs to be installed in the areas where electrical panels are located for egress of someone that may have been injured from an electrocution. The building code has not addressed this location and the safety of those working on this type of equipment needs to be addressed by the electrical code."

To repeat the Panel 1 statement answering Mr. Williams' proposal*:*

"It is not reasonable to require emergency lighting of all the equipment listed at a particular facility. There is insufficient substantiation for this major change. The panel concludes that the proposed requirement for areas to be provided with illumination by emergency power is under the scope of the building codes. The panel refers the submitter to Article 700 of the NEC."

Another, similar proposal, submitted to Panel 13 (covering Article 700) came back rejected with the following Panel Statement:

"There was no technical substantiation provided justifying the foot-candle level for all electrical service equipment and emergency switchgear. There was no indication of whether these requirements applied to indoor or outdoor locations. There was no technical explanation for the required illumination for the service switchgear. Service switchgear is covered in Article 230, not in Article 700."

What this substantiation intends to document is that emergency illumination for electrical switchgear rooms has been placed before two committees, four Articles, for over three NEC cycles. With the submission of this concept to NFPA 110 and NFPA101, the concept will have traveled among the committees of three NFPA document committees, thus forming what appears to be a near-perfect circle of fingers

The video showing the electrician killed while racking out a breaker is available on YouTube with the search term: "Arc Flash while racking a breaker". Note that the switchgear installation did not have emergency illumination. Did it not turn on within 10 seconds? Was it because the space in front of the switchgear was not on the primary or secondary egress path? Was the concept of "ingress" ever discussed? Did the codes permit emergency illumination for electricians' as a "design choice"?

Panel Meeting Action: Reject
Panel Statement: The submitter did not provide adequate substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

ANTHONY, M.: The submitter thanks Panel 1 for its respectful and detailed consideration of this proposal. A version of it has since been submitted to the NFPA 70E committee and the outcome of the NFPA 101 committee's work on the same safety concept will be known later in 2010. We already know that the International Code Council has rejected it. If the concept of mandatory emergency illumination for electricians working on switchgear does not find a place in either NFPA 101, NFPA 70E, NFPA 70B, or in any building code, it will be re-submitted to this committee during the 2014 NEC revision cycle.

1-137 Log #1700 NEC-P01 **Final Action: Reject**
(110.26(F)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-239
Recommendation: Accept the proposal.
Substantiation: The proposal appears to comply with 4.3.3 of the NFPA Regulations Governing Committee Projects.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-138 Log #1707 NEC-P01 **Final Action: Reject**
(110.26(F)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-244
Recommendation: Accept the proposal.
Substantiation: The proposal appears to comply with 4.3.3(d) of the NFPA Regulations Governing Committee Projects.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide a statement of an alleged problem, or substantiate that the comment would resolve the problem, as required by 4.4.5(d) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-139 Log #2119 NEC-P01 **Final Action: Reject**
(110.26(O) (New))

Submitter: Michael A. Anthony, University of Michigan
Comment on Proposal No: 1-249
Recommendation: Accept the Proposal.
Substantiation: The Panel Statement, "*Emergency illumination requirements are a function of the building codes and NFPA 101, Life Safety Code*", ignores the fact that NFPA 101 does not recognize electrical switchgear rooms as an occupancy type. Nevertheless, at the suggestion of the committee, the submitter submitted a proposal covering this issue to the applicable NFPA 101 technical committee on July 31, 2009. NFPA 101 is now in the middle of its 2012 update cycle and that proposal will be available for public review on the NFPA web site in the near future.

The only existing section of NFPA 101 that came close to applying to the electrical equipment space that is the subject of this proposal has been reproduced below:

==========EXTRACT FROM NFPA 101-2009 ==========

Chapter 9 Building Service And Fire Protection Equipment
9.1 Utilities.
9.1.1 Gas. Equipment using gas and related gas piping shall be in accordance with NFPA 54, *National Fuel Gas Code*, or NFPA 58, *Liquefied Petroleum Gas Code*, unless such installations are approved existing installations, which shall be permitted to be continued in service.
9.1.2 Electrical Systems. Electrical wiring and equipment shall be in accordance with *NFPA 70* , *National Electrical Code*, unless such installations are approved existing installations, which shall be permitted to be continued in service.
9.1.3 Emergency Generators and Standby Power Systems. Where required for compliance with this *Code*, emergency generators and standby power systems shall comply with 9.1.3.1 and 9.1.3.2.
9.1.3.1 Emergency generators and standby power systems shall be installed, tested, and maintained in accordance with NFPA 110, *Standard for Emergency and Standby Power Systems*.
9.1.3.2 New generator controllers shall be monitored by the fire alarm system, where provided, or at an attended location, for the following conditions:
- (1) Generator running
- (2) Generator fault
- (3) Generator switch in nonautomatic position

9.1.4 Stored Electrical Energy Systems. Stored electrical energy systems shall be installed, tested, and maintained in accordance with NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*.

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See anything here in NFPA 101 that resembles the space around service/transfer/generator control switchgear that an electrician might need to get to in diagnosing an outage? See anything here in NFPA 101 that requires lighting an ingress path to a darkened room from, say, the parking lot where an ambulance might be waiting for a downed electrician? I found nothing in Chapter 7 of NFPA 101 or in NFPA 110 either. That may because this requirement belongs in the National Electric Code.

To restate the original substantiation: This proposal provides both an illuminated egress and ingress path for a) the electrician who is working in the service equipment area without a flashlight, b) for the maintenance mechanic who may neither be an electrician nor familiar with the electric service equipment to work on it in the dark. Electric service panels are not always installed along either the primary or secondary egress path required by the Life Safety Code and this panel should not leave it to Architects to remember that there may be someone stuck in the dark in the electrical room, or that the path to the electrical room ought to be illuminated in order to diagnose a power outage. This should be a General Requirement as much as marking of disconnects or the guarding of live parts. The 3 footcandle requirement matches the illumination levels required in 7.3.1 of NFPA 110 for Level 1 emergency power systems and follows NESC practices for vertical illumination.

Because the lack of electricity is as great a hazard to the built environment as the presence of electricity was 100 years ago, this proposal really does belong in a document that states its purpose as related to the practical and safe use of electricity arising when it is not there at all.
Panel Meeting Action: Reject
Panel Statement: The information provided is relative to NFPA 101, Life Safety Code, as stated in to the panel's action and statement on Proposal 1-249.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ANTHONY, M.: The submitter thanks Panel 1 for its respectful and detailed consideration of this proposal. A version of it has since been submitted to the NFPA 70E committee and the outcome of the NFPA 101 committee's work on the same safety concept will be known later in 2010. We already know that the International Code Council has rejected it. If the concept of mandatory emergency illumination for electricians working on switchgear does not find a place in either NFPA 101, NFPA 70E, NFPA 70B, or in any building code, it will be re-submitted to this committee during the 2014 NEC revision cycle.

1-140 Log #1955 NEC-P01 **Final Action: Accept in Principle in Part**
(110.28)

Submitter: John R. Kovacik, Underwriters Laboratories Inc.
Comment on Proposal No: 1-251
Recommendation: Revise the recommendation for Proposal 1-251 to move the proposed new text from the body of the NEC to a new Annex and add a Fine Print Note to Table 110.20 to reference this Annex.

SUMMARY of REVISIONS

1. Revise existing Fine Print Note to Table 110.20 from "FPN:" to "FPN No. 1:"

2. Add the following new Fine Print Note No. 2 to Table 110.20.

FPN No. 2: Ingress Protection (IP) ratings are not a substitute for Enclosure Type Ratings. See Annex X for an explanation of IP Ratings which may be marked on enclosures or enclosing parts of electrical equipment.

3. Add new Annex as follows.

Annex X (NEW) Ingress Protection (IP)

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

Tables X.1, X.2 and X.3 provide the basis for determining the protection provided by products marked with Ingress Protection (IP) ratings. Ingress Protection ratings classify the degrees of protection provided by enclosures and enclosing parts of electrical equipment for two conditions: 1) the protection of persons against access to hazardous parts and protection of equipment against the ingress of solid foreign objects and 2) the ingress of water. The degree of protection against these two conditions is designated by an IP Code. Products claiming ingress protection are marked with the letters IP followed by two characteristic numerals, either of which may be replaced by an "X", with or without suffix letters. The first characteristic numeral indicates the degree of protection provided by the enclosure or enclosing part with respect to persons and solid foreign objects entering the enclosure. The second characteristic numeral indicates the degree of protection provided by the enclosure or enclosing part with respect to the harmful ingress of water. The optional suffix letters indicate protection of persons against access to hazardous parts if higher than that indicated by the first characteristic numeral.

IP ratings do not specify degrees of protection against damage of equipment, risk of explosions, or conditions such as moisture (produced for example by condensation) or corrosive vapors.

IP ratings are not to be used as a substitute for Enclosure Type Ratings specified in Table 110.20.

Table X.1 IP Rating - First Characteristic Numeral

Ingress of Human Body Parts, Tools and Solid Objects		
Numeral	**Protection against Human/Tool Contact**	**Protection against the ingress of solid objects (foreign bodies)**
0	No protection	
1	Back of hand, Fist	Large foreign bodies, diameter greater than 50mm
2	Finger	Medium-sized foreign bodies, diameter greater than 12.5
3	Tools and wires with a thickness greater than 2.5mm	Small foreign bodies, diameter grater than 2.5mm
4	Tools and wires with a thickness greater than 1mm	Granular foreign bodies, diameter greater than 1mm
5	Complete protection, (limited ingress permitted)	Dust protected; dust deposits are permitted, but their volume must not affect the function of the equipment
6	Complete protection	Dust-proof

Table X.2 IP Rating - Second Characteristic Numeral

Ingress of Water		
Numeral	**Protection against the ingress of water**	**Protection for a Specific Condition**
0	No special protection	
1	Water dripping/falling vertically	Condensation/Light rain
2	Water sprayed at an angle (up to 15º degrees from the vertical)	Light rain with wind
3	Water sprayed at an angle (any direction up to 60º degrees from the vertical)	Heavy rainstorm
4	Water sprayed from all directions, (limited ingress permitted)	Splashing
5	Low pressure water jets from all directions, (limited ingress permitted)	Hosedown, residential
6	High pressure jets from all directions, (limited ingress permitted)	Hosedown, industrial
7	Temporary immersion, 15 cm to 1m	Temporary immersion in water
8	Permanent Immersion, under pressure	Continuous immersion in water,

Table X.3 IP Rating – Optional Suffix Letters

Letter	Protection against Human/Tool Contact
A	Back of hand, Fist
B	Finger
C	Tools and wires with a thickness greater than 2.5mm
D	Tools and wires with a thickness greater than 1mm

Notes to Tables X.1, X.2 and X.3

1. Where a characteristic numeral is not specified, it is replaced by the letter "X" ("XX" if both numerals are omitted).

2. Additional letters may be omitted without replacement.

3. An enclosure or enclosing part marked with a first characteristic numeral indicating a degree of protection also complies with all lower degrees of protection for the first characteristic numeral.

4. An enclosure or enclosing part marked with a second characteristic numeral of 6 or lower indicating a degree of protection complies with the requirements for all lower degrees of protection for the second characteristic numeral. An enclosure or enclosing part designated with second characteristic numeral 7 or 8 may be unsuitable for exposure to water jets (designated by second characteristic numeral 5 or 6) and may not comply with requirements for numeral 5 or 6 unless it is dual coded such as IPX5/IPX7.

5. If an enclosure or enclosing part provides different degrees of ingress protection for different intended mounting arrangements, the relevant degrees of protection related to the respective mounting arrangements are indicated in the instructions provided with the product.

6. Where one part of an enclosure has a different degree of protection to that of another part of the same enclosure, the enclosure is marked to indicate the degree of protection for the specific parts of the enclosure.

7. For products marked with the second characteristic numeral 8, the maximum immersion depth and time are indicated in the instructions provided with the product.

Substantiation: In the panel statement for the rejection of Proposal 1-251, CMP 1 stated that this information (the proposed new text) might be suitable for inclusion in an Annex. Following this advice, the proposal has been revised to recommend that the text be included as a new Annex to the NEC. This should remove any doubt from a Code user that the added text is not a requirement. Annexes are not a part of the requirements of the NEC and are included for informational purposes only. This new Annex would be no different. The lead in sentence at the beginning this new Annex will clearly state that it is not part of the NEC and provided for informational purposes only. As Annex material the information provided does not mandate the marking of an IP rating on any product. It is intended to provide guidance in understanding the meaning of IP ratings and to raise the level of awareness of the existence of the IP rating system. The information proposed to be added will provide Code users an explanation of the protection afforded by products and equipment marked with IP ratings. It is understood US standards which require enclosed products to be marked with an enclosure type rating specify that the rating shall be from the NEMA/UL enclosure type rating system covered in 110.20 and Table 110.20 of the NEC.

Further substantiation which was provided with proposal 1-251 is stated below.

The number of products and equipment being marked with Ingress Protection (IP) ratings has increased significantly over the past few years. Although there are few products which are required to be marked with an IP rating, manufacturers are optionally applying an IP rating to many industrial, commercial and residential products, in most cases to satisfy customer needs. The IP rating system not only applies to enclosures, but also any enclosing part of electrical equipment. This translates into the opportunity to specify a level of ingress protection for open products. This system can designate a degree of protection against contact with live electrical parts, for example, contact by human body parts such as a fist, back of hand or a finger and contact by tools or wires. The IP rating system is defined in the ANSI/NEMA Standard 60529. This standard was adopted as a US National Standard in 2004. It is an adoption of IEC 60529, Degrees of protection provided by enclosures (IP Code). The ANSI/NEMA standard contains no deviations from the IEC version. However, it is understood that US standards which require enclosed products to be marked with an enclosure type rating specify that the rating shall be from the NEMA/UL enclosure type rating system covered in 110.20 of the NEC. Ingress Protection (IP) ratings has increased significantly over the past few years. Although there are few products which are required to be marked with an IP rating, manufacturers are optionally applying an IP rating to many industrial, commercial and residential products, in most cases to satisfy customer needs. The IP rating system not only applies to enclosures, but also any enclosing part of electrical equipment. This translates into the opportunity to specify a level of ingress protection for open products. This system can designate a degree of protection against contact with live electrical parts, for example, contact by human body parts such as a fist, back of hand or a finger

and contact by tools or wires. The IP rating system is defined in the ANSI/ NEMA Standard 60529. This standard was adopted as a US National Standard in 2004. It is an adoption of IEC 60529, Degrees of protection provided by enclosures (IP Code). The ANSI/NEMA standard contains no deviations from the IEC version.

Panel Meeting Action: Accept in Principle in Part

In the recommended text, the panel Rejects the addition of the Annex and Accepts in Principle the addition of the FPN to read as follows:

"FPN: Ingress protection (IP) ratings may be found in ANSI/NEMA 60529, Degrees of Protection Provided by Enclosures. IP ratings are not a substitute for Enclosure Type ratings."

The revised FPN is to be placed immediately after the existing FPN in Table 110.28.

Panel Statement: The text of the proposed Informational Annex contains mandatory language that is not permitted per the NEC Style Manual.

In addition, the proposed Annex does not enhance usability and could create confusion with respect to the requirements for Enclosure Type designations for specific protection from various environmental conditions identified in Table 110.28.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-141 Log #2 NEC-P01 **Final Action: Accept in Principle**
(110.31(A))

Submitter: Palmer L. Hickman, National Joint Apprentice & Training Committee

Comment on Proposal No: 1-253

Recommendation: Accept Proposal 1-253 which will, in turn, modify the accepted action on Proposal 1-252. In addition, the "(A)" of 110.31(A) should not have been deleted (as shown by the recommended strike through by the submitter in Proposal 1-252 and as accepted by Code Panel 1). This comment is to have 110.31(A) and 110.31(A)(1) read as follows (remainder of Proposal 1-252 is not shown and is not intended to be changed by this comment):

(A) Electrical Vaults. Where an electrical vault is required or specified for conductors and equipment operating at over 600 volts, nominal, the following shall apply.

(1) Walls and Roof. The walls and roof shall be constructed of materials that have adequate structural strength for the conditions, with a minimum fire rating of 3 hours. For the purpose of this section, studs and ~~wallboards~~ wallboard construction shall not be considered acceptable.

Substantiation: The recommendation in Proposal 1-253 should have been accepted and integrated into the action of Proposal 1-252. Panel 1 rejected Proposal 1-253 by saying that it was not substantiated. The recommendation in Proposal 1-252 is substantiated. The recommended text is used in 450.42 as the submitter of 1-253 pointed out. In addition to providing the benefit of consistency of terminology for related information, it would appear that the term "wallboard construction" (rather than "wallboards") is really the intent of the term and is, in fact, more technically correct.

Panel Meeting Action: Accept in Principle

See the panel action on Comment 1-142.

Panel Statement: The panel understands that "(A)" remains.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-142 Log #2005 NEC-P01 **Final Action: Accept**
(110.31(A))

Submitter: Leo F. Martin, Jr., Martin Electrical & Technical Training Services

Comment on Proposal No: 1-252

Recommendation: Revise last sentence to read as follows:

For the purpose of this section, studs and wallboard construction shall not be permitted.

Substantiation: The term "studs and wallboard construction" is more consistent with language used in building codes. 450.42, last sentence, provides parallel wording and should be incorporated in 110.31(A). The term "acceptable" is unenforceable and vague and should be replaced with the term "shall not be permitted" which is consistent with 90.5(A), mandatory rules.

Panel Meeting Action: Accept

Panel Statement: The panel understands that the sentence to be revised is the last sentence of proposed 110.31(A)(1) in Proposal 1-252.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-143 Log #2006 NEC-P01 **Final Action: Accept**
(110.31(A))

Submitter: Leo F. Martin, Jr., Martin Electrical & Technical Training Services

Comment on Proposal No: 1-253

Recommendation: Accept the proposal and revise the last sentence to read as follows:

For the purpose of this section, studs and wallboard construction shall not be permitted.

Substantiation: The term "studs and wallboard construction" is more consistent with language used in building codes. 450.42, last sentence, provides parallel wording and should be incorporated in 110.31(A). The term "acceptable" is unenforceable and vague and should be replaced with the term "shall not be permitted" which is consistent with 90.5(A), mandatory rules.

Panel Meeting Action: Accept

Panel Statement: The panel understands that the sentence to be revised is the last sentence of proposed 110.31(A)(1) in Proposal 1-253.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-144 Log #2862 NEC-P01 **Final Action: Accept**
(110.34(A))

Submitter: Louis Barrios, Shell Global Solutions / Rep. American Chemistry Council

Comment on Proposal No: 1-197

Recommendation: Please note that NFPA incorrectly stated the recommendation in this proposal, which was a HOLD on Comment 1-77 from the 2008 Code Cycle.

The panel action should have been Accept in Principle. The second sentence in the exception to Article 110.34(A) should read as follows: "Where rear access is required to work on ~~de-energized~~ nonelectrical parts on the back of enclosed equipment, a minimum working space of 762mm (30in.) horizontally shall be provided."

Substantiation: The recommendation in this proposal was incorrectly stated from NFPA. Proposal 1-197 was a HOLD on Comment 1-77 from the 2008 Code Cycle. Comment 1-77 proposed to change "de-energized" to "non-electrical" in the Exception to 110.34A in order to correct an inconsistency in the requirements for safe work clearance behind electrical equipment that presently exists between equipment operating 600V and below, and equipment operating above 600V. The panel considered the proposed change in Comment 1-77 as new material and acted to HOLD this comment for the 2011 Code cycle. Justification for change: Section 110.26(A)(1)(a), which covers equipment rated 600V nominal and less states, "Where rear access is required to work on nonelectrical parts on the back of enclosed equipment, a minimum horizontal working space of 762 mm (30 in.) shall be provided". The exception to Section 110.34A, which covers equipment rated over 600V nominal states, "Where rear access is required to work on de-energized parts on the back of enclosed equipment, a minimum working space of 762mm (30 in.) horizontally shall be provided. Changing "de-energized parts" to "nonelectrical parts" will remove the inconsistency between the two requirements.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

HICKMAN, P.: Changing "de-energized parts" to "nonelectrical parts" is a significant change that has not been adequately substantiated. De-energized is not the same as locked and tagged and/or electrically safe. Adequate technical substantiation has not been provided to support changing from electrical non nonelectrical, that there is not a need for this work space, or that the technical committee did not intend that the requirements be different at different voltage levels.

1-145 Log #717 NEC-P01 **Final Action: Accept**
(110.40)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 1-258
Recommendation: The Proposal should be accepted in principle and revise "Table 310.67 through Table 310.86" to "Table 310.60(C)(67) through Table 310.60(C)(86)".
Substantiation: Panel 6 Accepted in Principal Proposal 6-123 and renumbered "Table 310.67 through Table 310.86" to "Table 310.60(C)(67) through Table 310.60(C)(86)". Acceptance of this Comment will provide correlation.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-146 Log #59 NEC-P01 **Final Action: Accept**
(110.74)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 1-260
Recommendation: The Technical Correlating Committee directs Code-Making Panel 1 to add titles to the first level subdivisions as required by the NEC Style Manual.

This action shall be considered as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action on Comment 1-147 that satisfies the direction received from the Technical Correlating Committee.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-147 Log #2489 NEC-P01 **Final Action: Accept**
(110.74)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-260
Recommendation: The proposal as modified in the ROP should be accepted in principle. Rearrange the material and add headings as follows:
110.74 Conductor Installation. Conductors installed in manholes and other enclosures intended for personnel entry shall be cabled, racked up, or arranged in an approved manner that provides ready and safe access for persons to enter for installation and maintenance. The installation shall comply with 110.74(A) or (B) as applicable:
(A) 600 Volts, Nominal, or Less. Wire bending space for conductors operating at 600 volts or less shall be provided in accordance with the requirements of 314.28.
(B) Over 600 Volts, Nominal. Conductors operating at over 600 volts shall be provided with bending space in accordance with 314.71(A) and 314.71(B), as applicable.
Exception: Where 314.71(B) applies, each row or column of ducts on one wall of the enclosure shall be calculated individually, and the single row or column that provides the maximum distance shall be used.
Substantiation: The racking requirement applies to all installations, regardless of voltage, and therefore belongs in the parent language. The panel ROP wording would have it apply only "as applicable" which is completely unclear in the context provided in the ROP. In addition, the ROP wording located the medium voltage exception after the racking requirement. In the interest of clarity, exceptions should directly follow the rule under exception, and if otherwise, they must contain explicit language pointing to the language they modify (See the Style Manual at 2.6.1). The wording in this comment correctly locates the material and provides the subheadings as directed by the TCC and the NEC Style Manual.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-148 Log #2863 NEC-P01 **Final Action: Accept in Principle**
(110.74)

Submitter: Louis Barrios, Shell Global Solutions / Rep. American Chemistry Council
Comment on Proposal No: 1-260
Recommendation: Revise the committee wording for 110.74(B) as follows: "Wire bending space for conductors operating over 600 volts shall be provided in accordance with the requirements of 314.71(A) and 314.71(B), as applicable."
Substantiation: The change is editorial in nature to make the statements in 110.74(A) and 110.74(B) parallel in structure.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 1-147.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 200 — USE AND IDENTIFICATION OF GROUNDED CONDUCTORS

5-22 Log #2191 NEC-P05 **Final Action: Reject**
(200.1)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-29
Recommendation: Accept the proposal.
Substantiation: The panel is correct that a grounded conductor is connected to earth, which includes equipment grounding conductors and grounding electrode conductors, which are not "circuit" conductors. They are covered by Article 250; Article 200 is limited to circuit conductors.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the panel statement to Proposal 5-29. By definition a grounded conductor is a circuit or system conductor.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-23 Log #603 NEC-P05 **Final Action: Accept in Principle**
(200.2)

Submitter: Robert J. Walsh, City of Hayward
Comment on Proposal No: 5-31
Recommendation: Revise text to read as follows:

"All premises wiring systems, other than circuits and systems specifically exempted or prohibited by other sections of this Code ~~210.10, 215.7, 250.21, 250.22, 250.162,~~ 430.21, 430.25, ~~503.155, 517.63,668.11, 668.21, and 680.41, Exception~~, shall have a grounded conductor that is identified in accordance with 200.6. The grounded conductor shall comply with 200.2 (A) and (B). For premises wiring systems. a grounded conductor shall not be required to be installed with the ungrounded conductors of a feeder or branch circuit where it is unnecessary based upon the load served."

Substantiation: I agree with Mr. Harding's comments on ROP 5-31 Log 315# NEC-P05 and the new sentence should be provided.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-25.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-24 Log #1823 NEC-P05 **Final Action: Accept in Principle**
(200.2)

Submitter: G. Scott Harding, F. B. Harding, Inc.
Comment on Proposal No: 5-31
Recommendation: Continue to Accept in Principle and add a new sentence to read as follows:

For premises wiring systems, a grounded conductor shall not be required to be installed with the ungrounded conductors of a feeder or branch circuit where it is unnecessary based on the load served.

Substantiation: Removal of the list in 200.2 does not completely address the concerns of the submitter. The submitter is concerned that this requirement, as currently indicated in the NEC, could be misconstrued to require a grounded conductor in applications whether it is required by the load or not.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-25.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-25 Log #2332 NEC-P05 **Final Action: Accept in Principle**
(200.2)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-31
Recommendation: Delete as follows:
~~**200.2 General.** All premises wiring systems, other than circuits and systems specifically exempted or prohibited by other sections of this *Code* shall have a grounded conductor that is identified in accordance with 200.6. The grounded conductor shall comply with 200.2(A) and (B).~~
Substantiation: This section can be deleted in its entirety, as it is already covered and dealt with in 250.24(C). With the acceptance of proposed 5-31, this section really becomes quite useless—"All systems must have a grounded conductor unless they don't have to" isn't helpful and doesn't seem to contain any requirement that isn't found elsewhere.
Panel Meeting Action: Accept in Principle
Revise 200.2 General to read as follows:
200.2 General. Grounded conductors shall comply with 200.2(A) and (B).
Panel Statement: There is no substantiation to remove subsections (A) and (B). CMP 5 has reconsidered the general requirement in 200.2. The requirement to install a grounded conductor is adequately covered in 250.24 (C) and 250.30 (A).
This action does not remove subsections (A) and (B).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-26 Log #2275 NEC-P05 **Final Action: Reject**
(200.2(B), FPN (New))

Submitter: Joseph A. Hertel, Safety and Buildings / Rep. State of Wisconsin
Comment on Proposal No: 5-32
Recommendation: Revise to read as follows:
(B) Continuity. The continuity of a grounded conductor shall not depend on a ~~connection to a~~ metallic enclosure, raceway, or cable armor.
Substantiation: Removal of the words (connection to a) eliminates the ambiguity where a threaded fastener connected to a panelboard holds the components of the grounded conductor bus system together, providing mechanical and electrical continuity. The word "connection" adds no value to the statement. The continuity of a grounded conductor may depend on the connection to a metallic enclosure but not use the enclosure as a conductor.
Panel Meeting Action: Reject
Panel Statement: No evidence of a problem was provided in the substantiation. Accepting this comment would restrict the use of currently listed products with no evidence of a problem. A significant portion of this requirement includes the concept of a connection to an enclosure. The continuity of the grounded conductor must be made by using something other than just the enclosure. A connection to the enclosure is not prohibited.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-27 Log #1447 NEC-P05 **Final Action: Reject**
(200.6(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-37
Recommendation: Accept the proposal with the following revisions:
Add: "individually covered" after "insulated" in the first sentence.
Substantiation: Where permitted, individually covered conductors should be included.
Panel Meeting Action: Reject
Panel Statement: The substantiation provided is not adequate.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-28 Log #1953 NEC-P05 **Final Action: Accept in Principle**
(200.6(B))

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 5-39
Recommendation: Revise the proposal as follows: (B) Sizes 5 AWG or Larger ~~Than 6 AWG~~. An insulated grounded conductor ~~larger than 6 AWG~~ 5 AWG or larger shall be identified by one of the following means:
Substantiation: The original proposal used the normal size of conductors that are covered and used in the General Rules. The proposal was rejected because it restricted 5 AWG from the requirement. This comment has made the change the code panel requested.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-29.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-29 Log #2091 NEC-P05 **Final Action: Accept**
(200.6(B))

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 5-39
Recommendation: Accept the proposal as originally submitted:
(B) Sizes 4 AWG or Larger ~~Than 6 AWG~~. An insulated grounded conductor ~~larger than 6 AWG~~ 4 AWG or larger shall be identified by one of the following means:
Substantiation: The panel rejected the proposal because it neglected to include a 5 AWG conductor. The proposal used the normal size of conductors that are covered and used in the general rules of the Code. If Article 610 needed to amend the general rules, that could be accomplished. A 5 AWG is only used in Article 610 for Cranes and Hoists. This section has seen similar proposals from others over the years to indicate that this issue needs to be made clearer. The proposed wording would clear up this requirement and make the code more user friendly. Why would we say that the rule applies to conductors larger than a 6 AWG when we mean for conductors 4 AWG or larger.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-30 Log #2744 NEC-P05 **Final Action: Reject**
(200.6(D))

Submitter: Randal Hunter, City of Las Vegas
Comment on Proposal No: 5-42
Recommendation: Revise text to read as follows:
(D) Grounded Conductors of Different Systems. Where the premises wiring system has grounded conductors of different systems ~~are installed in the same raceway, cable, box, auxiliary gutter, or other type of enclosure~~, each grounded conductor shall be identified by system. Identification that distinguishes each system grounded conductor shall be permitted by one of the following means:
Substantiation: This was presented originally due to the fact that we are currently having to accept jobs which have different voltages both with the same colored neutrals. The current code language allows the same color neutrals within the same premise as long as they are not in the same raceway(120/208 and 277/480 within the same building both with white neutrals). This has lead to confusion for both the inspectors and the contractors, especially when performing service work at a later date. This proposal will match the language in 210.5 and 215.12
Panel Meeting Action: Reject
Panel Statement: If the grounded conductors of different systems are not in the same enclosure then connecting to one from a different system is not likely to occur. In each application one can differentiate the grounded conductor from the ungrounded conductor(s).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
BRETT, JR., M.: I agree with the submitter, although the committee has moved towards marking requirements based on good substantiation. I feel we still fall short of providing the safe guards available to us. We still permit white and gray to be used interchangeably, for example a facility with three systems 480/277, 208/120 and 240/120 could all use white or gray in each system as long as they don't share the same enclosure, raceways etc. this I believe is unsafe. During the initial installation separation can be controlled however, revisions to the original installation may unintentionally mingle these systems. For this reason I believe requiring the identification of each system grounded conductor is an appropriate safety issue that needs to be addressed.

5-31 Log #2490 NEC-P05 **Final Action: Accept in Principle**
(200.7(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-44
Recommendation: The proposal should be rejected.
Substantiation: The panel action diminishes safety. A cable with a white (or gray) wire reidentified in a switch loop, as it must be in the current wording, still presents a generally white or gray finish at the outlet. It is crucial on grounded circuits where the grounded conductor is used at the outlet that the actual grounded conductor be used for this purpose. The current requirement, dating back many generations, assures that where outlet connections are made, the ungrounded wire connected at the outlet is an unambiguously black (or other color) wire, because the white wire went to the switch. This provides additional contrast with the white (or gray) wire to be connected to the other side of the equipment supplied. It the ROP wording stands, the two wires arriving at a typical luminaire could be white and white with a piece of black tape to reidentify it. This is simply not as clear and will lead to confusion.
CMP 5, over this submitter's adamant objections, required some time back that the white wire in a cable assembly be reidentified if used in a switch loop. The sole substantiation for this change was based on field confusion by a manifestly untrained installer who didn't understand the function of the white

wire in such a switch loop. Very well, now the NEC avoids this problem, to the extent an installation code can be written for untrained individuals. It makes no sense to first (1999 NEC) add the requirement for reidentification of a white wire in a switch loop, to reduce confusion among inadequately trained persons, and then (Proposal 5-44) subtract the requirement that the real black wire actually arrive at the outlet connection, thereby increasing confusion among the same individuals.

The proposal substantiation mentioned the acceptance (also dating back generations) of reidentified white wires in other applications, such as electric heat and water heaters. These applications seldom involve the simultaneous terminations of grounded circuit conductors to terminals where the improper connection point could lead to disastrous results, such as could easily happen with an energized screw shell of a luminaire. In addition, these applications clearly deserve some relief where the only practical alternative would be the use of cable with an additional conductor (white or gray) that would not be used except as a waste of good copper. A switch leg does not involve such problems, only care in making the conductor selection. CMP 5 should continue the present requirement.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-32.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-32 Log #2333 NEC-P05 **Final Action: Accept in Principle**
(200.7(C)(1))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-44
Recommendation: Revise 200.7(C)(1) as follows:

(1) If part of a cable assembly that has the insulation permanently reidentified to indicate its use as an ungrounded conductor by marking tape, painting, or other effective means at its termination and at each location where the conductor is visible and accessible. Identification shall encircle the insulation and shall be a color other than white, gray, or green. Where used for single-pole, 3-way or 4-way switch loops, the conductor with white or gray insulation or a marking of three continuous white stripes shall be used for the supply to the switch but not as a return conductor from the switch to the switched outlet.

Substantiation: The submitter is correct that (previous) (C)(2) is not necessary, but by removing it altogether the requirement for the white conductor to be the supply to the switch has been lost. That provision had merit and should be retained. This proposed text borrows language from previous editions of the Code, but modifies it very slightly in order to make a more appropriate sentence in the context of the new paragraph.

Panel Meeting Action: Accept in Principle
Revise text to read as follows:

(1) If part of a cable assembly that has the insulation permanently reidentified to indicate its use as an ungrounded conductor by marking tape, painting, or other effective means at its termination and at each location where the conductor is visible and accessible. Identification shall encircle the insulation and shall be a color other than white, gray, or green. If used for single-pole, 3-way or 4-way switch loops, the reidentified conductor with white or gray insulation or three continuous white stripes shall be used only for the supply to the switch but not as a return conductor from the switch to the outlet.

Panel Statement: The panel makes only editorial revisions to the recommended language.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-33 Log #1987 NEC-P05 **Final Action: Accept in Principle**
(200.8 (New))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 5-49
Recommendation: The proposal should be accepted as submitted.
Substantiation: There are cases where multiple ungrounded conductors having no potential between them are being installed with a single oversized grounded conductor. (example: Two #12s on 20 amp breakers both installed on A phase with a #8 grounded conductor. There is no code rule that prohibits this practice in the 2008 code. The two specific provisions that use the currently undefined term of “common neutral, only apply to multi-wire type circuits. If this proposal is accepted proposal 5-7 must also be accepted.

Panel Meeting Action: Accept in Principle
Revise the ROP draft text to read as follows:
200.4 Neutral Conductors. Neutral conductors shall not be used for more than one branch circuit, multiwire branch circuit, or for more than one set of ungrounded feeder conductors unless specifically permitted elsewhere in this Code.
Panel Statement: The revised text clarifies that the restriction on use of the neutral in more than one branch circuit is prescriptive and not permissive. The panel concludes these changes resolve the issues raised by the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-34 Log #2334 NEC-P05 **Final Action: Accept in Principle**
(200.8 (New))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-49
Recommendation: Accept the proposal as originally submitted.
Substantiation: Having spoken with the submitter of this proposal, it seems the panel action does not address the concerns of the submitter. This proposal is intended to prohibit the practice of using two ungrounded conductors of the same phase or line from sharing a grounded conductor. As currently written, the only rule that comes close to addressing this is 310.10, which basically just requires a larger grounded conductor for this type of scenario.
The text that was modified by the panel refers only to multiwire branch circuits, which does not include the type of circuit discussed in this substantiation, as the ungrounded conductors do not have a voltage between them.
Alternatively, the panel could accept the following text:
Neutral conductors shall not be permitted to be used for more than one ~~multiwire~~ branch circuit or for more than one set of ungrounded feeder conductors unless specifically permitted elsewhere in this *Code*.
This proposed text removes the word “multiwire”, because a multiwire branch circuit is a single circuit, per the definition. By accepting this changed language, the concern of the submitter is met, and the requirement is bit more obvious.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-33.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

ARTICLE 210 — BRANCH CIRCUITS

2-13 Log #1200 NEC-P02 **Final Action: Accept**
(Table 210.2)

Submitter: Michael Flegel, Reliance Controls Corporation
Comment on Proposal No: 2-29
Recommendation: Reject the proposal.
Substantiation: Paragraph 445.20 has no reference or information pertaining to branch circuits and should not be referenced in this table. People may mistakenly interpret this to mean the circuit on the generator with GFCI protection is a branch circuit.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

KING, D.: This comment should have been rejected. All 125 volt receptacles installed in locations that are required to have GFCI protection under 210.8 should be provided with GFCI protection regardless of the power source or the designation of the circuit which supplies the receptacle outlet. Rejecting this comment would ensure that the same level of safety is provided for persons utilizing 125 volt receptacles supplied by generators as those supplied from branch circuits as required by 210.8.

LAROCCA, R.: The receptacles contained on the generator are provided with over current protection that very easily could be the only as well as the final over current protective device. This fits within the definition of a branch circuit.

Additionally, in the 1975 NEC, Section 210-8(b) required “all 120-volt single phase 15 and 20 ampere receptacle outlets which are not part of the permanent wiring of the building or structure, to have ground fault circuit interrupters for personnel protection.” An exception was inserted into 210-8(b)in the 1975 NEC that permitted “receptacles on a portable generator rated not more than 5 kW, where the circuit conductors of the generator are insulated from earth and the generator frame is insulated from earth and all grounded surfaces.” The original text requiring GFCI protection and the exception for 5 kW and smaller generators was covered as a branch circuit within Article 210.

The text was only transferred to Panel 3 for inclusion in Article 305 since Panel 3 had jurisdiction over temporary power on construction sites. The text in the 1983 TCR stated that the NEC Technical Correlating Committee was transferring GFCI requirements and the exception for 5 kW and smaller generators for construction sites to Article 305 and Panel 3. This section and exception was moved to 305-4(a) in 1984 and the text in the exception was changed to “receptacles on a 2-wire, single-phase portable or vehicle-mounted generator rated not more than 5 kW, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces” need not be GFCI protected.”

2-14 Log #2330 NEC-P02 **Final Action: Accept**
(210.2)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 2-29
Recommendation: Reject this Proposal.
Substantiation: Mr. Pauley's comment is in the ROP is quite correct. The provisions in 445.20 do not have anything to do with specific branch circuits, rather they address receptacles. Rules such as these do not belong in 210.2.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-13.
LAROCCA, R.: See my Explanation of Negative on Comment 2-13.

2-15 Log #2521 NEC-P02 **Final Action: Accept**
(Table 210.2)

Submitter: James Jongkind, American Honda Motor Co., Inc.
Comment on Proposal No: 2-29
Recommendation: Please do not accept the proposal.
Substantiation: As explained in a related comment to proposal 13-19, adding a GFCI requirement for all portable generators could have serious unintended consequences. As such I this proposal to add section 445.20 to table 210.2 should be rejected.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-13.
LAROCCA, R.: See my Explanation of Negative on Comment 2-13.

2-16 Log #2083 NEC-P02 **Final Action: Reject**
(210.4(A))

Submitter: Jim Davis, Electrical Education Services, LLC
Comment on Proposal No: 2-30
Recommendation: Add a new last sentence as follows:
210.4 Multiwire Branch Circuits.
(A) General. Branch circuits recognized by this article shall be permitted as multiwire circuits. A multiwire circuit shall be permitted to be considered as multiple circuits. All conductors of a multiwire branch circuit shall originate from the same panelboard or similar distribution equipment. Multiwire circuits shall be permitted only in supervised industrial installations as defined in 240.2.
Substantiation: The code panel is respectfully asked to reconsider its action on this proposal. The items identified as potential sources of hazard to personnel in the proposal substantiation are not addressed in the panel statement. Beyond that, in some states, licensing ("qualified installers") of electrical workers is not required for residential property owners, so the impact of this proposed change has little effect on those workers. In any occupancy, the pressure on electrical workers to minimize disruption to building users (by not turning off three circuits) during routine maintenance work is the primary issue that could lead to increased equipment damage, injury, or death.
Panel Meeting Action: Reject
Panel Statement: The submitter's recommendation is not practical. Adding such a sentence would eliminate the ability to supply any device that needed a multi-wire circuit such as a dryer or range in a dwelling unit. The revisions made by the panel in the 2008 Edition of the NEC to require common disconnect of the ungrounded conductors as well as the grouping requirements for the conductors address many of the concerns stated in the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-17 Log #60 NEC-P02 **Final Action: Accept**
(210.4(B), FPN (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-37
Recommendation: The Technical Correlating Committee directs the panel to reconsider the panel action on this proposal and consider deleting the mandatory phrase "required by this section" to comply with 3.1.3 of the NEC Style Manual.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise the text from the proposal to read as follows:
"Informational Note: See 240.15(B) for information on the use of single pole circuit breakers as the disconnecting means."
Panel Statement: The revision addresses the issue raised by the Technical Correlating Committee.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-18 Log #486 NEC-P02 **Final Action: Reject**
(210.4(C) Exception No. 2)

Submitter: Pete Baldauf, City of Vandalia
Comment on Proposal No: 2-40
Recommendation: CMP-2 should reconsider deleting exception #2 to 210.4(C).
Substantiation: Exception No. 2 to 210.4(C) is redundant to 210.4(B). Exhibit 210.2 from the 2008 NEC Handbook gives a pictorial example of where Exception No. 2 to 210.4(C) is applicable. The requirement for simultaneous disconnection of all ungrounded conductors of a multi-wire branch circuit found in 210.4(C) Exception No. 2 is the same as that of 210.4(B).
The last sentence of the panel statement to Proposal 2-39 reinforces this point. I quote: "The second exception permits multiple pieces of utilization equipment that may be line-to-line connected to be supplied, but ONLY WHERE THE OVERCURRENT DEVICE IS COMMON TRIP." (Emphasis added).
The requirement found in 210.4(B) covers this adequately without undermining the importance of 210.4(C) as it relates to line-to-neutral loads for multi-wire branch circuits.
Based upon these facts, the panel should support the deletion of exception No. 2 to 210.4(C).
Panel Meeting Action: Reject
Panel Statement: Elimination of the exception would require that multi-wire branch circuits supply only line to neutral connected loads. The exception is necessary to have the ability to supply more than one line-to-line utilization equipment from a multi-wire branch circuit. The submitter is incorrect in that 210.4(B) provides the necessary text.
The main rule in 210.4(C) limits multi-wire circuits to line to neutral only, an exception is necessary for other than line-to-neutral loads.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-19 Log #480 NEC-P02 **Final Action: Reject**
(210.4(D))

Submitter: Pete Baldauf, City of Vandalia
Comment on Proposal No: 2-42
Recommendation: Revise text to read as follows:
The ungrounded and grounded conductors of each multi-wire branch circuit shall be grouped by ~~wire ties or similar means~~ approved means in ~~at least one location~~ each location that terminations, connections or splices are made.
Substantiation: The original Proposal 2-42 lacked substantiation for the addition of the phrase "approved means" to accomplish the grouping of multi-wire branch circuits as contemplated in 210.4(D). This was pointed out in the panel statement for Proposal 2-42.
The term "approved" is a defined term in Article 100. It states: "Acceptable to the authority having jurisdiction."
There is no supporting verbiage for the terms "wire ties" or "similar means". Both of these terms would be subject to be "approved". The terms "wire ties" and "similar means" are subjective without defined parameters. Further, the word "similar" is an unenforceable term in accordance with Table 3.2.1 of the NEC Style Manual.
The addition of the phrase "approved means" as shown in Proposal 2-42 utilizes verbiage that is currently defined and applied in various locations throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: As stated in 110.2, all conductors and equipment must be "approved". As such, whatever method is used is already subject to approval. The panel specifically mentions cable ties as one means because it is the most common method of meeting the rule. Changing the rule to "approved" only, does not add clarity.
See the panel action on Comment 2-22.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-22.

2-20 Log #1621 NEC-P02 **Final Action: Reject**
(210.4(D))

Submitter: Michael L. Last, Ocean View, HI
Comment on Proposal No: 2-44
Recommendation: Accept Proposal 2-44.
Substantiation: Further consideration of this proposal is indicated by the Explanation of Negative vote by panel member King, D. Member King represents a labor organization concerned with safety in the workplace. He states, "The Submitter of this proposal has identified a common installation practice that in many cases compromises this important safety requirement." In addition, he states, "The submitter has clearly substantiated that grouping alone is not sufficient and proposes an effective and practical means to ensure that the intent of 210.4(D) is met." These statements are attributed to a representative of those who encounter the situation while actually working in the profession. These ARE the "hands-on" employees whose safety is being compromised. Further consideration is warranted.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that the marking in addition to the grouping is necessary. The objective of the requirement is to find the particular grounded conductor associated with a set of ungrounded conductors that are part of a multi-wire branch circuit. Once the worker identifies the multi-wire circuit, ungrounded conductors that are intended to be worked on, it is a simple task to trace these back within the panelboard to the grouping and determine the associated grounded conductor.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This Comment should have been accepted. The panel statement does not address the submitter of this comment's concern which is proper identification of the grounded conductor of a multiwire branch circuit where multiple circuits enter a panel or box and are inadvertently grouped together. The only clear way to identify the conductors that are part of a multiwire branch circuit is by tagging or other similar methods as is recommended by the submitter in the the original proposal.

2-21 Log #1723 NEC-P02 **Final Action: Reject**
(210.4(D))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 2-42
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(D) Grouping. The ungrounded and grounded conductors of each multiwire branch circuit shall be grouped by cable ties or similar means where ~~at each location that~~ terminations, connections, or splices are made.
Substantiation: Editorial changes are suggested to improve the syntax. The word "where" should be used to indicate a location as indicated in the NEC Style Manual.
Panel Meeting Action: Reject
Panel Statement: The comment does improve the syntax, however, the text associated with grouping at other than the panelboard has been deleted through the action taken on Comment 2-22. The submitter of Comment 2-22 makes a valid case for not extending the grouping requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-22 Log #2491 NEC-P02 **Final Action: Accept**
(210.4(D))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-42
Recommendation: The proposal should be rejected.
Substantiation: The panel action on this proposal is excessive. As the originator (Comment 2-13, 2005 and Proposal 2-17, 2008 NEC cycles) of the concept that resulted in 210.4(D) mandating that the conductors of multiwire branch circuits be grouped where they originate, I can say with authority that it was never intended that the grouping requirement be applied in other locations. The adverse comment in the voting is exactly correct. The point was to make it possible for electricians attempting to isolate a multiwire circuit for disconnecting purposes to be able to do so correctly. Not all circuit breakers supplying multiwire branch circuits are adjacent to one another and all white (or gray) wires look alike; the grouping rule makes it easy to disconnect the correct conductors and it also makes it easy for an inspector to verify that a correct selection of phases (or lines) has been achieved. Neither of these actions will normally occur at a remote location.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This comment should have been rejected. I disagree with the submitter of this comment's substantiation. It was the intent of the submitter of proposal 2-42 that the grouping requirements for multiwire branch circuits apply to other locations. Proper identification of conductors associated with multiwire branch circuits is a safety concern at all points where splices and terminations are made. Given the near unanimous support for this proposal at the ROP Meeting, Panel 2 should give this comment further consideration.

2-23 Log #2492 NEC-P02 **Final Action: Accept**
(210.4(D))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-44
Recommendation: Continue to reject the proposal.
Substantiation: The grouping requirement includes the neutral conductor, making the function obvious. Although it is certainly true that conductors, especially stranded ones, are commonly grouped in a panel gutter for reasons of workmanship, the current wording of 210.4(D) assures that such a grouping will be a grouping of groups, immediately apparent to a qualified electrician.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 2-20.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: See explanation of negative on Comment 2-20.

2-24 Log #1448 NEC-P02 **Final Action: Reject**
(210.4(D) and Exception (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-48
Recommendation: Accept the proposal with the following revisions:
Exception: The requirement for grouping shall not apply where the multiwire circuit is supplied from a single circuit breaker or single fused switch in an enclosure that does not accommodate additional circuit breakers or fused switches. A circuit breaker with approved handle ties shall be considered a single circuit breaker.
Substantiation: Grouping is not necessary where only one multiwire circuit can be installed, since there is only one set of circuit conductors.
Panel Meeting Action: Reject
Panel Statement: The situation described by the submitter is already covered by the existing exception. By definition, if only one multi-wire branch circuit is entering the enclosure it will be from a unique raceway or cable which is covered by the existing exception.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-25 Log #61 NEC-P02 **Final Action: Accept**
(210.4(D) and Exception (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-48
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal with respect to the addition of the word "circuit".
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
In the wording of Proposal 2-48, add the word "circuit" between the words "ungrounded" and "conductors" in 210.4(D).
Panel Statement: The panel accepts the direction of the Technical Correlating Committee, and has clarified that the term "circuit" is to be added.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-26 Log #1045 NEC-P02 **Final Action: Reject**
(210.5(C))

Submitter: Jamie McNamara, Hastings, MN
Comment on Proposal No: 2-55
Recommendation: Mr. Don King's explanation of negative vote should be looked at again and the change he proposes accepted.
Substantiation: None given.
Panel Meeting Action: Reject
Panel Statement: There are numerous methods of providing such documentation that may not be "written". One example is an electronic system that would allow all of the documentation to be pulled up electronically based on the panel identification.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This comment should have been accepted. The proposed requirement for approved written documentation is to provide a consistent method for the authority having jurisdiction to be able to enforce.

2-27 Log #2335 NEC-P02 **Final Action: Accept**
(210.5(C))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 2-52
Recommendation: Add a charging statement to the text, as follows:
(C) Identification of Ungrounded Conductors. Ungrounded conductors shall be identified in accordance with (1), (2), and (3).
(1) Application. Text to remain unchanged.
(2) Means of Identification. Text to remain unchanged.
(3) Posting of Identification Means. Text to remain unchanged.
Substantiation: This change is an editorial one, intended to provide consistency with most other Code sections.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-28 Log #2493 NEC-P02 **Final Action: Reject**
(210.7(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-61
Recommendation: Accept the proposal.
Substantiation: The proposed text is neither vague nor unenforceable. It is equally prescriptive, and quite necessary. It provides a needed alternative to a multi-pole circuit breaker or an individual fused switch. It provides the equivalent in safety, because as worded if someone is attempting to disconnect the outlet for servicing, the common disconnect for the yoke will be immediately apparent to the user. Remember that 110.22(A) already requires a legible marking for such a device. It should not be necessary to send the inspector into the provisions of 90.4 to permit such an arrangement, which is arguably permitted by the current wording, depending on how broadly the word "point" in the current text is interpreted in the field. The proposal addresses a common occurrence, particularly in old work.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms it action and statement on Proposal 2-61.
The present text is clear and provides the AHJ with prescriptive requirements with which to determine what is a practical and safe installation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-3 Log #62 NEC-P18 **Final Action: Accept**
(210.8)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-66
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 18 for action in Article 406.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
CMP 18 accepts the direction of the TCC to consider Proposal 2-66 and rejects this proposal.
Panel Statement: CMP 18 reaffirms its action and statement on Proposals 18-71 and 18-73. Proposal 18-73 was the companion proposal to Proposal 2-66 submitted by the same individual.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

2-29 Log #1717 NEC-P02 **Final Action: Accept**
(210.8)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 2-77
Recommendation: Move the sentence added to 210.8(A) and (B) to the opening paragraph of 210.8 and delete the sentence from existing 210.8(A) and (B) of the 2011 NEC ROP Draft to read as follows:
210.8 Ground-Fault Circuit-Interrupter Protection for Personnel.
Ground-fault circuit-interruption for personnel shall be provided as required in (A) through (C). The ground-fault circuit-interrupter shall be installed in a readily accessible location.
Informational Note: See 215.9 for ground-fault circuit-interrupter protection for personnel on feeders.
Delete the second sentence in the proposed opening paragraph from 210.8(A) and (B) in the 2011 NEC ROP Draft.
Substantiation: A new opening paragraph is suggested to introduce the section. This is intended to be an editorial improvement and not introduce a new concept. Since an identical sentence has been added to both (A) and (B), the sentence should be moved to the opening paragraph so it applies to both (A) and (B) without duplicate sentences.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-30 Log #2175 NEC-P02 **Final Action: Reject**
(210.8(A))

Submitter: Wayne E. Morris, Association of Home Appliance Manufacturers
Comment on Proposal No: 2-70
Recommendation: The Code-Making Panel should accept Proposal 2-70.
Substantiation: This proposal replaces the exception from GFCI requirements for large appliances located in dedicated spaces that was deleted from the 2005 NEC. Nuisance failures of GFCIs for freezers or refrigerators located in a basement or garage may be rare, but cause a great deal of damage when they occur.. No evidence has been given of a problem causing the elimination of the exceptions in the 2005 NEC. Reports are coming in of nuisance tripped breakers causing homeowners and business managers to remove the GFCI breaker outlets. The fact that some states have not adopted this provision in the 2008 NEC shows that this is still a very controversial change by Code Panel 2.
Panel Meeting Action: Reject
Panel Statement: As stated in response to the original proposal, there is no specific text provided as to what is expected to be added into the NEC. In addition, the panel was very clear in its statements in the 2008 NEC as to the rationale for removal of the exceptions. Although the submitter indicates "reports of nuisance tripped" GFCIs, he fails to indicate how many of those are due to the failure of the appliance to maintain leakage current levels below the 4mA range.
As the panel has stated previously, if an appliance is leaking current above the GFCI threshold, the appliance needs to be investigated and serviced to eliminate the potential hazard.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
PURVIS, R.: This comment should have been accepted. The damage due to tripped GFCIs on refrigerators and freezers seems greater than the safety concerns with GFCIs.
Comment on Affirmative:
BROWN, L.: There still seems to be problems with GFCI protection for certain appliances that this Technical Committee refuses to believe. NFPA should do a study to substantiate the position taken by the NFPA Technical Committee.

2-31 Log #2696 NEC-P02 **Final Action: Reject**
(210.8(A))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 2-72
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject

Panel Statement: The panel notes that the submitter is proposing that the subject receptacle replace the requirements for GFCI protection. The report supplied with the substantiation indicates that the electric shock provisions would be evaluated in accordance with UL 943, Standard for Safety for Ground-Fault Circuit Interrupters. If the device is evaluated to and meets these provisions, it could be applied as a GFCI under the current NEC rules. As such, the panel does not see any justification to revise the code language. As for the other features of the receptacle, temperature sensing and power off, these are specific receptacle features that are under the purview of Code-Making Panel 18.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-32 Log #2699 NEC-P02 **Final Action: Reject**
(210.8(A))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 2-71
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-12.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-33 Log #1040 NEC-P02 **Final Action: Accept in Principle**
(210.8(A) and 210.8(B))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 2-77
Recommendation: Continue to accept the proposal in principle in part as outlined in the panel action text.
Substantiation: This will continue to improve the accessibility of GFCIs in all locations. Many ground fault receptacles are mounted behind large appliances making them difficult to locate for testing and resetting.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action taken on Comment 2-29. The panel has rearranged the text to place the rule into the main paragraph of 210.8.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-34 Log #2176 NEC-P02 **Final Action: Reject**
(210.8(A)(2))

Submitter: Wayne E. Morris, Association of Home Appliance Manufacturers
Comment on Proposal No: 2-80
Recommendation: The Code-Making Panel should accept Proposal 2-80.
Substantiation: This proposal replaces the exception from GFCI requirements for large appliances located in dedicated spaces that was deleted from the 2005 NEC. Nuisance failures of GFCIs for freezers or refrigerators located in a basement or garage may be rare, but cause a great deal of damage when they occur. The GFCI is often difficult to locate behind a refrigerator or freezer, leading to difficulty in both identifying the tripped outlet and resetting the GFCI.
Panel Meeting Action: Reject
Panel Statement: The panel reiterates its statement from Proposal 2-80 that these appliances are compatible with GFCIs.
The issue of the location of the GFCI is addressed through the actions taken on Proposal 2-77 and Comment 2-29.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BROWN, L.: There still seems to be problems with GFCI protection for certain appliances that this Technical Committee refuses to believe. NFPA should do a study to substantiate the position taken by the NFPA Technical Committee.
PURVIS, R.: This comment should have been accepted. The damage due to tripped GFCIs on refrigerators and freezers seems greater than the safety concerns with GFCIs.

2-35 Log #2358 NEC-P02 **Final Action: Accept in Principle**
(210.8(A)(2))

Submitter: Marcus R. Sampson, Lysistrata Electric
Comment on Proposal No: 2-77
Recommendation: Continue to accept this proposal.
Substantiation: The requirement to install the GFCI device in an accessible location will not only assist the user in complying with the recommended regular testing of the device, but the AHJ will be able to enforce common sense with specific Code language.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action taken on Comment 2-29. The panel has rearranged the text to place the rule into the main paragraph of 210.8.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-36 Log #2880 NEC-P02 **Final Action: Reject**
(210.8(A)(2))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" since it does not comply with 4.4.5(c) of the NFPA Regulations Governing Committee Projects.
Submitter: Timothy D. Curry, Curry Electric, Inc.
Comment on Proposal No: 2-77
Recommendation: None provided.
Substantiation: I STRONGLY AGREE THAT THIS IS A PROBLEM AND THAT THE PROPOSAL, AS IT HAS BEEN ACCEPTED, IS A GOOD REVISION AND WORTHY OF BEING ACCEPTED.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action taken on Comment 2-29. The panel has rearranged the text to place the rule into the main paragraph of 210.8.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-37 Log #2177 NEC-P02 **Final Action: Reject**
(210.8(A)(2) Exception to (2))

Submitter: Wayne E. Morris, Association of Home Appliance Manufacturers
Comment on Proposal No: 2-87
Recommendation: The Code-Making Panel should accept proposal 2-87.
Substantiation: This proposal replaces the exception from GFCI requirements for large appliances located in dedicated spaces that was deleted from the 2005 NEC. Nuisance failures of GFCIs for freezers or refrigerators located in a basement or garage may be rare, but cause a great deal of damage when they occur. The GFCI is often difficult to locate behind a refrigerator or freezer, leading to difficulty in both identifying the tripped outlet and resetting the GFCI.
Panel Meeting Action: Reject
Panel Statement: The panel reiterates its statement from Proposal 2-87 that these appliances are compatible with GFCIs. The issue of the location of the GFCI is addressed through the actions taken on Proposal 2-77 and Comment 2-29.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
PURVIS, R.: This comment should have been accepted. The damage due to tripped GFCIs on refrigerators and freezers seems greater than the safety concerns with GFCIs.

2-38 Log #2406 NEC-P02 **Final Action: Reject**
(210.8(A)(2) Exception to (2))

Submitter: Brian E. Rock, Hubbell Inc.
Comment on Proposal No: 2-87
Recommendation: If the Panel revises its previous Panel Action to Reject for any reason, revise any proposed text to replace "twist lock receptacle" with "locking-type receptacle".
Substantiation: "Twist-Lock", as proposed by the Submitter of P2-87, is a registered trademark (U.S. Patent & Trademark Office Nos. 565,872, 1,800,509, and 1,845,454) of Hubbell Incorporated for receptacles, attachment plugs, cable connectors, and inlets (motor attachment plug caps) of the locking-blade construction, and for enclosures employing similar. If the Panel revises its Panel Action for any reason and decides to include the P2-87 Submitter's new text, change to generic "locking-type receptacle."
Panel Meeting Action: Reject
Panel Statement: The panel has not revised its action on Proposal 2-87, and as such, the revision is not appropriate.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-39 Log #656 NEC-P02 **Final Action: Reject**
(210.8(A)(3))

Submitter: Michael Strauss, BSafe Electrix Inc.
Comment on Proposal No: 2-89
Recommendation: BSafe Electix Inc. had requested several revisions to NFPA 70 which were Rejected by the panels responsible for evaluating them.
Substantiation: We do claim that the device will eliminate/mitigate a subset of wiring device hazards. As studied and documented in the published literature, fires do arise from overheated receptacles; these fires are the ones Integral Thermal Circuit-Interrupers offer protection from.

UL test data, as well as internal test data, support our claim that the BSafe Exectrix receptacle will interrupt electrical flow to it if a specified temperature rise is exceeded; it does not appear the the panel disagreed with this. As with any device, there well may be unanticipated failure mechanisms that can arise. We, therefore, have developed, and are offering a device that will detect receptacle overheating, interrupt further electrical flow to it, and thereby reduce the number of fires that occur. This precisely focused effort has been successful; the fact that there may be other failure mechanisms that can lead to fires does not reduce the importance of the fire reductions that will result from acceptance of the Integral Thermal Circuit-Interrupter.

As the Panel indicated, "Installation of these devices is not prohibited by the NEC." We, therefore, proceeding to market the BSafe Electrix receptacle and in addition we are offering our patented technologies for licensing at reasonable royalties. Our goal, in part, is to gain additional performance experience in a range of applications and to promote fire safety. This experience will be made available to the NFPA and the public through presentations in various venues.

Additionally, we "...specifically noted that the new device embodies one approach to detecting and reacting to overheating within a receptacle. Many other approaches may be reduced to practice and marketed by companies and individuals throughout the world, based on improved sensing, analytical and manufacturing capabilities." Our expectation is that we and others will continue to develop Integral Thermal Circuit-Interrupter technologies and, when appropriate, present additional data to the NFPA that leads to their recognition as another advance in fire protection. We will, of course, carefully consider the Panel's Statement as we collect additional data and continue with our development programs.

While disappointed, we do respect the efforts the NFPA's Panels and the entire staff expend to continually increase the safety of the public, both nationally and throughout the world; and we sincerely thank them all.
Panel Meeting Action: Reject
Panel Statement: The comment does not recommend specific code text as is required by section 4.3.3(c) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-40 Log #657 NEC-P02 **Final Action: Reject**
(210.8(A)(5))

Submitter: Michael Strauss, BSafe Electrix Inc.
Comment on Proposal No: 2-92
Recommendation: BSafe Electix Inc. had requested several revisions to NFPA 70 which were Rejected by the panels responsible for evaluating them.
Substantiation: We do claim that the device will eliminate/mitigate a subset of wiring device hazards. As studied and documented in the published literature, fires do arise from overheated receptacles; these fires are the ones Integral Thermal Circuit-Interrupers offer protection from.

UL test data, as well as internal test data, support our claim that the BSafe Exectrix receptacle will interrupt electrical flow to it if a specified temperature rise is exceeded; it does not appear the the panel disagreed with this. As with any device, there well may be unanticipated failure mechanisms that can arise. We, therefore, have developed, and are offering a device that will detect receptacle overheating, interrupt further electrical flow to it, and thereby reduce the number of fires that occur. This precisely focused effort has been successful; the fact that there may be other failure mechanisms that can lead to fires does not reduce the importance of the fire reductions that will result from acceptance of the Integral Thermal Circuit-Interrupter.

As the Panel indicated, "Installation of these devices is not prohibited by the NEC." We, therefore, proceeding to market the BSafe Electrix receptacle and in addition we are offering our patented technologies for licensing at reasonable royalties. Our goal, in part, is to gain additional performance experience in a range of applications and to promote fire safety. This experience will be made available to the NFPA and the public through presentations in various venues.

Additionally, we "...specifically noted that the new device embodies one approach to detecting and reacting to overheating within a receptacle. Many other approaches may be reduced to practice and marketed by companies and individuals throughout the world, based on improved sensing, analytical and manufacturing capabilities." Our expectation is that we and others will continue to develop Integral Thermal Circuit-Interrupter technologies and, when appropriate, present additional data to the NFPA that leads to their recognition as another advance in fire protection. We will, of course, carefully consider the Panel's Statement as we collect additional data and continue with our development programs.

While disappointed, we do respect the efforts the NFPA's Panels and the entire staff expend to continually increase the safety of the public, both nationally and throughout the world; and we sincerely thank them all.
Panel Meeting Action: Reject
Panel Statement: The comment does not recommend specific code text as is required by section 4.3.3(c) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-41 Log #2178 NEC-P02 **Final Action: Reject**
(210.8(A)(5))

Submitter: Wayne E. Morris, Association of Home Appliance Manufacturers
Comment on Proposal No: 2-94
Recommendation: The Code-Making Panel should accept Proposal 2-94.
Substantiation: This proposal replaces the exception from GFCI requirements for large appliances located in dedicated spaces that was deleted from the 2005 NEC. Nuisance failures of GFCIs for freezers or refrigerators located in a basement or garage may be rare, but cause a great deal of damage when they occur. No evidence has been given of a problem causing the elimination of the exceptions in the 2005 NEC. Reports are coming in of nuisance tripped breakers causing homeowners and business managers to remove the GFCI breaker outlets. The fact that some states have not adopted this provision in the 2008 NEC shows that this is still a very controversial change by Code Panel 2.
Panel Meeting Action: Reject
Panel Statement: The panel reiterates its statement in Proposal 2-80 that these appliances are compatible with GFCIs. The issue of the location of the GFCI is addressed through the actions taken on Proposal 2-77 and Comment 2-29.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
PURVIS, R.: This comment should have been accepted. The damage due to tripped GFCIs on refrigerators and freezers seems greater than the safety concerns with GFCIs.

2-42 Log #1590 NEC-P02 **Final Action: Accept**
(210.8(A)(7))

Submitter: Jim Pauley, Schneider Electric
Comment on Proposal No: 2-103
Recommendation: Revise the wording to read as follows:
(7) Sinks — ~~for~~ located in areas other than kitchens ~~as covered in 210.8(A)(6)~~, where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink.
Substantiation: The revision is suggested to eliminate the possible confusion about where the new rule applies. 210.8(A)(6) applies to receptacles serving the countertop in kitchens. As worded in 210.8(A)(7), the rule seems to apply to receptacles other than the countertop receptacles and if interpreted in that manner would then place GFCI protection on the receptacles for the disposal and dishwasher which are not countertop receptacles, but are generally within 6' of the sink.

The revision modifies the wording to simply remove kitchens from consideration in 210.8(A)(7) which would seem to be the intent of the panel.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-43 Log #2494 NEC-P02 **Final Action: Accept in Principle**
(210.8(A)(7))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-103
Recommendation: Accept the panel action in principle. Revise the text to read as follows:
(7) Sinks located in areas other than kitchens, where installed within 1.8 m (6 ft), measured horizontally from the outside edge.
Substantiation: The comment in the voting is correct. In addition, it is important that the means of measuring the 6-ft dimension be spelled out. A baseboard-height receptacle 6 ft 1 in. from a countertop sink will be well within the 6-ft coverage zone if the height is measured horizontally and not on a diagonal; this comment clarifies that such a receptacle is within the coverage area. This particular topic is a routine area of controversy in the field.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action taken on Comment 2-42. The revision made by the acceptance of Comment 2-42 accomplishes the objective of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-44 Log #63 NEC-P02 **Final Action: Accept**
(210.8(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-109
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal as Proposal 2-77 addresses a different section with different text.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee and notes that Proposal 2-77 does, in fact, address 210.8(A) and 210.8(B) in the panel action. As such, the subject of Proposal 2-109 is addressed in the action taken on Proposal 2-77.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-45 Log #2241 NEC-P02 **Final Action: Accept**
(210.8(B))

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 2-122
Recommendation: Revise the submitter's Proposal 2-122 as follows:

~~Garages, service bays, and similar areas.~~ Garages, service bays, and similar areas where electrical diagnostic equipment, electrical hand tools, or portable lighting equipment are to be used.

Substantiation: The revised wording takes into account the submitter's original proposal, the panel statement, and the ballot comments. In addition to facilities where diesel-powered vehicles are parked, stored, or serviced, the expanded GFCI rules will enhance electrical safety in repair garages and similar occupancies that will increasingly be used for plug-in electric hybrid vehicles and similar new types of vehicles.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-46 Log #2697 NEC-P02 **Final Action: Reject**
(210.8(B) and Exceptions)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 2-111
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel notes that the submitter is proposing that the subject receptacle replace the requirements for GFCI protection. The report supplied with the substantiation indicates that the electric shock provisions would be evaluated in accordance with UL 943 - Standard for Safety for Ground-Fault Circuit Interrupters. If the device is evaluated to and meets these provisions, it could be applied as a GFCI under the current NEC rules.

As such, the panel does not see any justification to revise the code language. As for the other features of the receptacle, temperature sensing and power off, these are specific receptacle features that are under the purview of Code-Making Panel 18.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-47 Log #473 NEC-P02 **Final Action: Reject**
(210.8(B)(5) (New))

TCC Action: The Technical Correlating Committee notes that Code-Making Panel 14 agreed with the action taken on Proposal 2-122.
Submitter: Code-Making Panel 14,
Comment on Proposal No: 2-122
Recommendation: CMP 14 is in agreement with the principle CMP-2 acted upon on Proposal 2-122, in that personal protection in garages is improved by the installation/use of ground-fault circuit-interrupter (GFCI) protection.
Substantiation: CMP-14 needs new recommended actions by CMP-14 within Article 511 to address improvements on GFCI issues that will be more appropriate in dealing with commercial garages.

This comment was developed by a CMP-14 Task Group and balloted through the entire panel with the following ballot results:

14 Eligible to vote
12 Affirmative
2 Ballots Not Returned (T. Beall and D.W. Zipse (Voting Alternate))
No comments on vote were received.

Panel Meeting Action: Reject
Panel Statement: The panel is unclear as to what Code-Making Panel 14 is recommending, since no specific action to either modify the text or continue with the proposed text is given.

See the panel action taken on Comment 2-45.

The panel has revised the wording to be consistent with the text of 511.12.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-48 Log #658 NEC-P02 **Final Action: Reject**
(210.8(B)(5))

Submitter: Michael Strauss, BSafe Electrix Inc.
Comment on Proposal No: 2-120
Recommendation: BSafe Electix Inc. had requested several revisions to NFPA 70 which were Rejected by the panels responsible for evaluating them.
Substantiation: We do claim that the device will eliminate/mitigate a subset of wiring device hazards. As studied and documented in the published literature, fires do arise from overheated receptacles; these fires are the ones Integral Thermal Circuit-Interrupers offer protection from.

UL test data, as well as internal test data, support our claim that the BSafe Exectrix receptacle will interrupt electrical flow to it if a specified temperature rise is exceeded; it does not appear the the panel disagreed with this. As with any device, there well may be unanticipated failure mechanisms that can arise. We, therefore, have developed, and are offering a device that will detect receptacle overheating, interrupt further electrical flow to it, and thereby reduce the number of fires that occur. This precisely focused effort has been successful; the fact that there may be other failure mechanisms that can lead to fires does not reduce the importance of the fire reductions that will result from acceptance of the Integral Thermal Circuit-Interrupter.

As the Panel indicated, "Installation of these devices is not prohibited by the NEC." We, therefore, proceeding to market the BSafe Electrix receptacle and in addition we are offering our patented technologies for licensing at reasonable royalties. Our goal, in part, is to gain additional performance experience in a range of applications and to promote fire safety. This experience will be made available to the NFPA and the public through presentations in various venues.

Additionally, we "...specifically noted that the new device embodies one approach to detecting and reacting to overheating within a receptacle. Many other approaches may be reduced to practice and marketed by companies and individuals throughout the world, based on improved sensing, analytical and manufacturing capabilities." Our expectation is that we and others will continue to develop Integral Thermal Circuit-Interrupter technologies and, when appropriate, present additional data to the NFPA that leads to their recognition as another advance in fire protection. We will, of course, carefully consider the Panel's Statement as we collect additional data and continue with our development programs.

While disappointed, we do respect the efforts the NFPA's Panels and the entire staff expend to continually increase the safety of the public, both nationally and throughout the world; and we sincerely thank them all.
Panel Meeting Action: Reject
Panel Statement: The comment does not recommend specific code text as is required by section 4.3.3(c) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-49 Log #2495 NEC-P02 **Final Action: Reject**
(210.8(B)(5) (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-122
Recommendation: The proposal should be rejected.
Substantiation: This material is a special requirement related to one of the enumerated occupancies in Chapter 5 of the NEC and should not be moved into Chapter 2. The comment if the voting well describes just one of the likely outcomes of such a relocation. These issues should remain with CMP 14.
Panel Meeting Action: Reject
Panel Statement: Although the panel agrees that the provision is parallel to 511.12, it does expand the GFCI protection to garages and service bays that are not covered by Article 511, such as those garages where vehicles are powered by other than flammable liquids or flammable gases.

The panel has modified the language via the action taken on Comment 2-45 to make the language consistent with 511.12.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-50 Log #1724 NEC-P02 **Final Action: Reject**
(210.8(B)(5) and Exception No. 1)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 2-121
Recommendation: Revise the existing text of the 2008 NEC as follows:

(5) Sinks — those ~~where~~ receptacles ~~are~~ installed within 1.8 m (6 ft) of the outside edge of the sink.

Exception No 1 to (5): In industrial, university, and research laboratories, receptacles shall be permitted without GFCI protection if used to supply equipment that requires continuous ~~where removal of~~ power for procedures being performed or the process involved and removal of power would introduce a greater hazard ~~shall be permitted to be installed without GFCI protection~~.
Substantiation: Some of the changes proposed to the requirement in (5) and Exception No. 1 are intended to be editorial and bring the text into compliance with the NEC Style Manual. Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if."

Similar or identical work is done in research and university laboratories as is done in industrial laboratories so the Exception should apply to those laboratories as well. The relocation of the phrase "shall be permitted to be installed without GFCI protection" is intended to improve the sentence structure.
Panel Meeting Action: Reject
Panel Statement: The submitter did not offer any additional substantiation that university and research laboratories should be considered in the same manner as industrial laboratories.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

WEBER, R.: This comment does have merit. In many cases, university and research laboratories perform similar or identical work to that of industrial laboratories. This exception would only be applicable if removal of power would create a greater hazard to persons or personnel. The option of GFCI protection in these instances should be left up to the governing body of these types of facilities. I encourage the submitter to come back with additional information for the next cycle.

2-51 Log #1725 NEC-P02 **Final Action: Reject**
(210.8(B)(5) Exception No. 2)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" to correlate with the actions taken on Comments 15-26 and 15-27.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 2-123
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
Exception No 2 to (5): For other than those receptacles covered under 210.8(B)(1), GFCI protection shall not be required for receptacles located at ~~in~~ patient bed locations ~~of~~ in basic care rooms, general care rooms, or critical care rooms ~~areas~~ of health care facilities ~~other than those covered under 210.8(B)(1), GFCI protection shall not be required.~~
Substantiation: Code Panel 15 has changed several of the definitions related to this exception. The former patient care areas consisting of general and critical care areas has been changed to three classes of rooms where different types of patient care is administered. Included are basic care room, general care room, and critical care room.

This comment intends to include these revised terms and to make editorial revisions to the sentence structure.
Panel Meeting Action: Accept
Panel Statement: The panel notes that if Code-Making Panel 15 does not maintain their definitions for the different patient care spaces, the Technical Correlating Committee should reject this comment.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-52 Log #2258 NEC-P02 **Final Action: Accept**
(210.8(B)(6))

Submitter: William Benard, Gemini Electric Inc.
Comment on Proposal No: 2-110
Recommendation: Revise as folows:

210.8(B)(6) Locker Rooms—with ~~adjacent~~ associated showering facilities.
Substantiation: The current proposed language does not accurately describe a distance with the use of the word "adjacent." In years past, the NEC has found it necessary to add the word "immediately" to qualify the term "adjacent" in order to determine a specific distance. In a case where the locker room is located via passage through an adjacent bathroom from the shower area would exempt the locker room from the prescribed protection. The locker room would still provide a location that promotes electrical shock due to the nature of the use as described in the substantiation of Proposal 2-110. Changing the term "adjacent" to "associated" does not place focus on a distance, but does consider the source of water carried to the drying/dressing area which is the problem.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-53 Log #1421 NEC-P02 **Final Action: Accept in Principle**
(210.8(B)(8))

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 2-122
Recommendation: Revise proposed new 210.8(B)(8) by adding the following:

(8) Garages, service bays, and similar areas.

Exception to (8): Parking garages.
Substantiation: It is not clear whether this proposed new requirement would apply to parking garages. If the panel agrees that they are not intended to be included, then this need to be made clear.

If the panel intends to include them, then make that clear by revising the proposed wording to read, "(8) Garages, parking garages, service bays, and similar areas."
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action taken on Comment 2-45.

The revisions made by the panel in Comment 2-45 address the submitter's concern by limiting the application to receptacles where portable diagnostic tools, electric hand tools or portable lighting will be used.

This action will address the submitter's concern regarding parking garages.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-54 Log #2336 NEC-P02 **Final Action: Reject**
(210.8(B)(8))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 2-122
Recommendation: Reject this proposal.
Substantiation: This new requirement results in new requirements without any technical substantiation. The substantiation was anecdotal in nature, without citing any specific incidents. 90.3 works very well when we let it do its job. Unfortunately, when the Code parrots rules from Chapter 5 in Chapter 2, conflicts often occur. For example, if the garage is governed by Article 511, do the GFCI rules in 511 modify this rule, requiring GFCIs only in the specific locations discussed in that article? This proposal seems to add more confusion than safety.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-49.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-55 Log #2698 NEC-P02 **Final Action: Reject**
(210.8(C))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 2-129
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The panel notes that the submitter is proposing that the subject receptacle replace the requirements for GFCI protection. The report supplied with the substantiation indicates that the electric shock provisions would be evaluated in accordance with UL 943 - Standard for Safety for Ground-Fault Circuit Interrupters. If the device is evaluated to and meets these provisions, it could be applied as a GFCI under the current NEC rules. As such, the panel does not see any justification to revise the code language. As for the other features of the receptacle, temperature sensing and power off, these are specific receptacle features that are under the purview of Code-Making Panel 18.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-56 Log #1372 NEC-P02 **Final Action: Reject**
(210.9 Exception No. 2)

Submitter: Charles M. Trout, Maron Electric Company
Comment on Proposal No: 2-134
Recommendation: Delete Exception No. 2 in its' entirety.
Substantiation: The panel is attempting to shift the responsibility for providing prescriptive Code requirements to the authority having jurisdiction. It is the responsibility of the Code process to provide prescriptive requirements for the authority having jurisdiction to enforce.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the substantiation and notes that there are numerous instances where the AHJ must determine whether or not the appropriate supervision exists for an installation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: I agree with the submitter of this comment. An exception that permits a reduction in safety should include clear prescriptive language for proper interpretation by both the electrician and the AHJ. since there is no requirement for documentation that would provide evidence to the AHJ that a qualified person actually exists, this could lead to inconsistent and improper application of this section."

2-57 Log #2496 NEC-P02 **Final Action: Accept**
(210.9 Exception No. 2 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-134
Recommendation: Continue to reject the proposal.
Substantiation: This proposal was considered and rejected for the 2008 NEC. Since it is now back once again with essentially the same arguments, and as the submitter of the series of proposals and comments over several cycles that finally inserted this exception into the NEC, I thought some historical background was in order. The following paragraph of this comment recapitulates my comment in the prior cycle (Comment 2-63, 2008 NEC cycle) that was instrumental in the rejection of a similar proposal.
"I did a great deal of my initial trade work in a number of heavy industrial occupancies, all of whom were running at 600V ungrounded. It was common practice to bring in machinery rated for 480 volts, and I would be assigned the task of wiring it. I quickly discovered that there were no 600V/480V two-winding transformers commercially available. However, a 480V/120V two-winding transformer connected as an autotransformer worked very well, and saved the enormous expense and labor involved in the only alternative, two sets of two-winding transformers. Since the potential hazard in this situation consists of the equipment running at some voltage to ground greater than 480V but in this case not much more, not over 600V, and since that is well within the equipment parameters, the code making panel made a reasonable assessment and allowed it to go forward. It should continue until and unless the industry is willing to make two-winding transformers available for this duty."
With respect to providing prescriptive requirements (in reference to comments in the voting), it is important to recognize that 600V installations really do not exist outside of an industrial environment. When the proposal was originally submitted, it had no qualified supervision limitation. CMP 2 originated this requirement in the interest of increased safety. It would be highly inappropriate to remove this allowance altogether as requested in the proposal, which is routinely applied to make 480V equipment function on 600V distributions, particularly in light of the fact that the proposal submitter, in both this and the prior code cycle, failed to document a single instance of loss experience. It is clear that the real issue with this proposal is heartburn around "qualified person" allowances throughout the NEC, and not this particular exception. CMP 2 took the correct action by retaining a consistent approach as that followed by all other panels responding to similar concerns.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-56.

9-3 Log #65 NEC-P09 **Final Action: Accept**
(210.10(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-135
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 9 for action.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the direction of the Technical Correlating Committee to act on Proposal 2-135 and rejects the proposal.
Panel Statement: Refer to the panel action and statement on Comment 9-3a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-3a Log #2497a NEC-P09 **Final Action: Accept**
(210.10(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-135
Recommendation: Continue to reject the proposal.
Substantiation: The object of this proposal is already contained in the NEC, in Section 410.104(B). This submitter, the senior member of CMP 9, is well aware that the TCC has forwarded this proposal to CMP 9 for action, and will make the same argument to that panel at the December meetings. Until and unless the TCC reassigns jurisdiction for the technical content of 410.104(B), it would be inappropriate to address the usual application of the proposed rule (luminaire ballasts) in yet another part of the NEC, because correlation problems are likely to crop up over time.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

(Note: Sequence 2-58 was not used)

2-59 Log #329 NEC-P02 **Final Action: Accept**
(210.11(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-138
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-60 Log #1446 NEC-P02 **Final Action: Reject**
(210.11(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-141
Recommendation: Accept the proposal.
Substantiation: While duplex 15-ampere receptacles may be tested for a combined 20-ampere load, it is irrelevant to the proposal. Portable electric hair blow dryers are not a combined load. Many of these dryers exceed 1440 watts, the 12-ampere limit specified in Table 210.21(B)(2); minimum ratings are usually 1500 watts.
Panel Meeting Action: Reject
Panel Statement: As stated in panel statement in Proposal 2-141, the submitter has not substantiated that devices requiring a 20A T-slot receptacle is needed to accommodate the devices on the market.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

3-3 Log #66 NEC-P03 **Final Action: Accept**
(210.12)

TCC Action: The Technical Correlating Committee directs that this comment to be sent to the NFPA 72 Task Group on Wiring for correlation with NFPA 72.
Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-156
Recommendation: It was the action of the Technical Correlating Committee to refer this proposal to Code-Making Panel 3 for correlating action in Article 760.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the NEC Technical Correlating Committee to correlate the actions of Proposal 2-156 with requirements in Article 760 and supports the accept in principle in part of Panel 2 with no further correlation necessary.
Based on the action of Panel 2 on Proposal 2-156 and the action of Panel 3 on Proposals 3-259 and 3-280, no further correlation is necessary. Panel 3 has changed "dedicated branch circuit" to "individual branch circuit." The protection requirements for the branch circuit conductors to be installed in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, and steel armored cable, as accepted by Panel 2, provide more substantial protection than less substantial metal raceways. Consequently, the less protective methods were rejected. The proposed Fine Print Note referencing Section 11.6.3(5) in NFPA 72 is unnecessary in Article 760 since Section 760.1, FPN No. 1 already references NFPA 72.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:

AYER, L.: While I agree with the panel action, the statement provided by the technical committee for comment 2-156 is incorrect. The panel statement infers that CMP 3 changed "dedicated branch circuit" to "individual branch circuit" when in fact Panel 3 did not accept either of these terms. CMP 3 changed the wording to the following text: "The branch circuit supplying the fire alarm equipment(s) shall supply no other loads." This change was necessary to reflect that a "branch circuit" could supply multiple pieces of fire alarm equipment, while a "individual branch circuit" would only serve one utilization equipment.

EGESDAL, S.: The National Fire Alarm Code identifies the power for a fire alarm system as a "dedicated circuit" The term came into use in NFPA 72 after the requirement for connecting fire alarm system power ahead or the main breaker for a building was changed to permit connection on the downstream side of the main breaker panel. This subject needs further review and action to correlate the text in the NEC and NFPA 72.

KAHN, S.: Since NFPA 72 identifies power for a fire alarm circuit as being provided by a "dedicated circuit", the subject requires further review for correlation with the NFPA document that provides the performance specification.

2-61 Log #330 NEC-P02 **Final Action: Accept**
(Table 210.12)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-319
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Abstain: 1
Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

2-62 Log #607 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Vincent Metallo, Sr., Baltimore County Government
Comment on Proposal No: 2-170
Recommendation: After the word "dwelling" insert the following text:
"units except outlets that are required to be gfci protected in accordance with 210.8(A)."
Substantiation: The present requirement covers all outlets that are not currently required to be gfci protected in accordance with 210.8(A). As it stands now, the current wording does not require a dedicated lighting circuit that would serve the kitchen only because it is not listed as one of the rooms listed in 210.12. This change would add arc fault protection for the rooms that are excluded in 210.12 for other dedicated circuits that are not gfci protected.
Panel Meeting Action: Reject
Panel Statement: It is the intent of the panel to apply the AFCI protection requirements to the branch circuits specified by the list of rooms in 210.12. The panel does not agree with attempting to specify AFCI protection based on whether GFCI protection is included.

AFCI protection and GFCI protection are two independent protections that accomplish two different objectives.

Currently, there are areas of the dwelling that would require both forms of protection - one example is a wet bar located within a den or family room. The receptacles within 6 ft of the wet bar must have GFCI protection and the circuits supplying all outlets in the room must have AFCI protection.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Abstain: 1
Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

2-63 Log #1034 NEC-P02 **Final Action: Accept**
(210.12)

TCC Action: The Technical Correlating Committee directs that the word "when" be changed to "where" in Exception No. 2.
Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-156
Recommendation: Continue to Accept in Principle in Part but change "If" to "When" in Exception No. 2.
Substantiation: When is the more appropriate term. When the installation complies with the requirements of the Exception, AFCI protection shall be permitted to be omitted.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Abstain: 1
Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

2-64 Log #1205 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12)

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 2-154
Recommendation: Proposal 2-154 should be Accepted in Principle and considering the action of the TCC on proposal 2-153, the proposal should be revised to read as follows:
Exception No. 1: Where RMC, IMC, EMT, or steel armored cable, Type AC, meeting the requirements of 250.118 using metal outlet and junction boxes or Type PVC Conduit, Type RTRC Conduit, is installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a combination AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.
Exception No. 2: Where a listed metal or nonmetallic conduit or tubing is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a combination AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.
Exception No. ~~2~~3: Where a branch circuit to a fire alarm system installed in accordance with 760.41(B) and 760.121(B) is installed in RMC, IMC, EMT, or steel armored cable, Type AC, meeting the requirements of 250.118, with metal outlet and junction boxes, Type PVC Conduit, Type RTRC Conduit, AFCI protection shall be permitted to be omitted.

Substantiation: The submitter is correct in his substantiation where Type PVC Conduit and Type RTRC Conduit is an acceptable wiring method for protection of cables and conductors per 300.4 and where all types of raceways are acceptable when encased in concrete per 518.4 and 520.5. 210.12 should not discriminate against these acceptable wiring methods. The comment places the nonmetallic conduit after the grounding requirements of 250.118 which pertains to 250.118 and addresses the use of "Type PVC Conduit and Type RTRC Conduit" since the acronym "RNC" is no longer being used.

Panel Meeting Action: Accept in Principle in Part

The panel accepts the addition of a new Exception No. 2, with the revision of "a combination AFCI" to read "an outlet branch circuit AFCI".

The panel rejects the proposed revisions of existing Exceptions No. 1 and No. 3.

Panel Statement: The submitter provided no specific information demonstrating that PVC and RTRC conduit will provide protection of the conductors, relative to arcing events, equivalent to the protection provided by steel armored cable or metal conduit.

The panel revised the type of AFCI to correlate with the action taken on Comment 2-90.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

2-65 Log #1274 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: James W. Carpenter, International Association of Electrical Inspectors

Comment on Proposal No: 2-153

Recommendation: We support the panel's action for rejection of this proposal.

Substantiation: AFCI technology was first introduced in the early 1990s and has been included in the code development process in the 1999, 2002, 2005, and 2008 editions. AFCI requirements have been a progressive process, as well as substantiated over the past four NEC Code cycles.

Accordingly, this Code Panel has gradually expanded the AFCI protection requirements over numerous code cycles with the intent to increase electrical safety in the home, but do so on a gradual basis. However, the expansion of AFCI requirements didn't come without extensive deliberation by the panel, based on sound technical substantiation and data.

The following past ROPs & ROCs below clearly establish the Panel's long history and technical discussions, which has resulted in an equitable code that ensures a minimum level of safety.

NFPA 70 1999 Proposals 2-128, 2-129, 2-130

NFPA 70 1999 Comments 2-56, 2-65, 2-66, 2-67, 2-68, 2-69, 2-70, 2-85

NFPA 70 2002 Proposals 2-102, 2-103, 2-106, 2-110, 2-112, 2-113, 2-115, 2-116

NFPA 70 2002 Comments 2-71, 2-78, 2-79, 2-80, 2-81, 2-82

NFPA 70 2005 Proposals 2-123, 2-133, 2-134, 2-142, 2-146, 2-149, 2-150, 2-134a, 2-161, 2-167

NFPA 70 2005 Comments 2-87a, 2-93, 2-105, 2-108, 2-110

NFPA 70 2008 Proposals 2-142, 2-126

NFPA 70 2008 Comments 2-95, 2-129, 2-137

As stated by CMP 2 Members F. Coluccio, R. LaRocca and J. Pauley, acceptance of this proposal would remove AFCI protection for parallel arcing faults from the first portion of the branch circuit, which is in direct conflict to past panel actions to increase safety. Rejecting this proposal will ensure the level of safety for these branch circuits are not reduced.

The submitter's substantiation lacks merit as the Standard for AFCIs, UL 1699, doesn't consider as a component, the proximity to an arcing source. Regarding costs associated with metal raceways or cables, the submitter has not provided any cost analysis or data to demonstrate what is too cost prohibitive. In addition, CMP 2's panel statement from the 2002 ROP (2-106) further supports this concept:

"AFCIs Listed to UL 1699 are available, and the standard addresses efficacy, unwanted (nuisance) operation and operation inhibition. Cost should not be an issue for the panel to resolve. The panel reviewed a large amount of data, heard presentations on various positions on AFCIs, and received public comment on the topic. Upon that review, the panel arrived at the requirements in the 1999 NEC and continues to support that established position."

With respect to the state adoption, states throughout the U.S. continue to recognize and adopt the important safety provisions included in the 2008 NEC, despite the opposition from some industry groups. The panel needs to rise above the political battlefield and continue to move forward with what is in the best interest of safety for citizens.

In the panel statement ROP 2-166, the Code-Making Panel stresses that "AFCI protection is for protection from fire ignition for branch circuits." Consequently, with this statement and others in the past...the entire branch circuit shall be protected."

In the panel statement from ROP 2-155: "AFCI devices are widely available in the market and the panel notes that the cost has already come down since the introduction of AFCIs into the 1999 NEC." Therefore, cost should not be considered.

With regards to the substantiation that "wiring insulation has dramatically improved in the past 50 years." This is a consideration that should be addressed from the original proposal in 1999 and reviewed as to the comparison of Consumer Product Safety Commission fundamental data as to eliminate the AFCI requirement completely based on the introduction of 90 degree C insulation.

As indicated with this substantiation, the crisis with home structure fire civilian death, it appears that "Cord and Plugs" *cord-and-attachment-plug-connection* accounts for the significant share in 2002-2005 concerning this issue. If it is the cords of appliances and equipment that are of apprehension, then AFCI and/or leakage-current detector-interrupter protection may need to be applied to the product standard as with NEC section 440.64 and addressed by Code-Making Panels 17 and 18.

Should we disregard the past panel action concerning AFCI outlets many other consequences will occur. This will challenge the wisdom that the electrical industry's leaders have credible knowledge. We have discussed, assessed, informed, and legislated the concept of the entire branch circuit being protected as referenced from zone 1 Consumer Product Safety Commission study, where 36% of residential electrical fires occur. This change will provide the information for state and local jurisdictions to amend this entire section from the National Electrical Code.

Panel Meeting Action: Hold

Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1

Explanation of Negative:

KING, D.: I disagree with the panel action to place this comment on hold. This Comment should have been rejected. The submitter does not recommend any specific code text or action as is required by section 4.3.3(C) of the Rules Governing Committee Projects. Also as was noted in the submitters substantiation, requirements for AFCI devices has increased over the past several Code Cycles as more information has been made available for the panel to act on. Additional information on parallel arcing protection provided by the magnetic trip mechanism of standard circuit breakers was presented to the panel during this code cycle and should have been considered by the Panel when acting on this Comment. See my explanation of negative on Comment 2-99.

WOOD, T.: See my Explanation of Negative Vote on Comment 2-68.

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

Comment on Affirmative:

BECKER, R.: Affirmative vote of "HOLD" for the purpose of requiring further consideration of the merits of allowing protection, which is claimed to be provided by AFCI devices, to be satisfied by AFCI receptacles as proposed in 2011 ROP Proposal Number 2-153.

The advantages of allowing any protection provided by AFCI devices to be provided by AFCI receptacles include the following:

1. The risk of parallel arcing (i.e., arcing between the hot and neutral) in the 120V branch circuit premises wiring is extremely small and little or no evidence of this type of arcing has been positively attributed to loss of life or property.
2. The risk of parallel or series arcing in appliance cords and extension cords has been shown to exist and would be prevented by AFCI receptacles.
3. If AFCI receptacles are not allowed to satisfy the requirement for AFCI protection without the installation of the home-run portion of a branch circuit in conduit or steel armored cable, the demand for AFCI receptacles will continue to be extremely limited. With an extremely limited demand for AFCI receptacles, the incentive for manufactures to mass produce AFCI receptacles and for retailers to give AFCI receptacles shelf space will continue to be extremely limited. This will result in AFCI receptacles continuing to be commercially unavailable.

Without AFCI receptacles commercially available, the protection, claimed to be provided by AFCI technology, will usually be provided only for new homes and homes undergoing a major remodel.

It is instructive to consider whether GFCI protection would have been adopted as quickly and widely as it was if the NEC had required GFCI protection for the home-run portion of branch circuits and not allowed GFCI protection to be provided at the receptacle without installing the home-run portion of each branch circuit in conduit or armored cable. It is likely that GFCI receptacles would not have been mass produced and readily available to anyone wanting to provide GFCI protection in areas like bathrooms in older homes with very little effort. It is likely that GFCI protection would only exist in newer homes and homes which have undergone major remodels if the same requirements were put on GFCI protection as exist now for AFCI protection (i.e., not allowing the AFCI protection to be satisfied at the receptacle).

The benefit of allowing AFCI receptacles to satisfy the required AFCI

protection is significant. It would enable readily available AFCI receptacles capable of being installed with little effort which would result in faster and wider adoption of AFCI protection at the receptacle level, where it would protect appliance cords and extension cords, in existing homes.
Conversely, the benefit of allowing AFCI receptacles to satisfy the required AFCI protection would be sacrificed if home runs are required to be protected against parallel arcing faults in the circumstance where the parallel fault current magnitude would be so low that a conventional circuit breakers magnetic trip function would not detect and interrupt the fault.

PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-66 Log #1607 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: Thomas A. Domitrovich, Eaton Corp.
Comment on Proposal No: 2-153
Recommendation: Reject this proposal.
Substantiation: The elimination of physical steel protection to the first outlet as put forward in Proposal 2-153 significantly reduces the quantity of AFCI protected installed wire within residential structures. In a survey of new built homes, comprised of single family homes and townhouses ranging in size from 1,100 sq-ft to 3,300 sq-ft, it was determined that over 20% of wiring within the home is included between the first outlet and the loadcenter. Therefore, these circuits would have reduced protection should Proposal 2-153 be accepted.

The wire between the first outlet and the loadcenter is typically run between studs and inside the rafters of the residence. This wire is just as susceptible to damage that could result in an arcing condition as any other installed wiring.

Eaton recommends the panel's continued rejection of this proposal. This action will maintain the safety measures which already exist in several editions of the National Electric code.
Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:

KING, D.: See my explanation of negative for Comment 2-99.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.
Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.
Comment on Affirmative:

PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-67 Log #1650 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: John W. Young, Siemens Industry
Comment on Proposal No: 2-153
Recommendation: Reject the Proposal.
Substantiation: The Code should focus on safety and not on commercial considerations to write Code language to allow or promote a product at the expense of giving up safety. This Proposal argues that the Code language needs to be written to promote receptacles and that in doing this you don't lose much protection. Why give up any protection? The code should be about safety and should promote complete protection and should not try to rationalize giving up the level of protection we now have so another product could be used. Once you start that where does it end?

A GFCI can offer the same personnel protection from different points - breaker or receptacle - but an AFCI, like a circuit breaker or fuse, can only protect the branch if it installed at the beginning of the branch circuit.

The substantiation speaks of the dramatically improved wiring insulations as the reason the AFCI protection is not needed on the branch circuit wiring and can therefore be moved to the receptacle. There is no question that wiring insulations have improved but nails and screws can still pierce the best of the insulations with no difficulty and sharp edges can still cut the best insulation with no effort.
Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:

KING, D.: See my explanation of negative for Comment 2-99.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.
Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.
Comment on Affirmative:

PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-68 Log #1755 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 2-153
Recommendation: This proposal should be Accepted in Principle as seen in the panel action in the ROP.
Substantiation: I agree with the affirmative comments made by both Mr. Weber and Mr. King as seen in the ROP.

I agree with the comments of Mr. King that the statement to the negative submitted by Mr. Pauley, is factually inaccurate. The statement is misleading with respect to the OBC type AFCI. The statement "By allowing the AFCI to be installed at the first outlet without any protection of the wiring between the panel and the first outlet..." is factually incorrect. The reader of the ROP will clearly see that the panel specified the "Outlet Branch Circuit" type AFCI. These devices provide protection for series arcing on the home run and for series and parallel arcing downstream.

The statement "...the panel has effectively eliminated AFCI protection on 25% to 50% of the wiring that was previously covered by 210.12" is factually incorrect.

The 25% to 50% claim is undocumented and unsupportable. Electrical contractors are not in business to make home runs as long as possible. Contractors will plan on locating the service equipment and installing home runs as efficiently as possible. Arguments against the action to accept this proposal in principle claim that the action on 2-153 is a safety issue and now those home runs represent a hazard. I do not buy into that argument for the following reasons:

(1) The vast majority of fires caused by an electrical arc occur on the load side of receptacle outlets, not in the home run. This action to accept in principle provides series arcing protection for the home run.

(2) Fire science does not support the claim that an electrical arc in a 12/2 cable will ignite a fir 2 x 4 structural member.

(3) A typical 2400 square foot home would not require many AFCI circuits. The present requirement basically covers only the 3 volt-amp per square foot load as required in 210.12. When one does the calculation: 2400 x 3 = 7200, 7200 /120 (volts) = 60-amps which translates into a minimum of three 20-amp or four 15-amp circuits requiring AFCI protection. A typical 2400 square foot home will also have circuits not requiring AFCI protection for (2) small appliances, (1) laundry, (1) bathroom (in most cases more than one bathroom is installed and more than one home run is provided), (1) refrigerator, (1) microwave, (1) unfinished basement, (1) garage, (1) outdoor receptacles, (1) AC air handler, (1) AC condensing unit, (1) electric dryer, (1) electric range and (1) for heat if it is gas or oil and many more if it is electric heat. An argument that 3 or 4 home runs in a dwelling unit require parallel AFCI protection of the home run but the remainder of the home runs, (the significant majority) do not require any AFCI protection at all, is a flawed argument.

I disagree with the statement that 210.12 exists solely for the protection of the branch circuit only. The vast majority of electrically related fires start on the load side of the outlet. This is recognized by CMP-2 in the "combination type" AFCI requirement. In fact the demonstration of this device in the 1999 NEC cycle for CMP-2 was the cutting of an "extension cord" to visually show how AFCI protection could prevent a fire where such an event occurred.

I also agree with Mr. Kings statement as follows:

I agree with the Panel Action on this Proposal because it provides a more practical alternative for compliance with this section in many applications. The Panel action to revise the text to require "outlet type" AFCI protection provides series arc protection on the line side of the device eliminating the need for additional physical protection of the conductors to the first outlet. The Panel action on this Proposal allows for a more practical means of meeting the requirements of 210.12 and will extend this life saving technology to more branch circuit wiring than what is being protected by the present code text.
Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:

KING, D.: I disagree with the Panel Action to place this Comment on Hold. I agree with the submitter's recommended action and substantiation. Reports presented at the ROC Meeting showed evidence of a significant increase in the number of branch circuits that would be protected by this life saving technology had this comment been accepted. See my explanation of negative on Comment 2-99.

WOOD, T.: The Panels action to "Hold" this Comment and the associated Proposals has denied the public and all interested parties the ability to consider all sides of the argument regarding the acceptability of the possible additional safety that may have been achieved by the use of this product.
During the Panel discussions there were ample opportunities to reach a consensus regarding the use of the product described. The "hold" and the lack of finding a middle ground does not allow the additional safety that could have been provided in existing residences or additions to or alterations to existing residences.
The underlaying reason for the "hold" has little to do with Safety and a great deal to do with Product sales.

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

Comment on Affirmative:

PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-69 Log #1773 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: Ed Larsen, Square D Company/Schneider Electric / Rep. American Circuit Breaker Manufacturers Assoc.
Comment on Proposal No: 2-153
Recommendation: Continue to reject this proposal.
Substantiation: The American Circuit Breaker Manufacturers Association (ACBMA), headquartered in Washington DC, is an association of American manufacturers of circuit breakers to represent and promote the interests of American circuit breaker manufacturers in areas of codes and standards, applications, safety and education. Members of the Association include Eaton Corporation, General Electric Company, Siemens Industry, Inc., and Square D/ Schneider Electric.

This proposal will reduce the level of safety from the currently required combination type AFCI protection of the entire branch circuit and should be rejected for the following reasons:

1. A survey of single and two story homes ranging in size from 1072 to 7488 sq. ft. of finished space found that the total AFCI branch circuit conductor length in the home runs ranged from 20 to 39% of the total circuit length (see attached survey summary). Fires can, and do, result from arcing in home run conductors (see attached document on fire investigations), yet the proposal specifically reduces this protection. No justification has been offered for why the current level of protection and safety for the home run should be reduced.

2. No technical documentation has been submitted to substantiate the claim that receptacle type AFCIs would be "more sensitive to hazardous vs. normal arcing."

3. Claims were made in the substantiation that wiring insulation has improved and the results of the Fire Protection Research Foundation Residential Electrical System Aging Research Project Technical Report were cited. While these statements are certainly true for properly installed and maintained systems, they ignore the damage that wiring can suffer due to improper installation, maintenance and use.

4. Contrary to the claim in the substantiation, states are readily adopting the 2008 NEC with the AFCI requirement to protect the entire branch circuit.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:

KING, D.: I disagree with the Panel Action to place this Comment on Hold. I disagree with the submitter of this comment comment that "This proposal will reduce the level of safety from the currently required combination type AFCI protection of the entire
branch circuit." See my explanation of negative for Comment 2-99.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-658

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

Comment on Affirmative:

PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-70 Log #1928 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: Philip M. Piqueira, General Electric Co.
Comment on Proposal No: 2-153
Recommendation: Continue to reject this proposal.
Substantiation: Proposal 2-153 should continue to be rejected by CMP-2 because the adoption of this proposal would introduce into the code a significant reduction in safety and the substantiation for this proposal is seriously flawed.

The proposal states: "Cords and plugs accounted for the largest share of the 2005-2006 home structure fire civilian deaths." This statement blatantly ignores the fact that 30% of the electrical wiring in a house is located in the "home run" portion of the wiring (the portion left unprotected if Proposal 2-153 is accepted) and that approximately 35% of residential building electrical fires occur in the structural areas (crawl spaces, attics, walls, porches, and roofs) of the home (see Residential Building Fire Report, March, 2008, U.S. Fire Administration National Fire Data Center that I have provided).

As part of the justification to leave 30% of the house wiring unprotected, the submitter provides the rationalization that this wiring doesn't need the protection because "...wiring insulations have dramatically improved over the last fifty (50) years." While wiring insulations have certainly improved, the above statistics demonstrate that electrical fires continue to occur as a result of ignition of the electrical wire If damage occurs to the insulation, arcing, and its potentially lethal results, will occur no matter how "robust" the insulation is.

The submitter also states that" "Receptacle type AFCIs would be located closer to the probable arcing sources and be more sensitive to hazardous vs. normal arcing." This is erroneous. Physical proximity to arcing does not provide any increase in sensitivity as arc detection methods rely on current patterns and impedance and, although impedance generally varies with the length of wire, physical location of outlets to arcing is not indicative of impedance to arcing. The combination AFCI detects all types of faults as identified by UL 1699 to the same level of performance as the outlet type AFCI.

The submitter also stated: "It is evident that some states are not adopting AFCI requirements. This proposal would reduce objections...thus, resulting in increased safety." Again, a statement without basis—states are readily adopting the 2008 NEC with the AFCI requirement to protect the entire branch circuit. As of July, 2009, 33 states have adopted AFCI requirements.

Finally, comments such as "...an unintentional barrier built into the wording of this article" and "The requirement of a metal conduit or metal-jacketed cable...is, in many cases, cost prohibitive" should never be considered as part of a code substantiation. Reduction of demonstrated and established electrical safety requirements should never be justified by suggesting that they are cost prohibitive.

Note: Supporting material is available for review at NFPA Headquarters

Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:

KING, D.: I disagree with the Panel Action to place this Comment on Hold. I disagree with the submitter of this comment that "adoption of this proposal would introduce into the code a significant reduction in safety." See my explanation of negative for Comment 2-99.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

Comment on Affirmative:

PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-71 Log #1982 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 2-153
Recommendation: This proposal should be rejected.
Substantiation: If the panel accepts this proposal they you really undermining the requirement for AFCI protection. Many of the substantiations in support of the AFCI requirement over the last 4 code cycles showed that as many as 40% of the fires of electrical origin in dwelling units were caused by the fixed wiring of the building. If AFCIs are really needed, you are taking a big step backwards by permitting extensive non-AFCI protected wiring within in the dwelling unit. The acceptance of this could leave a large portion of the fixed wiring without AFCI protection. If the "home run" portion of the branch circuit does not need AFCI protection, why does any part of the branch circuit need AFCI protection?
Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:
KING, D.: See my Explanation of Negative for Comment 2-99.
WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.
Explanation of Abstention:
BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.
Comment on Affirmative:
PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-72 Log #2123 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: Patrick G. Salas, General Electric Company
Comment on Proposal No: 2-153
Recommendation: Continue to reject this proposal.
Substantiation: The statement in this proposal that "*These electrical fires would be best mitigated by an AFCI device installed at the closest location to where these cords and plugs are most commonly used...*" is technically invalid.
Physical proximity to arcing does not provide any increase in sensitivity as arc detection methods rely on current patterns and impedance and, although impedance generally varies with the length of wire, physical location of outlets to arcing is not indicative of impedance to arcing. Further, the combination-type AFCI detects all types of faults as identified by UL 1699 to the same level of performance as the outlet type AFCI.
Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:
KING, D.: I disagree with the Panel Action to place this comment on hold. I agree with the submitter's substantiation regarding the placement of AFCI devices in the branch circuit but disagree with the submitter's recommended action. The Panel has reviewed additional information submitted during this cycle that confirms that there would be a significant increase in then number of branch circuits protected if this proposal was accepted. See my explanation of negative for Comment 2-99.
WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.
Explanation of Abstention:
BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.
Comment on Affirmative:
PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-73 Log #2454 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: Philip M. Piqueira, General Electric Company
Comment on Proposal No: 2-173
Recommendation: Continue to reject this proposal.
Substantiation: Proposal 2-173 should continue to be rejected by CMP 2 because the adoption of this proposal would introduce into the code a significant reduction in safety and the substantiation for this proposal is seriously flawed.
The proposal ignores the fact that 30% of the electrical wiring in a house is located in the "home run" portion of the wiring (the portion left unprotected if Proposal 2-173 is accepted) and that approximately 35% of residential building electrical fires occur in the structural areas (crawl spaces, attics. walls, porches. and roofs) of the home (see Residential Building Fire Report., March, 2008, U.S. Fire Administration National Fire Data Center that I have provided).
Although the submitter recognizes that "there would be some wire that would not have AFCI protection," it is clear that he has significantly under estimated how much wire in a typical house could be left unprotected. Further, the submitter implies that NM cable, being a "proven safe method," does not become damaged.
However, it is well known that under certain circumstances, NM cable can easily be damaged.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-173 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:
KING, D.: I disagree with the Panel Action to place this comment on hold. The Panel has reviewed additional information submitted during this cycle that confirms that there would be a significant increase in then number of branch circuits protected if this proposal was accepted. See my explanation of negative for Comment 2-99.
WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.
Explanation of Abstention:
BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.
Comment on Affirmative:
PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-74 Log #2498 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-153
Recommendation: The proposal should be accepted.
Substantiation: The arguments surrounding this issue were fully explored in the proposal submitter's Comment 2-78 in the 2002 NEC cycle. As fully documented in that comment, very few low-level parallel ground faults ever occur between the branch circuit overcurrent device and the first outlet, and series issues are detected by the devices in question. When the Commonwealth of Massachusetts adopted the 2002 NEC, effective January 1, 2002, it did so with a state amendment creating a fine print note following the NEC text mandating AFCI for the entire branch circuit, reading as follows: "Where installed as the first device on a branch circuit, some receptacles are listed as providing AFCI protection for the entire branch circuit." Massachusetts did so in order to clarify that the devices described in the subject proposal were acceptable. Unfortunately the ambiguity at the NEC level in that cycle, followed by subsequent NEC amendments that explicitly and severely limited the use of these devices, led to a continuing business decision by receptacle manufacturers that there would be and still is insufficient demand in the market to justify the production costs.
This brings us to the current unfortunate state of affairs where it is not cost effective to offer the proven safety effectiveness of AFCI protection in countless older residential occupancies where the owner is unable to pay for a service upgrade from existing overcurrent devices that are either fuses or circuit breakers of obsolete manufacture. By failing to muster the required two-thirds majority, CMP 2 has retained the intellectual purity of this rule at the expense of the only practical alternative in many older homes, where extensive research done as part of the NFPA 73 project and other investigations clearly demonstrates that genuine electrical hazards are largely a function of the age of the occupancy.
Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:
KING, D.: I disagree with the Panel Action to place this Comment on Hold. I agree with the submitter's recommended action and substantiation. Reports presented at the ROC Meeting showed evidence of a significant increase in the number of branch circuits that would be protected by this life saving technology had this comment been accepted. See my explanation of negative on Comment 2-99.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.
Explanation of Abstention:
BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.
Comment on Affirmative:
PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

WEBER, R.: The acceptance of proposal 2-90 should satisfy the submitters concerns with older dwelling. The issue of an additional AFCI device being cost effective should not be a concern to the code making panel. Substantiation provided in comment 2-99 by the Arc Fault Circuit Interrupter Wiring Device and Joint Research and Development Consortium indicates to this panelist that there is already a market for the development of the Outlet Branch Circuit AFCI device. Given the option, many homeowners would chose to install these devices in their personal homes if they were available today. Hopefully the code making panel will approve the allowance of the outlet branch circuit AFCI device to be installed at the first receptacle outlet of the existing branch circuit. Combined with the comments made to and approved by other code making panels the manufactures will feel there is a large enough market share to begin production of the product.

2-75 Log #2798 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-158
Recommendation: Accept Proposal 2-158.
Substantiation: Panel 2 has not taken the figures showing there is no cost-benefit to mandating AFCI's in dwellings as a serious matter. The cost-benefit studies still show well over 2 Billion dollars will be spent each year in an effort to partially eliminate losses that total only 18 Million dollars. And, "partially eliminate" is a key aspect of why these devices should not be mandated. A NAHB Research Center Survey (attached) shows these devices are not working with 100% efficacy. The problems of nuisance tripping reported when these devices were first developed continue to plague both electricians and builders. In addition, no manufacturer will claim their devises will work 100% of the time. It is proven that the lack of efficacy of these devices, along with the complete lack of a cost-benefit provides no benefit to society in any fashion and mandates for these devices should be deleted from the National Electrical Code.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel has concluded that the information provided over several code cycles indicates that AFCIs provide substantial protection against arcing incidents in the electrical system.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: It was an interesting day when NEC Panel 2 was presented with presentation by the manufacturers of the different types of Arc-Fault Circuit Interrupter (AFCI) devices. What really piqued my attention was the extensive discussion on the market share the manufacturers of the AFCI breaker devices would receive vs. the manufacturers of the receptacle-type AFCI devices. Over the many hours of presentation and discussion, the non life-safety aspect of market share seemed to have been the biggest concern. It is this type of "concern" goes to directly to NAHB's position that the mandates for AFCIs should be removed from the National Electric Code. Not once in the entire development of the NEC has a Proposal to mandate AFCI's ever provided supporting information relative to a cost-benefit society would receive if these devices are installed. To the contrary, there is more data, documentation, and information that shows mandating the installation of AFCI devices will cost the U.S. billions of dollars to possibly save less than 30 million dollars of losses a year - and that is if the devices worked 100 percent of the time. More recent data from the United States Fire Administration's National Fire Incident Reporting System (NFIRS) shows that the fire-loss figures are significantly lower than the manipulated figures from the NFPA data originally used to show the huge cost-to-loss ratio. This type of mandate is unacceptable, especially in this economy. Allowing manufacturer's to mandate the purchase and installation of their products through the NEC should be looked on the same as the practices by large corporations in misusing public funds. No jurisdiction should ever adopt any industry standard that does not provide a cost-benefit to that community. If you would like more information on the NFIRS data, please contact NAHB through Steve Orlowski at (202) 266-8303 or sorlowski@nahb.org.

In addition, no documentation (information) was ever provided to the Technical Committee to prove AFCI's provide the "Substantial protection" stated in the Panel Statement. I will also note that debate on this issue was cut-off early by a call for the question.

2-76 Log #2810 NEC-P02 **Final Action: Hold**
(210.12)

Submitter: Richard W. Becker, Engineered Electrical Systems, Inc. / Rep. IEEE
Comment on Proposal No: 2-153
Recommendation: Accept the proposal.
Substantiation: The panel statement refers to "documented series arc protection benefit...", CMP-2 does not have the referenced information.
Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:
KING, D.: I disagree with the Panel Action to place this Comment on Hold. I agree with the submitter's recommended action to accept Proposal 2-153 but disagree with the submitter's substantiation. The Panel has reviewed sufficient data over several Code cycles that confirms the ability of this life saving technology to recognize and respond to arcing faults.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.
Explanation of Abstention:
BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.
Comment on Affirmative:
PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-77 Log #2811 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Richard W. Becker, Engineered Electrical Systems, Inc. / Rep. IEEE
Comment on Proposal No: 2-157
Recommendation: Delete paragraph.
Substantiation: The panel statement refers to "technical studies...", CMP-2 does not have the referenced information.
Panel Meeting Action: Reject
Panel Statement: The panel has concluded that the information provided over several code cycles indicates that AFCIs provide protection against arcing incidents in the electrical system.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

2-78 Log #1825 NEC-P02 **Final Action: Accept in Principle**
(210.12 Exception No. 1)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 2-182
Recommendation: Revise 210.12 Exception No.1 in the 2001 NEC ROP Draft as follows:

Exception No. 1: If ~~Where~~ RMC, IMC, EMT, ~~or steel armored~~ Type MC or ~~cable,~~ Type AC cables meeting the requirements of 250.118 and ~~using~~ metal outlet and junction boxes are ~~is~~ installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a combination type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.
Substantiation: Armored cables are more than suitable to offer the physical protection needed for the branch circuit conductors between the panelboard and box where receptacle-type ACFI devices are permitted to be installed. The cables must pass rigorous testing mandated in UL-4, the UL standard that applies to Type AC cables and UL 1569, the UL standard that applies to Type MC cables.

Since the Panel's action on revisions to 210.12 (ROP 2-153) failed at the letter ballot, it has become necessary to re-submit this revision at the Comment stage of the NEC revision process.

Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if." This Comment intends to use the word "if" where appropriate.

Panel Meeting Action: Accept in Principle

Revise the proposed text to read as follows:

"Exception No. 1: If RMC, IMC, EMT, Type MC or steel armored Type AC cables meeting the requirements of 250.118 and metal outlet and junction boxes are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a outlet branch circuit Type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit."

Panel Statement: The panel accepts the addition of MC Cable meeting the requirements of 250.118, however, has maintained the requirement for Type AC Cable be of the steel armoured type due to the lack of a crush impact test.

The panel changed "combination type" to outlet branch circuit type of AFCI based on its action on Comment 2-90.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

2-79 Log #1619 NEC-P02 **Final Action: Accept in Principle**
(210.12 Exception No. 3 (New))

Submitter: Donald R. Cook, Pelham, AL

Comment on Proposal No: 2-160

Recommendation: Add new text to read as follows:

Exception: Where circuits and/or outlets in the rooms listed in 210.12(B) are altered, modified, extended, replaced, or revised in an existing electrical installation, the AFCI protection shall be permitted to be located at the first outlet by a Listed Combination Type AFCI Receptacle.

Substantiation: The Panel Statements for many of the proposals to revise the 2008, NEC 210.12 requirements reflect one of two positions.

One position seems to suggest the risk of parallel damage from the overcurrent device to the first outlet is minimal and permission to use device type protection would provide options to protect existing circuits that are incompatible with currently listed Combination AFCI protective devices installed at the supply end of the circuit.

The other position seems to suggest the maximum benefit to safety should include parallel and series protection of the entire branch circuit.

Panel statements for several proposals state the decision to apply the NEW CONSTRUCTION AFCI requirements, to a circuit modification, are that of the AHJ. That statement is interesting, puzzling and problematic when the text in 210.1, 210.12, 90.1, 90.2, 220.87, 250.130(C), and 406.3(D) are reviewed. Nothing in 210.1, 210.12, 90.1, or 90.2 currently limits this requirement to NEW CONSTRUCTION. Other requirements in the NEC address modifications to existing installations. Nothing in the original substantiation for AFCI protection indicates there is a reduced risk in existing installations.

The proposed text is an attempt to provide the committee a practical option to maximize protection in both new and modified electrical installations. It seems that decision should be made by the technical committee, not individual enforcement jurisdictions. Individual decisions result in extreme inconsistency causing problems for everyone involved. Where new equipment and new circuits are installed, practical safeguarding should be provided to the entire circuit. Where modifications are made to existing installations, practical safeguarding can also be provided. The proposed text is an exception to the general requirement to provide that protection.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 2-90.

The panel notes that the appropriate type of receptacle AFCI is an outlet branch circuit AFCI, as specified in Comment 2-90.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

Comment on Affirmative:

KING, D.: See my affirmative with comment on Comment 2-90.

WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90.

2-80 Log #2242 NEC-P02 **Final Action: Accept**
(210.12 Exception No. 3 (New))

Submitter: John Williamson, Maple Grove, MN

Comment on Proposal No: 2-160

Recommendation: Proposal 2-160 should continue to be rejected.

Substantiation: Although not part of the NEC unless specifically adopted, NEC 80.9(B) explicitly states that "Existing electrical installations that do not comply with the provisions of this Code shall be permitted to be continued in use unless the authority having jurisdiction determines that the lack of conformity with this Code presents an imminent danger to occupants. Where changes are required for correction of hazards, a reasonable amount of time shall be given for compliance, depending on the degree of the hazard." The lack of AFCI protection in millions of existing homes does not constitute an imminent danger to the occupants. Is AFCI protection in all dwellings desirable and beneficial? Yes. However, from an enforcement perspective, this is extremely impracticable. Similar to other new technologies and code changes, enhanced NEC safety features are incorporated into existing installations over many years through remodeling, renovation, replacement, relocation, and other improvements. Patience is warranted.

Panel Meeting Action: Accept

Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation. There are applications in existing installations where the application of AFCI protection is important.

See the panel action and statement on Comment 2-90.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Abstain: 1

Explanation of Abstention:

BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

Comment on Affirmative:

KING, D.: See my affirmative with comment on Comment 2-90.

2-81 Log #492 NEC-P02 **Final Action: Hold**
(210.12(B))

Submitter: Richard E. Loyd, Sun Lakes, AZ

Comment on Proposal No: 2-153

Recommendation: I support the action on the negative voting to reject Proposal 2-153 and other associated proposals.

Substantiation: I agree with the negative commenting on the voting. All data originally submitted showed infrastructure fires to be a major problem in the US today. The data showed these fires are primarily related to nonmetallic sheathed type cable damage. I have heard about and have seen many instances of damaged sheath and conductors both from damage during and after installation. It is a documented fact that rodents regularly damage thermoplastic coverings. This issue has not been solved and I disagree with the submitter that the product has improved. I believe the product is now more susceptible to damage by post installation and damage from other crafts during construction since the sheath is thinner and there are less filler materials to protect the enclosed conductors.

The monetary objections to AFCIs seems to be subsiding and had the panel accepted this Proposal 2-153, it seems to me that all the CPSC substantiation that allowed this monumental safety change to be accepted would have been rejected or ignored by this panel?

Please continue to reject this proposal until substantiation has shown the device type AFCI will provide equal circuit protection to what is presently required in the 2008 NEC, Section 210.12

Panel Meeting Action: Hold

Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1

Explanation of Negative:

KING, D.: I disagree with the panel action to place this comment on hold. I agree with the submitter that there is sufficient documentation to support the need for AFCI Protection of infrastructure wiring. Further information was presented with Comments submitted in this code cycle that support the recommended action of Proposal 2-153. See my explanation of negative on Comment 2-99.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

Comment on Affirmative:

PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-82 Log #1403 NEC-P02 **Final Action: Accept in Principle**
(210.12(B))

Submitter: Lawrence S. Cross, BCIT
Comment on Proposal No: 2-165
Recommendation: Accept Proposal 2-165.
Substantiation: This proposal should be accepted.

The submitter of this proposal seeks clarification of the requirement in 210.12(B). The panel action to reject and the panel statement serve only to compound the serious confusion surrounding AFCI requirements in existing dwelling units.

CMP-2 has gone on record stating that an extension of a branch circuit does not fall under the literal text of 210.12 as this extension or modification is not "new construction." Unfortunately for the NEC user, CMP-2 does not define "new construction" nor is this term used in any requirements within their purview. When the user of the NEC or a lawyer in a civil suit reads the title and text of 210.12 they will be hard pressed to find out if those requirements apply to only "new construction." There is no such qualifier found anywhere in Article 210. The waters muddy even further as the AHJ is portrayed as the decision maker. The panel statement to reject Proposal 2-165 reads as follows: "The decision on applying the new construction AFCI requirements to a circuit modification is that of the authority having jurisdiction." This is presently resulting in some jurisdictions requiring AFCI on a branch circuit extension and across the street another jurisdiction does not. This is occurring on a daily basis in the Philadelphia five county areas. This lack of uniform enforcement is endorsed by a panel statement that claims that a branch circuit extension is not "new construction" and is further compounded by a lack of such a qualifier in any Article 210 requirement. It should be noted that CMP-2 has consistently stated that an extension of a branch circuit is not "new construction."
In essence this statement asserts that the text of 210.12 is unclear and ambiguous with respect to extensions of branch circuits in an existing dwelling unit. See the panel statement on Proposal 2-179.

This action and statement on this proposal have far deeper ramifications. CMP-2 is now on record as recognizing the provisions of 210.12 as "new construction" requirements and there is no reference in 210.12 to "new construction." Does this mean that all of Article 210 applies only to new construction? Would the requirements of 250.130(C) apply to a branch circuit extension?

Is a TIA necessary to clarify this limited scope of Article 210?

The simple fact is that an extension of a branch circuit is "new."

New branch circuit conductors are added. New junction boxes are added. New devices are added. A contractor and AHJ would be hard pressed to convince a jury that the work performed was not "new." It will be even more difficult for the contractor and AHJ to convince a jury that Article 210 including 210.12(B) did not apply.

The electrical industry cannot tolerate decisions and statements by code making panels that basically tell the installer/maintainer to "ask your local inspector'' when the "local lawyer" reading the NEC in effect will enforce the printed words.

Good code has to be: (1) Easy to read, (2) Practical and (3) Enforceable. CMP-2 should accept this proposal to make the text practical and enforceable.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-90 that satisfies the submitter's intent.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

Comment on Affirmative:

KING, D.: See my affirmative with comment on Comment 2-90.

WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90.

2-83 Log #1581 NEC-P02 **Final Action: Hold**
(210.12(B))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 2-173
Recommendation: Continue to reject this proposal.
Substantiation: Unlike section 210.8 that requires receptacle protection, section 210.12 has always required branch circuit protection. The panel has affirmed this need numerous times in the past by:

· Rejecting 2002 2-104 that proposed receptacle type AFCIs, stating, "The panel does not agree that the data submitted for the 1999 NEC did not support the present AFCI requirement for branch circuit wiring."

· Rejecting 2002 comment 2-67, stating "The requirement in Section 210-12 expresses the intent of the panel, which is that the entire branch circuit be provided with AFCI protection."

· Rejecting 2002 comment 2-7, stating, "The information available to the panel during the 1999 Code Cycle shows a number of fires that are attributed to branch-circuit wiring. The present code rule expresses the panel's intent that the specified branch-circuits have AFCI protection."

· Rejecting 2002 comment 2-72, stating, "The code requirement is for an AFCI that provides protection for the entire branch circuit."

· Rejecting 2002 comment 2-76, stating, "The panel reiterates that the branch circuits must be protected with an arc-fault circuit-interrupter."

· Rejecting 2002 comment 2-78, stating, "The panel has revised the requirement from the ROP to make it clear that the AFCI must be 'listed' to protect the entire branch circuit."

· Accepting 2002 comment 2-81 that stated in part, "This comment supports the addition of the AFCI at the branch to provide protection to the fixed wiring and protection to extension and appliance wiring."

· Rejecting 2008 proposal 2-130, stating, "The panel reaffirms its position that AFCI devices are to protect the entire length of all 120 volt, 15- and 20-ampere branch circuits supplying outlets in dwelling unit bedrooms and that the AFCI devices that are used be installed at the origin of the circuit;"

· Rejecting 2008 proposal 2-139, stating, "The panel reaffirms its position that all branch circuits that supply dwelling unit bedrooms shall be protected by an AFCI device and that the device shall protect the branch circuit;"

· Rejecting 2008 proposal 2-140, stating in part that, "The protection is required for the branch circuit." Regarding this proposal, Mr. King stated, "Additional physical protection of the unprotected portion of the branch circuit wiring is also required when applying the exception due to the hazard that exists with leaving that part of the branch circuit wiring unprotected by the AFCI device."

In his statement on 2008 proposal 2-147, Mr. King also stated, "The requirement for the additional physical protection provided in exception is necessary to reduce the risk of physical damage to this portion of the branch circuit wiring that is not protected by the AFCI device. It is the intent of this section that AFCI protection is provided for the entire length of the branch circuit. An exception to allow even a small portion of this circuit to be unprotected must be supplemented with some other means of physical protection."

In the 2008 ROC the panel continued to affirm its strong position, stating in its rejection of 2-127, "The submitter's recommendation would remove AFCI protection from a significant portion of the branch circuit. Given that 210.12 is intended to provide protection for the branch circuit, the exception is in conflict with the basic intent. The submitter's claim that 'the data was clear in indicating arcs at receptacles and in branch circuit extensions' is not supported since a significant percentage of the fires are estimated to be in the distribution system itself and not just in extension and appliance cords."
Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-173 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:

KING, D.: I disagree with the panel action to place this comment on hold. The submitter of this Comment has accurately documented a history of the Panel's commitment to the expansion of AFCI Protection for branch Circuit wiring based on data presented to the panel at each code cycle. Data presented to the Panel at the ROC Meeting for this code cycle showed evidence of a significant increase in the number of branch circuits that would be afforded AFCI protection if Proposal 2-153 were accepted. See my explanation of negative for comment 2-99.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

Comment on Affirmative:

PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-84 Log #1756 NEC-P02 **Final Action: Accept in Principle**
(210.12(B))

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 2-160
Recommendation: This proposal should be Accepted in Principle as follows:
Dwelling Units. All 120-volt, single phase, 15- and 20-ampere branch circuits supplying outlets installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms or areas shall be protected by a listed arc-fault circuit interrupter, combination-type, installed to provide protection of the branch circuit. Where a branch circuit is modified or extended, AFCI protection shall be provided for the portion of the branch circuit that is modified or extended.
Substantiation: The panel statement to reject this proposal fully recognizes that the submitter is correct. This panel statement and action create serious confusion. The panel clearly states that the provisions of 210.12(B) apply only to "New Construction." What is "New Construction" and where is this term used in Article 210"?

The statement further informs the code community that the decision to apply these "New Construction" installation requirements is that of the AHJ. This is extremely problematic. These actions place the AHJ and the installer/maintainer in a very precarious position. There are many rules for branch circuits scattered throughout the NEC including those in Article 210. Are all of these rules now applicable only to "New Construction"? Where is this term defined? Where is this term used in Article 210? Why is this term absent from 210.12? Is a branch circuit extension of new type NM, new boxes and new receptacles to supply new appliances in a new wall considered "old construction"?

The suggested text will clearly require that the modified or extended portion of the branch circuit be provided with AFCI protection.

This issue should be reviewed globally by the TCC. Where a TC rejects a proposal because the existing text applies only to "New Construction" the existing text must clearly state that fact in positive text in the applicable requirement.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 2-90 that satisfies the submitter's intent.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

Comment on Affirmative:

KING, D.: See my affirmative with comment on Comment 2-90.

WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90.

2-85 Log #1757 NEC-P02 **Final Action: Accept in Principle**
(210.12(B))

Submitter: James T. Dollard, Jr., IBEW Local 98

Comment on Proposal No: 2-165

Recommendation: This proposal should be Accepted in Principle as follows:

Dwelling Units. All 120-volt, single phase, 15- and 20-ampere branch circuits supplying outlets installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms or areas shall be protected by a listed arc-fault circuit interrupter, combination-type, installed to provide protection of the branch circuit. Where a branch circuit is modified or extended, AFCI protection shall be provided for the portion of the branch circuit that is modified or extended.

Substantiation: The panel statement to reject this proposal fully recognizes that the submitter is correct. This panel statement and action create serious confusion. The panel clearly states that the provisions of 210.12(B) apply only to "New Construction." What is "New Construction" and where is this term used in Article 210"?

The statement further informs the code community that the decision to apply these "New Construction" installation requirements is that of the AHJ. This is extremely problematic. These actions place the AHJ and the installer/maintainer in a very precarious position. There are many rules for branch circuits scattered throughout the NEC including those in Article 210. Are all of these rules now applicable only to "New Construction"? Where is this term defined? Where is this term used in Article 210? Why is this term absent from 210.12? Is a branch circuit extension of new type NM, new boxes and new receptacles to supply new appliances in a new wall considered "old construction"?

The suggested text will clearly require that the modified or extended portion of the branch circuit be provided with AFCI protection.

This issue should be reviewed globally by the TCC. Where a TC rejects a proposal because the existing text applies only to "New Construction" the existing text must clearly state that fact in positive text in the applicable requirement.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 2-90 that satisfies the submitter's intent.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

Comment on Affirmative:

KING, D.: See my affirmative with comment on Comment 2-90.

WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90.

2-86 Log #1774 NEC-P02 **Final Action: Hold**
(210.12(B))

Submitter: Ed Larsen, Square D Company/Schneider Electric / Rep. American Circuit Breaker Manufacturers Assoc.

Comment on Proposal No: 2-173

Recommendation: Continue to reject this proposal.

Substantiation: The American Circuit Breaker Manufacturers Association (ACBMA), headquartered in Washington DC, is an association of American manufacturers of circuit breakers to represent and promote the interests of American circuit breaker manufacturers in areas of codes and standards, applications, safety and education. Members of the Association include Eaton Corporation, General Electric Company, Siemens Industry, Inc., and Square D/Schneider Electric.

This proposal will reduce the level of safety from the currently required combination type AFCI protection of the entire branch circuit and should be rejected for the following reasons:

1. A survey of single and two story homes ranging in size from 1072 to 7488 sq. ft. of finished space found that the total AFCI branch circuit conductor length in the home runs ranged from 20 to 39% of the total circuit length (see attached survey summary). Fires can, and do, result from arcing in home run conductors (see attached document on fire investigations), and not just at termination points, yet the proposal specifically reduces this protection. No justification has been offered for why the current level of protection and safety for the home run should be reduced.

2. The substantiation stated that, "Type NM Cable is the most used wiring method in dwelling units and is a proven safe method." While this is true if it is installed and maintained properly, it is well known that under certain circumstances NM cable can easily be damaged, as is illustrated in the attached document on fire investigations.

This documentation shows why combination arc fault protection at the source of supply is so important.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Hold

Panel Statement: The panel "Holds" this comment and Proposal 2-173 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1

Explanation of Negative:

KING, D.: I disagree with the Panel Action to place this Comment on Hold. I disagree with the submitter of this comment that "This proposal will reduce the level of safety from the currently required combination type AFCI protection of the entire
branch circuit." See my explanation of negative for Comment 2-99.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

Comment on Affirmative:

PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-87 Log #2004 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: James H. Maxfield, Dover, NH

Comment on Proposal No: 2-175

Recommendation: Revise text to read as follows:

(B) Dwelling Units. All 120 volt, single phase, 15- and 20-ampere branch circuits supplying outlets installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, and hallways within finished living areas, or similar habitable rooms or areas shall be protected by a listed arc-fault circuit interrupter, combination-type, installed to provide protection of the branch circuit.

Substantiation: I disagree with the panel's statement that "the revisions are unnecessary". This international document should be clear, concise and contain language that is understandable and enforceable. There is a significant amount of confusion regarding this section of the NEC based on the number of proposals submitted, the number and extent of discussions and debates at IAEI meetings, various building official meetings, and field inspections. Additionally, there are multiple variations by AHJs where AFCI protection is required. For example, based on the current language it is unclear if a dwelling unit with an eat in kitchen without a dining room, a breakfast room, pantry, butler's pantry or laundry room require AFCI protection. The acceptance of this proposal would appear to bring some clarity to this section of the code.

If it is the intent of the panel to only AFCI protect branch circuits covered by 210.52(A) as indicated in the panel statement, then the NEC should specifically indicate it by referencing said NEC section.

Panel Meeting Action: Reject
Panel Statement: The words "within finished living areas, or similar habitable rooms" are unnecessary because of the use of the phrase " similar rooms or areas" which provides the AHJ clarification as to what outlets require AFCI protection.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Abstain: 1
Explanation of Abstention:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

2-88 Log #2188 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-176
Recommendation: Accept the proposal with the following revisions:
All 120 volt, single-phase 15-1nd 20-ampere branch circuits in a dwelling unit including bathrooms, laundry areas, garages, and accessory structures shall be protected by a listed ground-fault circuit interrupter.
Substantiation: The laundry list doesn't include unfinished basements, bathrooms, or garages. Per the panel statement, GFCI protection in those areas has no bearing on AFCI requirements.
Panel Meeting Action: Reject
Panel Statement: 210.12 does not contain requirements for GFCIs. 210.8 provides GFCI requirements.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Abstain: 1
Explanation of Abstention:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

2-89 Log #2243 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 2-165
Recommendation: Proposal 2-165 should continue to be rejected.
Substantiation: Although not part of the NEC unless specifically adopted, NEC 80.9(B) explicitly states that "Existing electrical installations that do not comply with the provisions of this Code shall be permitted to be continued in use unless the authority having jurisdiction determines that the lack of conformity with this Code presents an imminent danger to occupants. Where changes are required for correction of hazards, a reasonable amount of time shall be given for compliance, depending on the degree of the hazard." The lack of AFCI protection in millions of existing homes does not constitute an imminent danger to the occupants. Is AFCI protection in all dwellings desirable and beneficial? Yes. However, from an enforcement perspective, this is extremely impracticable. Similar to other new technologies and code changes, enhanced NEC safety features are incorporated into existing installations over many years through remodeling, renovation, replacement, relocation, and other improvements. Patience is warranted.
Panel Meeting Action: Reject
Panel Statement: The original proposal does not address an existing installation and, therefore, the provisions of 80.9(B) do not apply.
See the panel action and statement on Comment 2-90.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Abstain: 1
Explanation of Abstention:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

2-90 Log #2393 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12(B))

Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 2-179
Recommendation: Revise to read as follows:
Exception: Where circuits for the rooms and/or outlets in the rooms listed in 210.12(B) are altered, modified, extended, replaced, or revised in an existing electrical installation, the AFCI protection shall be permitted to be located at the first outlet by a listed Outlet Branch Circuit (OBC) AFCI Receptacle.
Substantiation: The exception number will need to be correlated with other actions for this section.
The Panel and Committee Member Statements for many of the proposals to revise the 2008, NEC 210.12 requirements reflect one of two positions.
One position seems to suggest the risk of parallel damage from the overcurrent device to the first outlet is minimal and permission to use device type protection would provide options to protect existing circuits that are incompatible with currently listed Combination AFCI protective devices installed at the supply end of the circuit.
The other position seems to suggest the maximum benefit to safety should include parallel and series protection of the entire branch circuit.
Panel statements for several proposals state the decision to apply the NEW CONSTRUCTION AFCI requirements, to a circuit modification, are that of the AHJ. That statement is interesting, puzzling and problematic when the text in 210.1, 210.12, 90.1, 90.2, 220.87, 250.130(C), and 406.3(D) are reviewed. Nothing in 210.1, 210.12, 90.1, or 90.2 currently limits this requirement to NEW CONSTRUCTION. Current requirements in 220.87, 250.130(C) and 406.3(D) address modifications to existing installations. I believe additional examples could be identified. Nothing in the original substantiation for AFCI protection indicates there is a reduced risk in existing installations.
The proposed text is an attempt to provide the committee a practical option to maximize protection in both new and modified electrical installations. It seems that decision should be made by the technical committee, not individual enforcement jurisdictions. Individual decisions result in extreme inconsistency causing problems for everyone involved. Where new equipment and new circuits are provided in a new installation, practical safeguarding should and can be provided to the entire circuit. Where modifications are made to existing installations, practical safeguarding can also be provided. The parallel protection of the home run in those existing installations may not be practical. However, excluding the protection of the entire circuit based on the home run does not appear to be the best option for practical safeguarding the installation. The proposed text is an exception to the general requirement to provide that protection.
Panel Meeting Action: Accept in Principle in Part
The panel Rejects the addition of the Exception and substitutes it with the following:
"(B) Branch Circuit Extensions or Modifications - Dwelling Units. In any of the areas specified in 210.12(A), where branch circuit wiring is modified, replaced or extended, the branch circuit shall be protected by:
1. A listed combination AFCI located at the origin of the branch circuit; or
2. A listed outlet branch circuit AFCI located at the first receptacle outlet of the existing branch circuit."
Panel Statement: The panel has added a new subdivision requiring AFCI protection that would apply to branch circuit extensions and modifications.
The panel did not accept the language for modification of "outlets" because the focus of 210.12 is on the branch circuit.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: It was an interesting day when NEC Panel 2 was presented with presentation by the manufacturers of the different types of Arc-Fault Circuit Interrupter (AFCI) devices. What really piqued my attention was the extensive discussion on the market share the manufacturers of the AFCI breaker devices would receive vs. the manufacturers of the receptacle-type AFCI devices. Over the many hours of presentation and discussion, the non life-safety aspect of market share seemed to have been the biggest concern. It is this type of "concern" goes to directly to NAHB's position that the mandates for AFCIs should be removed from the National Electric Code. Not once in the entire development of the NEC has a Proposal to mandate AFCI's ever provided supporting information relative to a cost-benefit society would receive if these devices are installed. To the contrary, there is more data, documentation, and information that shows mandating the installation of AFCI devices will cost the U.S. billions of dollars to possibly save less than 30 million dollars of losses a year - and that is if the
devices worked 100 percent of the time. More recent data from the United States Fire Administration's National Fire Incident Reporting System (NFIRS) shows that the fire-loss figures are significantly lower than the manipulated figures from the NFPA data originally used to show the huge cost-to-loss ratio. This type of mandate is unacceptable, especially in this economy. Allowing manufacturer's to mandate the purchase and installation of their products through the NEC should be looked on the same as the practices by large corporations in misusing public funds. No jurisdiction should ever adopt any industry standard that does not provide a cost-benefit to that community. If you would like more information on the NFIRS data, please contact NAHB through Steve Orlowski at
(202) 266-8303 or sorlowski@nahb.org.
Comment on Affirmative:
KING, D.: The Panel action on this Comment is an important move in the right direction that extends this life saving technology to branch circuits that otherwise would be left unprotected. The addition of this sub-division will provide clear prescriptive requirements for AFCI protection on branch circuit extensions for both the installer and the Authority Having Jurisdiction and ultimately will protect property from fires caused by electrical arcing and save many lives.
WEBER, R.: This new exception provides relief to homeowners and installers when faced with panelboards that will not accept present day AFCI devices. Manufactures will also have an expanded market for AFCI technology when existing branch circuits are altered during remodeling. This provides the homeowner the benefit of slightly reduced AFCI protection without having to endure the cost of a service upgrade or an additional feeder panelboard being installed.

2-91 Log #2394 NEC-P02 **Final Action: Accept in Principle**
(210.12(B))

Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 2-192
Recommendation: Revise to read as follows:
Exception: Where circuits for the rooms and/or outlets in the rooms listed in 210.12(B) are altered, modified, extended, replaced, or revised in an existing electrical installation, the AFCI protection shall be permitted to be located at the first outlet by a listed Outlet Branch Circuit (OBC) AFCI Receptacle.
Substantiation: The exception number will need to be correlated with other actions for this section.

The Panel and Committee Member Statements for many of the proposals to revise the 2008, NEC 210.12 requirements reflect one of two positions.

One position seems to suggest the risk of parallel damage from the overcurrent device to the first outlet is minimal and permission to use device type protection would provide options to protect existing circuits that are incompatible with currently listed Combination AFCI protective devices installed at the supply end of the circuit.

The other position seems to suggest the maximum benefit to safety should include parallel and series protection of the entire branch circuit.

Panel statements for several proposals state the decision to apply the NEW CONSTRUCTION AFCI requirements, to a circuit modification, are that of the AHJ. That statement is interesting, puzzling and problematic when the text in 210.1, 210.12, 90.1, 90.2, 220.87, 250.130(C), and 406.3(D) are reviewed. Nothing in 210.1, 210.12, 90.1, or 90.2 currently limits this requirement to NEW CONSTRUCTION. Current requirements in 220.87, 250.130(C) and 406.3(D) address modifications to existing installations. I believe additional examples could be identified. Nothing in the original substantiation for AFCI protection indicates there is a reduced risk in existing installations.

The proposed text is an attempt to provide the committee a practical option to maximize protection in both new and modified electrical installations. It seems that decision should be made by the technical committee, not individual enforcement jurisdictions. Individual decisions result in extreme inconsistency causing problems for everyone involved. Where new equipment and new circuits are provided in a new installation, practical safeguarding should and can be provided to the entire circuit. Where modifications are made to existing installations, practical safeguarding can also be provided. The parallel protection of the home run in those existing installations may not be practical. However, excluding the protection of the entire circuit based on the home run does not appear to be the best option for practical safeguarding the installation. The proposed text is an exception to the general requirement to provide that protection.

Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-90.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.
Comment on Affirmative:
KING, D.: See my affirmative with comment on Comment 2-90.
WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90.

2-92 Log #2401 NEC-P02 **Final Action: Accept in Principle**
(210.12(B))

Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 2-153
Recommendation: Revise to read as follows:
Exception: Where circuits for the rooms and/or outlets in the rooms listed in 210.12(B) are altered, modified, extended, replaced, or revised in an existing electrical installation, the AFCI protection shall be permitted to be located at the first outlet by a listed Outlet Branch Circuit (OBC) AFCI Receptacle.
Substantiation: The exception number will need to be correlated with other actions for this section.

The Panel and Committee Member Statements for many of the proposals to revise the 2008, NEC 210.12 requirements reflect one of two positions.

One position seems to suggest the risk of parallel damage from the overcurrent device to the first outlet is minimal and permission to use device type protection would provide options to protect existing circuits that are incompatible with currently listed Combination AFCI protective devices installed at the supply end of the circuit.

The other position seems to suggest the maximum benefit to safety should include parallel and series protection of the entire branch circuit.

Panel statements for several proposals state the decision to apply the NEW CONSTRUCTION AFCI requirements, to a circuit modification, are that of the AHJ. That statement is interesting, puzzling and problematic when the text in 210.1, 210.12, 90.1, 90.2, 220.87, 250.130(C), and 406.3(D) are reviewed. Nothing in 210.1, 210.12, 90.1, or 90.2 currently limits this requirement to NEW CONSTRUCTION. Current requirements in 220.87, 250.130(C) and 406.3(D) address modifications to existing installations. I believe additional examples could be identified. Nothing in the original substantiation for AFCI protection indicates there is a reduced risk in existing installations.

The proposed text is an attempt to provide the committee a practical option to maximize protection in both new and modified electrical installations. It seems that decision should be made by the technical committee, not individual enforcement jurisdictions. Individual decisions result in extreme inconsistency causing problems for everyone involved. Where new equipment and new circuits are provided in a new installation, practical safeguarding should and can be provided to the entire circuit. Where modifications are made to existing installations, practical safeguarding can also be provided. The parallel protection of the home run in those existing installations may not be practical. However, excluding the protection of the entire circuit based on the home run does not appear to be the best option for practical safeguarding the installation. The proposed text is an exception to the general requirement to provide that protection.

Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-90.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.
Comment on Affirmative:
KING, D.: See my affirmative with comment on Comment 2-90.
WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90.

2-93 Log #2499 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-176
Recommendation: This submitter is well aware of the distinctions that exist between AFCI and GFCI devices, and for that reason it was never asserted that they were equivalent, because they are plainly not. They are, however, at least in part, residual current devices. When CMP 2 broadened the applicability of AFCI protection from bedrooms only, it simply provided a list of rooms to be protected. It never substantiated why this room, and not that room. In so doing, CMP 2 left it to the public to try and make sense of why this room and not that room. This submitter seriously doubts that the broad applicability of GFCI protection requirements in bathrooms and kitchens did not inform the panel decision, which this comment does not challenge. This proposal is merely intended to fully implement, in a consistent and easily explainable fashion, the prior panel action that created the current room list.
Substantiation: None given.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided specific code text as required by 4.3.3(c) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Abstain: 1
Explanation of Abstention:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

2-94 Log #2866 NEC-P02 **Final Action: Accept in Principle**
(210.12(B))

Submitter: Don Ganiere, Ottawa, IL
Comment on Proposal No: 2-160
Recommendation: Accept in principle as shown below.

Dwelling Units. All 120-volt, single phase, 15- and 20-ampere branch circuits supplying outlets installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms or areas shall be protected by a listed arc-fault circuit interrupter, combination-type, installed to provide protection of the branch circuit. Where a branch circuit is modified or extended, AFCI protection shall be provided for the portion of the branch circuit that is modified or extended.

Substantiation: This needs to be addressed by the code language and not left to the installer and the AHJ. In addition, the panel statement will cause issues in the use and application of many code rule as the statement clearly and incorrectly says that the rules found in the NEC only apply to new construction I see nothing in the code anywhere, except 800.156,where the code says a rule only applies to new construction. 90.2(A) says that this code applies to "electrical installations". There is nothing to suggest that the code rules only apply to new construction and not to modifications, extensions or upgrades.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-90 that satisfies the submitter's intent.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.
Comment on Affirmative:
KING, D.: See my affirmative with comment on Comment 2-90.
WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90.

2-95 Log #2881 NEC-P02 **Final Action: Hold**
(210.12(B))

Submitter: Timothy D. Curry, Curry Electric, Inc.
Comment on Proposal No: 2-153
Recommendation: THE PANEL SHOULD REJECT THIS PROPOSAL.
Substantiation: WHILE SOME AFCI DEVICES CAN DETECT ARCING ON THE LINE SIDE (IE: BETWEEN THE BREAKER AND THE1ST DEVICE) IF THE DEVICE TRIPS, IT WILL ONLY REMOVE THE LOAD FROM THE CIRCUIT. THE ARCING MAY BE A HIGH RESISTANCE FAULT TO GROUND, WHICH WILL CONTINUE, DESPITE THE AFCI DEVICE SHEDDING THE LOAD. THIS WOULD THEN LEAD THE OWNER TO BELIEVE THE PROBLEM WAS LOADSIDE (NEVER THINKING ABOUT LINE SIDE) AND HE / SHE WOULD INVESTIGATE ONLY THE LOAD SIDE. THUS, THE FAULT WOULD CONTINUE, POSING A SIGNIFICANT RISK OF INJURY OR DEATH TO THE OCCUPANTS.
Panel Meeting Action: Hold
Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1
Explanation of Negative:
KING, D.: I disagree with the panel action to place this comment on hold. This Comment should have been rejected. The submitter's substantiation is anecdotal in nature and lacks the technical documentation necessary to support his recommendation. Data presented to Panel 2 this code cycle shows evidence of parallel arc protection provided by the branch circuit overcurrent device. See my explanation of negative on Comment 2-99.
WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.
Explanation of Abstention:
BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.
Comment on Affirmative:
PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-96 Log #2390 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception)

Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 2-160
Recommendation: Revise to read as follows:
Exception: Where circuits and/or outlets in the rooms listed in 210.12(B) are altered, modified, extended, replaced, or revised in an existing electrical installation, the AFCI protection shall be permitted to be located at the first outlet by a Listed Combination Type AFCI Receptacle.
Substantiation: The Panel Statements for many of the proposals to revise the 2008, NEC 210.12 requirements reflect one of two positions.
One position seems to suggest the risk of parallel damage from the overcurrent device to the first outlet is minimal and permission to use device type protection would provide options to protect existing circuits that are incompatible with currently listed Combination AFCI protective devices installed at the supply end of the circuit.
The other position seems to suggest the maximum benefit to safety should include parallel and series protection of the entire branch circuit.
Panel statements for several proposals state the decision to apply the NEW CONSTRUCTION AFCI requirements, to a circuit modification, are that of the AHJ. That statement is interesting, puzzling and problematic when the text in 210.1, 210.12, 90.1, 90.2, 220.87, 250.130 (C), and 406.3 (D) are reviewed. Nothing in 210.1, 210.12, 90.1, or 90.2 currently limits this requirement to NEW CONSTRUCTION. Other requirements in the NEC address modifications to existing installations. Nothing in the original substantiation for AFCI protection indicates there is a reduced risk in existing installations.
The proposed text is an attempt to provide the committee a practical option to maximize protection in both new and modified electrical installations. It seems that decision should be made by the technical committee, not individual enforcement jurisdictions. Individual decisions result in extreme inconsistency causing problems for everyone involved. Where new equipment and new circuits are installed, practical safeguarding should be provided to the entire circuit. Where modifications are made to existing installations, practical safeguarding can also be provided. The proposed text is an exception to the general requirement to provide that protection.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-90.
The panel notes that the appropriate type of receptacle AFCI is an outlet branch circuit AFCI, as specified in Comment 2-90.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.
Comment on Affirmative:
KING, D.: See my affirmative with comment on Comment 2-90.
WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90.

2-97 Log #2391 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception)

Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 2-165
Recommendation: Revise to read as follows:
Exception: Where circuits for the rooms and/or outlets in the rooms listed in 210.12(B) are altered, modified, extended, replaced, or revised in an existing electrical installation, the AFCI protection shall be permitted to be located at the first outlet by a listed Outlet Branch Circuit (OBC) AFCI Receptacle.
Substantiation: The exception number will need to be correlated with other actions for this section. The Panel and Committee Member Statements for many of the proposals to revise the 2008, NEC 210.12 requirements reflect one of two positions.
One position seems to suggest the risk of parallel damage from the overcurrent device to the first outlet is minimal and permission to use device type protection would provide options to protect existing circuits that are incompatible with currently listed Combination AFCI protective devices installed at the supply end of the circuit.
The other position seems to suggest the maximum benefit to safety should include parallel and series protection of the entire branch circuit.
Panel statements for several proposals state the decision to apply the NEW CONSTRUCTION AFCI requirements, to a circuit modification, are that of the AHJ. That statement is interesting, puzzling and problematic when the text in 210.1, 210.12, 90.1, 90.2, 220.87, 250.130 (C), and 406.3 (D) are reviewed. Nothing in 210.1, 210.12, 90.1, or 90.2 currently limits this requirement to NEW CONSTRUCTION. Current requirements in 220.87, 250.130(C) and 406.3 (D) address modifications to existing installations. I believe additional examples could be identified. Nothing in the original substantiation for AFCI protection indicates there is a reduced risk in existing installations.
The proposed text is an attempt to provide the committee a practical option to maximize protection in both new and modified electrical installations. It seems that decision should be made by the technical committee, not individual enforcement jurisdictions. Individual decisions result in extreme inconsistency causing problems for everyone involved. Where new equipment and new circuits are provided in a new installation, practical safeguarding should and can be provided to the entire circuit. Where modifications are made to existing installations, practical safeguarding can also be provided. The parallel protection of the home run in those existing installations may not be practical. However, excluding the protection of the entire circuit based on the home run does not appear to be the best option for practical safeguarding the installation. The proposed text is an exception to the general requirement to provide that protection.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-90.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.
Comment on Affirmative:
KING, D.: See my affirmative with comment on Comment 2-90.
WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90

2-98 Log #1580 NEC-P02 **Final Action: Hold**
(210.12(B) Exception No. 1)

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 2-153
Recommendation: Continue to reject this proposal.
Substantiation: Unlike section 210.8 that requires receptacle protection, section 210.12 has always required branch circuit protection. The panel has affirmed this need numerous times in the past by:
· Rejecting 2002 2-104 that proposed receptacle type AFCIs, stating, "The panel does not agree that the data submitted for the 1999 NEC did not support the present AFCI requirement for branch circuit wiring."
· Rejecting 2002 comment 2-67, stating "The requirement in Section 210-12 expresses the intent of the panel, which is that the entire branch circuit be provided with AFCI protection."
· Rejecting 2002 comment 2-7, stating, "The information available to the panel during the 1999 Code Cycle shows a number of fires that are attributed to branch-circuit wiring. The present code rule expresses the panel's intent that the specified branch-circuits have AFCI protection."

· Rejecting 2002 comment 2-72, stating, "The code requirement is for an AFCI that provides protection for the entire branch circuit."

· Rejecting 2002 comment 2-76, stating, "The panel reiterates that the branch circuits must be protected with an arc-fault circuit-interrupter."

· Rejecting 2002 comment 2-78, stating, "The panel has revised the requirement from the ROP to make it clear that the AFCI must be 'listed' to protect the entire branch circuit."

· Accepting 2002 comment 2-81 that stated in part, "This comment supports the addition of the AFCI at the branch to provide protection to the fixed wiring and protection to extension and appliance wiring."

· Rejecting 2008 proposal 2-130, stating, "The panel reaffirms its position that AFCI devices are to protect the entire length of all 120 volt, 15- and 20-ampere branch circuits supplying outlets in dwelling unit bedrooms and that the AFCI devices that are used be installed at the origin of the circuit;"

· Rejecting 2008 proposal 2-139, stating, "The panel reaffirms its position that all branch circuits that supply dwelling unit bedrooms shall be protected by an AFCI device and that the device shall protect the branch circuit;"

· Rejecting 2008 proposal 2-140, stating in part that, "The protection is required for the branch circuit." Regarding this proposal, Mr. King stated, "Additional physical protection of the unprotected portion of the branch circuit wiring is also required when applying the exception due to the hazard that exists with leaving that part of the branch circuit wiring unprotected by the AFCI device."

In his statement on 2008 proposal 2-147, Mr. King also stated, "The requirement for the additional physical protection provided in exception is necessary to reduce the risk of physical damage to this portion of the branch circuit wiring that is not protected by the AFCI device. It is the intent of this section that AFCI protection is provided for the entire length of the branch circuit. An exception to allow even a small portion of this circuit to be unprotected must be supplemented with some other means of physical protection."

In the 2008 ROC the panel continued to affirm its strong position, stating in its rejection of 2-127, "The submitter's recommendation would remove AFCI protection from a significant portion of the branch circuit. Given that 210.12 is intended to provide protection for the branch circuit, the exception is in conflict with the basic intent. The submitter's claim that 'the data was clear in indicating arcs at receptacles and in branch circuit extensions' is not supported since a significant percentage of the fires are estimated to be in the distribution system itself and not just in extension and appliance cords."

The past statements made by the panel on the need to protect the entire branch circuit are strong and unambiguous.

Panel Meeting Action: Hold

Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1

Explanation of Negative:

KING, D.: I disagree with the panel action to place this comment on hold. The submitter of this Comment has accurately documented a history of the Panel's commitment to the expansion of AFCI Protection for branch Circuit wiring based on data presented to the panel at each code cycle. Data presented to the Panel at the ROC Meeting for this code cycle showed evidence of a significant increase in the number of branch circuits that would be afforded AFCI protection if Proposal 2-153 were accepted. See my explanation of negative for comment 2-99.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

Comment on Affirmative:

PURVIS, R.: See my comment with my affirmative vote on Comment 2-99.

2-99 Log #1917 NEC-P02 **Final Action: Hold**

(210.12(B) Exception No. 1)

Submitter: Jack Wells, Arc Fault Circuit Interrupter Wiring Device Joint Research and Development Consortium

Comment on Proposal No: 2-153

Recommendation: The panel should accept the proposal to revise 210.12(B) Exception No.1 but change the wording to read as follows:

Exception No. 1 ~~Where RMC, IMC, EMT or steel armored cable, Type AC, meeting the requirements of 250.118 using metal outlet and junction boxes installed for the portion of the branch circuit between the branch circuit overcurrent device and the first outlet, i~~It shall be permitted to install ~~a combination~~ a listed Outlet Branch Circuit AFCI provided it is installed as the first outlet on the branch circuit and the branch circuit wiring is continuous from the service panel to the AFCI receptacle.

Substantiation: Determining whether to accept this comment and allow Outlet Branch Circuit (OBC) AFCI receptacles to be used at the first outlet in a branch circuit without the burdensome requirement of protecting the "homerun" with a metallic wiring method boils down to one consideration.

Is the increased risk of diminished protection against parallel arcs on the "home run" more than offset by the increase in use of AFCI protection afforded by the availability of OBC AFCI receptacles in the market place?

This proposal and this final comment are offered by four companies under the name of the Arc Fault Circuit Interrupter Wiring Device Joint Research and Development Consortium (AFCI WD Consortium). Those four companies are: Cooper Wiring Devices, Hubbell Incorporated (Delaware), Leviton Manufacturing Company, Inc., and Pass & Seymour/ Legrand.

The AFCI WD Consortium has commissioned a technical literature search by Underwriters Laboratories and an extensive market research project conducted by Parks Associates which are appended to and a part of this comment.

Based on the information developed in these two reports, The AFCI WD Consortium believes that the answer is an unequivocal yes. Most importantly, acceptance of this proposal will significantly increase the number of AFCI installations in existing older dwellings.-The increased use of AFCIs in older homes will place the protection exactly where, according to CPSC, over 90% of the residential fires of electrical origin occur.

Key points to consider and covered in more detail in this comment are:

Protection afforded by an ODC Type AFCI Receptacle:

· OBC AFCI Receptacles detect and interrupt series arcs on the entire branch circuit. (UL 1699A, Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters)

· OBC AFCI Receptacles detect and interrupt parallel arcing on the branch circuit downstream from the first outlet. OBC AFCI Receptacles do not detect and interrupt parallel arcing on the "home run". (UL I699A, Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters)

· The "home run" typically represents 35% or the 25 to 50 feet of the branch circuit closest to the circuit breaker. (parks Associates White Paper, Figures 25, 26)

· A conventional circuit breaker's magnetic trip function protects a portion of the first 50 feet of the circuit from parallel arcing. (see "Analysis of Circuit Protection of the Branch Circuit Home Run")

Increased installation of AFCI protection if ODC Type AFCI Receptacles are available:

· Consumers who own and occupy single-family existing dwellings and undertake electrical do-it yourself projects are more than twice as likely to replace receptacles compared to circuit breakers. (parks Associates White Paper, Figure 10)

· If OBC AFCI receptacles were available, 75% of consumers would add AFCI protection immediately or when remodeling or doing other electrical work. (Parks Associates White Paper, Figure 4)

· This finding factored with other research in a Risk-Benefit Analysis conclude there would be a net gain of more than 8 million additional circuits in existing homes built prior to 2002 with AFCI protection within five years. (Parks Associates White Paper, Sections 1.0, 1.4, Appendix 3)

· 83% of respondents live in homes more than 10 years old. (Parks Associates White Paper, Figure 2)

· CPSC reports that 94.5% of residential fires of electrical origin are in homes 10 years or older (US Consumer Product Safety Commission (CPSC) in 1987 and summarized in the UL Research report "Data Analysis of Fires in the residential Electrical Distribution System, Table3)

Conclusion is an increase in circuits protected with AFCI if the code is changed:

· The net protection added by approving this code proposal is the equivalent of 8.2 million circuits with a significant number going to older homes where protection is needed the most.

Acceptance of this comment and thus enabling the feasibility of developing and commercializing OBC AFCI receptacles will accelerate the installation of AFCI protection where the electrical fires are, in older homes.

Adoption of the code requirement to permit the use of the OBC AFCI for protection of the branch circuit is critical in establishing the consumer confidence that this device will provide a high level of protection against electrical fires. As noted in the Parks report, a significant number of users are likely to install a receptacle OBC AFCI, especially if the code recognizes this type of device.

This change in the code will lead to acceptance of the receptacle type OBC AFCI by consumers as a product that provides an increased level of safety for their electrical system. The study by Parks Associates demonstrates that consumers will install AFCI receptacles instead of standard receptacles in a substantial number of remodeling and replacement applications. Based on the survey conducted by Parks Associates, the installation of receptacle type AFCI's in these applications is clearly based on consumer recognition that the receptacle OBC AFCI has been accepted as a code requirement.

By accepting this code proposal, the OBC AFCI Receptacle will receive a stamp of approval from the NEC. Professional Electrical Contractors and Do-It-Yourselfers will not use the OBC AFCI Receptacle without this stamp of approval. The net result is that circuits that would have previously been unprotected will now have a level of AFCI protection.

Table 1 of the attached UL Report compares the protection provided by a Combination AFCI and an OBC AFCI. As the table indicates the only

difference between the Combination AFCI and OBC AFCI is parallel arc detection in the home run. The remainder of the circuit will be equally protected by both the Combination AFCI circuit breaker and the OBC AFCI receptacle at the first outlet, including equal series arc protection of the home run by both the circuit breaker and receptacle AFCIs.

The Summary of Findings in the UL report states that "Approximately 35% of fires occurring in the residential electrical distribution system may be attributed to fires in the fixed building wire." A survey conducted by Parks Associates indicates that the home run is typically 35% of the total length of the fixed wiring in a branch circuit. Based on this information it is apparent that the home run portion of the fixed wiring potentially exposed to parallel arcing faults is relatively small. The Park's Associates survey data indicates that the home run is commonly in the range of 25 to 50 feet.

An additional factor when considering protection against parallel faults in the home run is the protection provided by a standard circuit breaker. Since the home run is typically only 35% of the length of the branch circuit, it is likely that available short circuit current will be sufficient to cause the instantaneous trip of a circuit breaker to interrupt a parallel fault in the home run. In fact, in an AFCI protected circuit, it may be difficult to determine if the protection against any parallel fault in the home run is provided by the instantaneous trip of the circuit breaker or by the AFCI protection.

The relatively short length of the typical home run and the protection afforded by a standard circuit breaker serve to decrease the likelihood of arcing in the home run as a significant contributor to electrical fires.

It can be predicted that there will be increased use of receptacle type AFCI's if the code is changed to permit the use of these products. The Parks white paper provides data that supports the conclusion that achieving a net increase in electrical safety will be accomplished by making receptacle type AFCI's available and by increasing the awareness by homeowners and contractors of the effectiveness of receptacle type OBC AFCI's in preventing electrical fires.

There are 16million receptacle replacement occurrences annually. Based on the survey responses of home owners and contractors, 1.3 million of the receptacle replacement occurrences would be annual if these devices were available; another 826,000 would be one-time occurrences. The replacement receptacle AFCI's would be installed in existing housing.

As noted in the UL report, the frequency of fires in residential electrical systems increases as the home ages. The replacement of standard receptacles with AFCI receptacles will take place in older housing stock, where the arcing events leading to fires occur more frequently than in new housing.

The benefit of replacing standard receptacles with AFCI receptacles can be achieved by accepting the code revision that allows the OBC AFCI to provide protection of the branch circuit. The change in the code will provide receptacle manufacturers with the opportunity to introduce receptacle AFCI's into the market. The code change will also generate home owner awareness of the benefits of installing APCI protection.

We urge the panel to accept the addition to the code of Outlet Branch Circuit AFCI in order to insure an increase in safety of the electrical distribution system in homes.

(The three following documents are included as part of this comment:

- Underwriters Laboratories Inc. Research Report "Data Analysis of Fires in the Residential Electrical Distribution System"
- Parks Associates White Paper "APCI Code Change Analysis"
- The paper titled: (" Analysis of Circuit Breaker Protection of the Branch Circuit Home Run").

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Hold

Panel Statement: The panel "Holds" this comment and Proposal 2-153 under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 2 Abstain: 1

Explanation of Negative:

KING, D.: I disagree with the Panel action to place this Comment on Hold. The submitter of this comment included documentation that clearly exhibited a significant increase in the number of Branch Circuits that would be protected if this Comment were to be accepted. Further consideration should have been given by Panel 2 to the three separate reports that were included with this comment along with the presentation made by the representative of the Joint AFCI WD Consortium at the ROC meeting. An independent analysis of this proposed change by Parks Associates estimated that an additional 8 million branch circuits would be protected by allowing the installation of OBC Type AFCI devices to be installed. As was pointed out at the ROC meeting, this was an extremely conservative estimate and did not factor in the ability of OBC Type AFCI devices to detect series arcing faults in branch circuit homeruns. Furthermore the Analysis did not consider any parallel arc protection that is currently provided by the magnetic trip mechanism of a standard overcurrent device that is already required at the origin of the branch circuit. Additional Analysis that was included with this comment documented the ability of a standard overcurrent device to respond to a parallel arcing fault within the first 40 feet of a branch circuit homerun. Again this was a conservative estimate that was based on an abnormally low available fault current at the service panel of only 500 amperes. A more realistic assumption of available fault current at the service equipment greatly extends the length of the branch circuit homerun that is protected by a standard overcurrent device.

WOOD, T.: See My Explanation of Negative Vote on Comment 2-68.

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

Comment on Affirmative:

LAROCCA, R.: We understand the potential benefits of the availability of Outlet Branch Circuit Type AFCI, but do not fully agree the data presented adequately provides a factual indication of the risks associated with removing parallel protection in the home run. The Panel's action allows for the development of additional data to quantify the potential for parallel arcing faults in the home run of the branch circuit as well as the extent of the protection against parallel arcing faults provided for the home run by the over current protective device.

PURVIS, R.: This comment should have been accepted in order to increase overall safety in homes across the country by increasing the number of AFCI devices actually installed in the future. This would be in accordance with the purpose of the NEC in 90.1, "Practical Safeguarding". However, with a "Hold" both UL and the manufacturers will now have time before the next code cycle to actually verify the risks of not covering the home run with AFCI protection. It seems that the home run of each circuit required to have AFCI protection is by far the safest part of the branch circuit and these home runs are a small percentage of the entire risks to the total length of ALL branch circuits in the home. If this turns out to be true, maybe a reasonable length of the unprotected home run can also be determined by the next code cycle.

WILKINSON, R.: The panel should not risk the annual loss of hundreds of lives and billions of dollars in lost property by not demanding that the entire circuit on new homes be fully protected by AFCI's as has been this panel stated goal for four code cycles. Furthermore we should not squander the public trust in us by not providing the most advanced and comprehensive coverage available to safeguard their families and their homes.

2-100 Log #2500 NEC-P02 **Final Action: Accept**
(210.12(B) Exception No. 1 and No. 2)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-182
Recommendation: Accept the panel action as written in principle, changing the conjunction "and" to "or".
Substantiation: It is a physical impossibility for a fire alarm system to be simultaneously nonpower limited as covered in 760.41(B) and power limited as covered in 760.121(B), however all fire alarm systems will be either one or the other. This comment corrects the apparently inadvertent error that repeated the same drafting error in the proposal as submitted, as well as in the text of the 2008 NEC.

Panel Meeting Action: Accept

Panel Statement: The panel understands that the addition of the recommended text is in addition to the action taken on Comment 2-63.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Abstain: 1

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

2-101 Log #2501 NEC-P02 **Final Action: Reject**
(210.12(B) Exception No. 1 and No. 2)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-183
Recommendation: The proposal should be accepted in principle and in part. Reject the modification to Exception No. 1 provided Proposal 2-153 acquires the required two-thirds majority. Accept the modification to Exception No. 2 by further limiting it to steel wireways and auxiliary gutters, and provide a list format, as follows:

Exception No. 2: Where a branch circuit to a fire alarm system is installed in accordance with one or more of the wiring methods specified in a. through g., AFCI protection shall be permitted to be omitted. The wiring methods employed shall comply with 250.118.

a. RMC
b. IMC
c. EMT
d. Type AC cable if manufactured with steel armor
e. Type MC cable if manufactured with steel armor
f. Steel wireways

g. Steel auxiliary gutters
h. Metal outlet and junction boxes.

Substantiation: The panel statement regarding wireways and auxiliary gutters is substantially true for small residential construction such as one- and two-family dwellings. However, the AFCI requirements extend far beyond such limited applications. They apply in very large multifamily applications, as well as staff apartments in university dormitories, etc. All of these applications, which are the typical ones for Article 760 fire alarm systems, very commonly involve wireways and auxiliary gutters, and it is impractical to omit them from the list. The submitter has inspected numerous examples of this work.

In the event that the modifications to Exception No. 1 do not succeed, then a comparable permission should be extended to this exception as well.

Panel Meeting Action: Reject

Panel Statement: The present format of the Exception is clear and the revision does not improve clarity or enhance usability.

The panel did not accept the addition of steel wireways and auxiliary gutters because the submitter is unclear as to their application in a fire alarm supply circuit.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Abstain: 1

Explanation of Abstention:

BROWN, L.: NAHB is abstaining from voting on this Public Comment as it deals with Section 210.12 - Arc-Fault Circuit Interrupters (AFCI). As a resident of a state or local jurisdiction will receive no cost-benefit from the installation of these expensive devices, as mandated through the National Electric Code (NEC), NAHB cannot support any Public Proposal or Public Comment related to AFCIs.

2-102 Log #2392 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception No. 3)

Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 2-184
Recommendation: Revise to read as follows:

Exception: Where circuits for the rooms and/or outlets in the rooms listed in 210.12(B) are altered, modified, extended, replaced, or revised in an existing electrical installation, the AFCI protection shall be permitted to be located at the first outlet by a listed Outlet Branch Circuit (OBC) AFCI Receptacle.

Substantiation: The exception number will need to be correlated with other actions for this section.

The Panel and Committee Member Statements for many of the proposals to revise the 2008, NEC 210.12 requirements reflect one of two positions.

One position seems to suggest the risk of parallel damage from the overcurrent device to the first outlet is minimal and permission to use device type protection would provide options to protect existing circuits that are incompatible with currently listed Combination AFCI protective devices installed at the supply end of the circuit.

The other position seems to suggest the maximum benefit to safety should include parallel and series protection of the entire branch circuit.

Panel statements for several proposals state the decision to apply the NEW CONSTRUCTION AFCI requirements, to a circuit modification, are that of the AHJ. That statement is interesting, puzzling and problematic when the text in 210.1, 210.12, 90.1, 90.2, 220.87, 250.130(C), and 406.3(D) are reviewed. Nothing in 210.1, 210.12, 90.1, or 90.2 currently limits this requirement to NEW CONSTRUCTION. Current requirements in 220.87, 250.130(C) and 406.3(D) address modifications to existing installations. I believe additional examples could be identified. Nothing in the original substantiation for AFCI protection indicates there is a reduced risk in existing installations.

The proposed text is an attempt to provide the committee a practical option to maximize protection in both new and modified electrical installations. It seems that decision should be made by the technical committee, not individual enforcement jurisdictions. Individual decisions result in extreme inconsistency causing problems for everyone involved. Where new equipment and new circuits are provided in a new installation, practical safeguarding should and can be provided to the entire circuit. Where modifications are made to existing installations, practical safeguarding can also be provided. The parallel protection of the home run in those existing installations may not be practical. However, excluding the protection of the entire circuit based on the home run does not appear to be the best option for practical safeguarding the installation. The proposed text is an exception to the general requirement to provide that protection.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 2-90.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

Comment on Affirmative:

KING, D.: See my affirmative with comment on Comment 2-90.
WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90.

2-103 Log #2745 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception No. 3)

Submitter: Randal Hunter, City of Las Vegas
Comment on Proposal No: 2-184
Recommendation: Add text to read as follows:

Exception No. 3: In existing dwellings, where utilizing existing wiring, it shall be permissible to install a combination AFCI device at the first outlet to provide protection for the remaining portion of the branch circuit.

Substantiation: Below are two examples of situations where we should allow the above code language, also with the continued expansion of the AFCI requirements we need to be able to look back and provide the same protection for older residences.

As inspectors we are frequently faced with a compromise situation when minor additions are done to residences, often just adding a few additional receptacles to an existing circuit, currently we have to give away the AFCI upgrade due to the fact we have a multi-wire branch circuit and it is way too destructive to require an entire new home run to be installed. By allowing a device to be installed in the first outlet of a branch circuit we have provided a safer condition without requiring unreasonable modifications to existing homes.

Due to either the style, age or other conditions of the electrical service, many have to rely on devices rather than AFCI breakers. Owners of any home built before the last two code cycles have not benefited from the safety provided by the AFCI technology. With this proposal we don't get the protection of the home run, however protection of the rest of the circuit is certainly better than none at all. The code should not discriminate against those who don't have a new residence. If this technology is as good as we believe, we should make it possible for more people to benefit from it in existing dwellings without extensive re-wiring or modifications which could include homerun replacement or panel change outs. This would allow for retro-fitting provisions similar to the GFCI methods used in Article 406.3(D)(3).

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 2-90 that meets the submitter's intent.

The panel notes that the appropriate type of receptacle AFCI is an outlet branch circuit AFCI, as specified in Comment 2-90.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

Comment on Affirmative:

KING, D.: See my affirmative with comment on Comment 2-90.
WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-90.

2-104 Log #1219 NEC-P02 **Final Action: Reject**
(210.12(C) (New))

Submitter: David E. Shapiro, Safety First Electric
Comment on Proposal No: 2-186
Recommendation: Revise 210.12(B) follows:

... from the first outlet on. Where a multiwire circuit splits into two or three separate branch circuits, this protection shall be provided no further downstream than the first outlet on each branch.

Substantiation: In case the CMP's action on Proposal 2-153 is not overturned, It is important that in existing wiring there be some relief for installers who otherwise would have difficulties beyond those caused by the manifold illegalities that, however large or minuscule the level of hazard they add, would cause an AFCI to trip immediately.

As the panel acknowledges, AFCIs are proven life- and property-savers. As GFCIs warranted the rare replacement requirement, so should AFCIs. However, these are a hard sell. The relief I propose would go a small way to protect Mr. Manche's proposal from local amendment.

Panel Meeting Action: Reject

Panel Statement: The present code text already allows for AFCI protection to be installed in other than the origin of the branch circuit by the Exception in 210.12(A) and the panel action taken on Comment 2-90.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Abstain: 1

Explanation of Abstention:

BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

2-105 Log #1759 NEC-P02 **Final Action: Reject**
(210.12(C) (New))

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 2-186
Recommendation: Add a new last sentence to 210.12(B) as written in the 2008 NEC as follows:
This section shall not apply to the replacement of branch circuit overcurrent devices or where a service is upgraded or replaced.
Substantiation: The panel action and statement clearly illustrate that CMP-2 recognizes 210.12 as applicable only to "New Construction." The panel statement further illustrates a desire to gain more experience with AFCI technology. The problem is that the text of 210.12 does not prescriptively exempt the AFCI requirement for replacement of overcurrent devices or a service upgrade in an existing dwelling unit. The rule is presently met with AFCI circuit breakers in "new construction". Contractors and AHJ's will find themselves the targets of lawsuits where a replacement or service upgrade is made and a fire occurs. The fact that CMP-2 has consistently rejected attempts to include prescriptive text to include replacements or service upgrades will not be an acceptable argument for not installing AFCI on a replacement or service upgrade. This issue has been kicked around for several cycles. The intent of CMP-2 must be included in the prescriptive text of 210.12 for clarity and usability.
The lack of prescriptive text in 210.12 to exclude overcurrent device replacement and service upgrades is creating serious liability for the installer/maintainer and the AHJ.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees that prohibiting the installation of AFCI devices, where the overcurrent device is replaced or the service is upgraded, applies in all cases.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Abstain: 1
Explanation of Abstention:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.
Comment on Affirmative:
KING, D.: Although I agree with the panel that prohibiting the installation of AFCI devices where services are upgraded or changed should not apply in all cases, it should have been stated that it does not apply in any case which is the basis for the concerns expressed in the submitter's substantiation. I agree with the submitter that clear prescriptive language should be included in this section that requires AFCI protective devices to be installed where services are upgraded or replaced. Also the submitter's concerns regarding liability issues for the installer, maintainer and AHJ are valid and should be addressed by Panel 2.

17-3 Log #67 NEC-P17 **Final Action: Accept**
(210.13 (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-189
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panels 17 and 18 for action on protection of the appliance and action related to the construction of the receptacle, respectively.
This action will be considered by Code-Making Panels 17 and 18 as public comments.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: CMP 17 accepts the direction of the TCC to act on Proposal 2-189, and the panel rejects the proposal.
The companion proposals for neither 210.13 [Proposal 2-189] nor the associated Article 100 Electrical Fault Circuit Interrupter definition [Proposal 2-15] do not characterize the specific protection provided. With no parameters and limiting values for those parameters established, any device with a current-interrupting feature could purport to provide electrical fault circuit interrupter protection. As such, the proposed requirement is unenforceable.
CMP 17 agrees with the panel statement of CMP 2 for rejecting this proposal. This proposal did not address a cord installed EFCI device but specifically addresses receptacles, which are not in the scope of CMP 17. CMP 17 does not accept that the documentation provided justifies the requirement that these receptacles be mandatory. The FEMA report mainly points to the major cause of these fires being the build up of lint in the exhaust system. This device would not correct that specific problem.
Installation of these devices is not currently prohibited by the NEC.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

18-4 Log #67a NEC-P18 **Final Action: Accept**
(210.13 (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-189
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panels 17 and 18 for action on protection of the appliance and action related to the construction of the receptacle, respectively.
This action will be considered by Code-Making Panels 17 and 18 as public comments.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the TCC direction to act on Proposal 2-189 and rejects the proposal.
Panel Statement: There are no product requirements for electrical-fault circuit-interrupter protection. The Fact-Finding Investigations submitted by the two testing laboratories (CSA and Intertek) appear to be only test programs designed by the product manufacturer. They conclude that Safe Plug performs as specified by the manufacturer. A thorough study of wiring device failure mechanisms, and the ability of this technology to mitigate these hazards is warranted before such devices should be mandated in the code. Installation of these devices is not currently prohibited by the NEC.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

2-106 Log #2383 NEC-P02 **Final Action: Reject**
(210.18(C))

Submitter: Michael A. Anthony, University of Michigan
Comment on Proposal No: 2-191
Recommendation: Accept the Proposal in Principle with a new Part C in Section 210.12 instead:
(C) Student Residence Facilities. Sleeping areas in student residence facilities shall have branch circuits protected by arc-fault circuit interrupters by January 1, 2016.
Substantiation: This comment is submitted to simplify the migration to AFCI protection for our industry. We assume that adoption of this electrical safety technology will follow a trajectory similar to Ground Fault Circuit Interrupters over 30 years ago so we should not waste time getting to the ultimate destination: where this technology takes its place beside all other electrical safety technologies with known costs and benefits. Neither should we waste resources binding state legislative processes -- as other industries have -- to forestall the inevitable, either. With virally distributed acceptance and understanding forming the basis for a larger economy of scale, the cost differential between regular and AFCI breakers -- now about $20 for a 20A single pole breaker -- will narrow substantially.
This modification to the original proposal reduces difficulties in interpretation by eliminating the cooking provision criterion. Observers of student living habits in colleges and universities know that the conditions within student rooms often resemble Class II, Division II combustible dust occupancies -- whether there are permanent provisions for cooking or not. Parents wanting safety for their children, and APPA administrators wanting to protect the brand identity of their organization as a fire-safe organization, will want this change. If an electrical accident in a student dormitory occurs, we want to be already in motion to reduce the likelihood of a similar accident happening again.
The specific adoption date gives the manufacturer's time to innovate upon its performance, thus reducing nuisance trips, and getting costs down by establishing a common platform for competitions. I hope that the manufacturers will also innovate upon both ends of the electrical safety continuum as well: starting from the breaker in the panelboard in the hall and ending with safer end-use equipment coordinated with the Consumer Product Safety Council. The specific date gives designers and capital planners time to prepare programs for dormitory upgrades. The removal of uncertainty in the application of AFCI will reduce costs on many levels.
The Committee should note that APPA.ORG has submitted proposals for new chapters in the next edition of NFPA 101 and NFPA 5000 that contain definitions for "student residence facilities".
Panel Meeting Action: Reject
Panel Statement: The panel has been provided with extensive data relative to arcing conditions in dwellings.
The submitter has not provided sufficient substantiation that explains any specific events that have occurred in student resident facilities.
In addition, a clear definition of a student residence facility has not been provided.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 1 Abstain: 1

Explanation of Negative:
KING, D.: I disagree with the panel action. Student Residence Facilities are clearly occupancies that should have AFCI protection. Any one that has ever lived in or visited a College /University living unit can appreciate that these areas have at least the same level of hazards that have led to the requirement for AFCI protection in dwellings.
Explanation of Abstention:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-90.

2-107 Log #1582 NEC-P02 **Final Action: Accept**
(210.19(A) (New))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 2-193
Recommendation: Continue to reject this proposal.
Substantiation: This proposal should continue to be rejected. The substantiation claims in #2 that, "the value of I2T conductor heating recorded by the test exceeded the maximum safe limit according to accepted industry standards for conductor heating in insulated cables, potentially compromising the insulation when power to the circuit is restored." The substantiation goes on to state that, "A proposal presently under evaluation by UL/STP-489 will, if accepted, assure that the circuit breaker performance described in the proposed Fine Print Note is assured in the future for all OCPD devices installed to meet the overcurrent protection requirements of 240.4."

The ICEA conductor damage data referenced in the substantiation of the submitters UL 489 proposal and the presentation he made to CMP2 at the ROP meeting is based on an initial temperature of the copper conductor of 75°C. It is illogical to assume that all the conductors in a home typically operate at such an elevated temperature. As a matter of fact, in its discussion of the insulation damage formula, The IEEE Green Book (IEEE Std 142-1991, pg. 116) cautions that the initial operating temperature factor in the equation is, "often taken as the conductor maximum operating temperature rating rather than the actual operating temperature. This is a conservative approach but may result in conductor oversizing by one trade size".

Testing conducted by Square D/Schneider Electric confirms that circuit breakers protect wire very well. For example, the submitter suggested in his UL 489 proposal that in some of the tests he conducted the circuit breaker let-through I^2t was allegedly 88,804. But actual laboratory testing on #14 copper wire at room temperature confirms that it can withstand as much as 250,000 I^2t without insulation damage. Residential type circuit breakers typically let through a small fraction of that amount with a full 10,000 amps of available short circuit current. The let-through in actual applications where the available short circuit current will be considerably lower will likewise be much less than this.

The problem alleged by the submitter is purely theoretical. There is no "real" problem with the products on the market today, therefore, the UL 489 proposal and this NEC proposal are unnecessary. Finally, it should be noted that while the final ballot has not been cast, the submitter's UL 489 proposal did not fair well during the comment period.
Panel Meeting Action: Accept
Panel Statement: The panel notes that the test data that the submitter referred to in his substantiation was not submitted with his comment.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-108 Log #2876 NEC-P02 **Final Action: Reject**
(210.19(A) (New))

Submitter: Paul A. Keleher, Paul Keleher Electrical Services
Comment on Proposal No: 2-193
Recommendation: Revise text to read as follows:
210.19 Conductors- Minimum Ampacity and size
(A) Branch Circuits Not More Than 600 Volts.
(5) Permissible Voltage-Drop. The circuit conductors of a 15 or 20-ampere/120-volt branch circuit shall be sized such that voltage-drop measured at the rated ampacity of the circuit shall be 5 percent or less at any outlet.
Exception No. 1: Use of non-standardized circuit breakers in compliance with 240.4 shall be permitted on circuits supplying dedicated loads with high inrush or motor starting current where a circuit breaker meeting the requirements of this section can be shown to nuisance trip.
Exception No. 2: Where 240.3 or 240.4(G) applies.
FPN: Standard 120/240V circuit breakers rated from 15-50A that are listed to meet the overcurrent protection requirements of 240.4 contain a nonadjustable, instantaneous trip mechanism whose current setting will open the circuit within 1 cycle of being subjected to an overcurrent equal to or greater than 20 times their rated current. A full-load voltage drop measurement of 5% or less on a 120V branch circuit allows the system to deliver at least 20 times the rated current of the circuit to a short-circuit or bolted fault, ensuring that the circuit breaker's instantaneous mechanism will respond in compliance with other requirements of this Code.
Substantiation: The proposal has technically substantiated a problem that supports the need for this revision. CMP-2 based their action to this proposal using history and did not address the supporting evidence that this issue is a safety concern for property and persons. The NEC does not limit voltage drop at 120-volt outlets, and the product standard for standard circuit breakers does not require an instantaneous breaker response to a ground-fault or short-circuit current.1 Consequently, as recently collected short-circuit field test data indicates2, if excessive voltage-drop limits the current available to a short-circuit or ground-fault occurring on a 15 or 20A/120V branch circuit to a level that is less than that required to trigger the branch circuit breaker's magnetic (instantaneous) response, a thermal/magnetic circuit breaker protecting a 120V outlet will respond to a short-circuit or ground-fault with its intentionally delayed, thermal response. This response mechanism has been designed and is tested by the standard to respond effectively to low-level overloads. However, the product standard contains no calibrated time test within the range of fault-current typically available at 120V outlets3. Consequently, the ability of the thermal mechanism in a 15 or 20A circuit breaker protecting a 120V branch circuit to consistently protect against insulation damage from short-circuit or ground-fault current when high voltage drop limits the available fault current to a level that is insufficient to trigger the instantaneous magnetic mechanism, is not tested by the standard.

A sample of >1000 field short-circuit tests has been assembled from residential users of a field test instrument that conducts a short-circuit test at a 120V receptacle outlet, measuring and recording the short-circuit current and the response time of the circuit breaker in each test. The test results indicate that in a majority of 120 receptacle outlets tested, a short-circuit test produced a delayed, thermal response from the thermal/magnetic circuit breaker protecting the outlet-under-test. Conductor heating has been calculated from these results by applying the calculation I2T to the data in each of the 1017 tests. The results of those calculations indicate that in 10 percent of the tests the circuit conductors were overheated when compared against short-circuit withstand ratings for insulated copper cables as established by the ICEA4. The data further reveals that in all tests in which the breaker responded magnetically, conductor heating was safely limited to levels far below the I2T conductor heating allowed by the same standard.

The substantiation to proposal 2-193 explains how limiting voltage drop to 5 percent or less will ensure that sufficient current is available to produce a magnetic breaker response to a short-circuit or ground-fault at all 120V outlets, thereby addressing the questions raised by the data regarding the ability of thermal/magnetic circuit breakers to consistently protect conductors from overheating when exposed to a short-circuit or ground-fault.

The panel's rejection statement ignores both the submitter's technically substantiated argument that excessive voltage-drop is in fact a safety issue when it compromises overcurrent protection, and the supporting test data providing technical substantiation that the problem is real. Therefore, the submitter maintains that the panel's rejection statement lacks sufficient basis to reject this proposal given the technical substantiation clearly demonstrates a safety concern for property. Proposals in the past about this issue did not provide the technical evidence that clearly supports the need for including the requirement in the NEC.

This proposal should be accepted with the exceptions deleted, and as revised above. The exceptions are not applicable to the intent of the requirement. One minor correction has been inserted in the FPN. If however, after acknowledging the truth of the argument and the data that documents a real but latent problem, questions remain, the submitter suggests a compromise in the form of Acceptance in Principle and in Part. Such a resolution would mean that the panel understands the submitter's intent, but believes more study is needed, and in Part means that the proposal should include the deletions and insertions as shown in the revision accompanying this comment.
2-193 Panel Rejection statement:
"The panel reaffirms their position taken on similar proposals in previous Code cycles that voltage drop is a design consideration that must be dealt with by the installer/designer for each installation and can be specific to the involved equipment."

Note: Supporting material is available for review at NFPA Headquarters.

1UL-489, Section 7, Standard Circuit Breakers
2Residential Circuit Breaker- sorted by Short-Circuit Current
3ibid
4ibid, International Cable Engineers Association standard P32-382, Rev 2007: "Short-circuit Withstand Ratings for Insulated Copper Cables".
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided data that shows that conductors are damaged in the circumstances claimed.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-109 Log #1445 NEC-P02 **Final Action: Reject**
(210.19(A)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-194
Recommendation: Accept the proposal.
Substantiation: "Maximum" loads may be reduced by demand factors which then become "calculated" loads. Conductor ampacity may be reduced with the demand factors, but the maximum load (before demand factors) seemingly does not permit that reduction in ampacity.
Panel Meeting Action: Reject
Panel Statement: The panel maintains its position that the intent of this section is to ensure that conductors are sized to handle the maximum load.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-4 Log #68 NEC-P10 **Final Action: Accept**
(210.19(A)(2))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-200
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 10 for action in 240.4(B)(1) for consistency relating to the text in 210.19(A)(2).
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the TCC direction to take action on 240.4(B)(1) as referenced in proposal 2-200. See the action on comment 10-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-110 Log #1444 NEC-P02 **Final Action: Accept in Principle**
(210.19(A)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-199
Recommendation: Accept the proposal with the following revisions:
Insert "Multiple Receptacles" in lieu of "Multioutlet" in the heading.
Substantiation: The text refers to more than one receptacle, not outlets; multiple receptacles can be installed at one outlet.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel action taken on Proposal 2-200 satisfies the submitter's intent.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-5 Log #2502 NEC-P10 **Final Action: Accept in Principle**
(210.19(A)(2) [and 240.4(B)(1)])

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-200
Recommendation: Accept the proposal in principle and in part. Accept the panel action changing the title of 210.19(A)(2). Accept the assignment of jurisdiction over the subject matter to CMP 2 by the TCC. Revise the wording of 240.4(B)(1) to read as follows:
(1) The conductors being protected are not of a ~~multioutlet~~ branch circuit supplying multiple receptacles for cord- and plug-connected loads.
Substantiation: This comment is intended for the agenda of CMP 10, in response to the TCC note on Proposal 2-200 requiring action in 240.4(B)(1). The point of the original proposal, by this submitter, was to eliminate a conflict between 210.19(A)(2) and 240.4(B)(1) and this wording will accomplish the goal.
Panel Meeting Action: Accept in Principle
Revise 240.4(B) (1) to read as follows:
The conductors being protected are not part of a branch circuit supplying more than one receptacle for cord-and-plug-connected portable loads.
Panel Statement: The panel has revised the proposed text to reflect the action on proposal 2-200.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-111 Log #1443 NEC-P02 **Final Action: Reject**
(210.21(B)(2) and Table 210.21(B)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-207
Recommendation: Accept the proposal.
Substantiation: If 15-ampere duplex receptacles are evaluated to supply 15-amperes through each half, why is the load limited to 12-amperes? Is safety involved? On a 20-ampere circuit, a 15-ampere receptacle supplying a 15-ampere load allows for an additional 5- ampere load; if this is exceeded, the overcurrent device will function, as with any overload. What safety is involved? A single receptacle on an individual circuit can supply its full current rating with presumably no safety concern. This rule is virtually unenforceable and violated every time a hair blow dryer or other appliance or tool rated over 12- amperes is used with a 15- ampere rated receptacle.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided the panel with any new information to support his recommendation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-112 Log #478 NEC-P02 **Final Action: Accept**
(210.23 Exception (New))

Submitter: Code-Making Panel 8,
Comment on Proposal No: 2-210
Recommendation: Code-Making Panel 8 concurs with the action taken by Code-Making Panel 2 to "Reject" Proposal 2-210.
Substantiation: Supplementary overcurrrent protection that may be provided with a luminaire that is supplied from a busway is in addition to the required overcurrent protection described in 368.17(C) and Exceptions 1, 2, and 3. Refer to Article 100 for the definition of "Supplementary Overcurrent Protective Device."
This comment was developed by a CMP-8 Task Group and balloted through the entire panel with the following ballot results:
12 Eligible to vote
12 Affirmative
1 comment on affirmative vote was received as follows:
M. Shan Griffith stated: "The original Proposal 2-210 seeks to change the meaning of the existing code text beyond that described by the submitter and without sufficient justification."
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-113 Log #1442 NEC-P02 **Final Action: Reject**
(210.23(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-212
Recommendation: Accept the proposal with the following revisions:
A 40- or 50- ampere circuit shall be permitted to supply cooking appliances that are located in dedicated spaces in any occupancy; or in other than dwelling units, a 40- or 50- ampere branch circuit shall be permitted to...(remainder unchanged).
FPN: See 422.11 for overcurrent protection.
Substantiation: Free standing electric ranges are not "fastened" in place; many countertop cooking units are set in place, but not "fastened." The provision for "in other than dwelling units" is prefaced with "or," and "such" is deleted to remove any misconception that the cooking appliance circuit can also serve such loads in addition to the cooking appliance load. 422.11 is an important consideration that may be overlooked.
Panel Meeting Action: Reject
Panel Statement: The submitter's recommendation creates issues with appliances such as microwave ovens that are often in "dedicated space", but are not intended to be supplied from these circuits. The existing wording is well understood and it has not been shown to have created interpretation issues.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-114 Log #1225 NEC-P02 **Final Action: Accept in Principle in Part (210.52(I))**

TCC Action: The Technical Correlating Committee directs that the text be revised to read as follows:

"(I) Foyers. Foyers that are not part of a hallway in accordance with 210.52(H) and that have an area that is greater than 5.6 m2 (60 ft2) shall have a receptacle(s) located in each wall space 900 mm (3 ft) or more in width and unbroken by doorways, floor to ceiling windows, and similar openings."

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 2-223

Recommendation: Continue to accept in principle but reword the Panel Action as follows:

"(I) Foyers. For purposes of this section, a foyer is considered to be the entranceway or transitional space from the exterior to the interior of a dwelling unit. Foyers that have an area that is greater than 60 ft2 shall have a receptacle(s) located in each wall space ~~as defined in 210.52 (A)(2)(1)~~ 900 m (3 ft) or more in width and unbroken by doorways, floor to ceiling windows and similar openings.

Substantiation: As noted in the proposal substantiation and comments, many new homes are being built with large foyers that should be treated as separate areas requiring receptacle installation. It is not uncommon for lamps and other cord connected products to be located in these foyers. Receptacles should be available for the connections of these products. This comment addresses the concerns expressed by some of the panel members.

The lack of a receptacle within a reasonable distance from cord connected equipment leads to the use of extension cords and the attendant hazards associated with the increase use of extension cords.

Panel Meeting Action: Accept in Principle in Part

Revise the proposed text to read as follows:

"(I) Foyers. Foyers that are not part of a hallway under 210.52(H) and that have an area that is greater than 60 ft squared shall have a receptacle(s) located in each wall space 900 mm (3 ft) or more in width and unbroken by doorways, floor to ceiling windows, and similar openings."

Panel Statement: The first sentence of the submitter's recommendation was not accepted as the proposed definition does not add any additional clarity.

The revision also includes the recommendation from Comment 2-119.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-115 Log #1883 NEC-P02 **Final Action: Reject (210.52, FPN)**

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facilities Executives

Comment on Proposal No: 2-221

Recommendation: Accept the proposal and strike the Fine Print Note completely, or edit the Fine Print Note accordingly:

FPN: Listed baseboard heaters include instructions that ~~may not~~ do not permit their installation below receptacle outlets.

Substantiation: The UL Standard, as quoted by the submitter, couldn't be clearer. But since the UL language was stated in recommended ("should") language, an alternate method of getting the point across would be an edit of the Fine Print Note as follows:

FPN: Listed baseboard heaters include instructions that ~~may not~~ permit restrict their installation below receptacle outlets.

Panel Meeting Action: Reject

Panel Statement: The panel maintains that the Fine Print Note is still accurate and it is important in order to draw attention to the instructions.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-116 Log #2184 NEC-P02 **Final Action: Reject (210.52(1))**

Submitter: Tom Studer, Electric Inspection Agency of Northern Kentucky

Comment on Proposal No: 2-233

Recommendation: Delete the following text:

~~210.52(1) Foyers. Foyers that have an area that is greater than 60 ft2 shall have a receptacle(s) located in each wall space as defined in 210.52(A)(2)(1).~~

Substantiation: This proposal should be rejected. First, the lack of a definition of a foyer within the NEC invites inconsistent enforcement of this rule throughout the industry. Without a definition of a "foyer", we need to use the commonly defined general term of "an entrance hallway" as defined in Webster's dictionary. In addition, the sixty square feet requirement will include foyers/hallways that are too small to place furniture within them. In the substantiation for this proposal, the statement: "Today's homes are being built with large foyers some being as large as other rooms in the dwelling" was made, and while this may be true for some homes, it is only a small percentage of the total. There are many home plans that include a hallway that runs from the front of the house towards the rear of the house to which the front door opens into, thereby becoming a foyer, and this foyer/hallway can easily be over sixty square feet in area. Within these hallways are doors to closet(2), bathrooms, garages, and laundry rooms, creating numerous wall spaces 2 ft or more in length which will not require a receptacle. Since the width of these hallways precludes the placement of furniture within these numerous wall spaces, the added receptacles will have no practical use. The need for receptacles in wall spaces of large foyers may be warranted, however, a home that would contain such a hallway is typically constructed as a custom home, and custom homes are rarely wired only to meet the minimum code requirements, with the owner knowing the placement of furniture and intended use of wall spaces and having the opportunity to add receptacles in these spaces. Mandating a requirement for receptacles that will be rarely used accomplishes little other than adding costs without producing a real benefit to the majority of homeowners or occupants.

Panel Meeting Action: Reject

Panel Statement: The term "foyer" is a generally understood term.

See the panel action and statement on Comment 2-114.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-117 Log #69 NEC-P02 **Final Action: Accept (210.52(A))**

TCC Action: The Technical Correlating Committee directs that 210.52(A)(4) be revised as follows to provide a title in compliance with the NEC Style Manual:

"(4) Countertop Receptacles. Receptacles installed for countertop surfaces as specified in 210.52(C) shall not be considered as the receptacles required by 210.52(A)."

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 2-228

Recommendation: It was the action of the Technical Correlating Committee that this action be rewritten to comply with the NEC Style Manual.

The panel action did not include a title for the new subdivision (4).

This proposal will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-118 Log #2503 NEC-P02 **Final Action: Reject (210.52(A))**

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 2-228

Recommendation: The proposal should be rejected.

Substantiation: Countertop receptacles have been used to comply with the perimeter spacing rules for generations. Remember that any receptacle placement not exceeding 5½ feet above a floor qualifies as a perimeter receptacle per 210.52(4). At one time, there were no prescriptive rules for receptacle placements on countertops and the only requirements that applied were the customary 6- and 2-foot rules. The receptacles so installed met the perimeter spacing rules due to their height. When the 2- and 1-foot limits entered the NEC, kitchen counters became much more heavily populated with receptacles (and justifiably so), but the perimeter spacing rules never failed to apply. In the case cited in the substantiation, the counter receptacle does now and should continue to count as the required receptacle. Before prohibiting this long-standing practice, CMP 2 should consider that the absence of an additional receptacle in the three-foot area adjacent to the counter could be legally cured by installing a receptacle in that space 5 feet above the floor. Imagine explaining to ordinary people that the counter receptacle some 3 feet above the floor doesn't count, but the other one would.

The comment in the voting addresses only one unintended consequence of this proposal; there are many others. For example, a receptacle placement adjacent to a refrigerator cut-out (instead of within the cut-out) becomes a code violation unless an additional receptacle is placed within the cut-out, since this will now be wall space over two feet wide. The same could be said for stove locations. Peninsular and island counters would be required to have additional receptacles below those installed to service the countertop above, in some cases even if cabinets are exempted. The problems go on and on, and no technical substantiation in the way of loss experience or engineering judgment was supplied to support such an extreme change.

Panel Meeting Action: Reject

Panel Statement: Receptacles that are intended to serve countertops are dedicated for appliances utilized in that countertop space and are not intended to serve other loads. Receptacles installed to meet the requirements of 210.52(A) are separate from those installed to meet the requirements of 210.52(C).

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-119 Log #2802 NEC-P02 **Final Action: Accept in Principle**
(210.52(A))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-223
Recommendation: Revise text to read as follows:
"(I) Foyers. Foyers that are not part of a hallway under 210.52(H) and have an area that is greater than 60 ft2 shall have a receptacle(s) located in each wall space as defined in 210.52 (A)(2)(1)."
Substantiation: There are many configurations for a home when it comes to the area just inside the house at the main entry door. The new provision for receptacles in Foyers might be simple to understand is the foyer was enclosed by four walls. In most designs, the floor area just inside the main entry door is either a part of a hallway or is an extension of a room. In other words, the main entry door is on one exterior wall, with no more than one wall directly adjacent to the door. In those cases where a door opens directly into an area are the end of a hallway with openings into a room on each side of this are, then possibly it could be considered a "foyer". But without a clear definition of a "foyer" as it relates to a residential dwelling, there will still be problems with discerning what exactly is a foyer. As an inspector I never ran into a situation where the wall space adjacent to an exterior door was not either part of an adjacent room, or part of a hallway.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-114.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-120 Log #2803 NEC-P02 **Final Action: Accept**
(210.52(A)(2)(1))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-228
Recommendation: Revise text to read as follows:
(2) Wall Space. As used in this section, a wall space shall include the following:
(1) Any space 600 mm (2 ft) or more in width (including space measured around corners) and unbroken along the floor line by doorways and similar openings, fireplaces, and fixed cabinets ~~and similar openings~~.
Substantiation: As noted in NAHB's Affirmative Comment on this proposed change, without this added text the "unbroken floor line" would include the floor line in front of the kitchen cabinets.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-121 Log #2233 NEC-P02 **Final Action: Reject**
(210.52(A)(2)(3))

Submitter: Charles E. Beck, Affiliated Engineers NW, Inc.
Comment on Proposal No: 2-235
Recommendation: Revise text to read as follows:
The space ~~afforded~~ occupied by fixed room dividers...".
Substantiation: Use of the word "afforded" is simply wrong! Pick up any dictionary, and you will find any definition of "afforded" that fits into the intended meaning of this article. That word has no meaning, and thus the sentence has no meaning. The essence of this proposal was not so much about railings, as the CMP appears to have surmised. That was a minor element. The essence is that the word "afforded" needs to be replaced.
Panel Meeting Action: Reject
Panel Statement: The submitter's change would literally state that the space in question is the space occupied by the fixed room divider itself.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-122 Log #1223 NEC-P02 **Final Action: Reject**
(210.52(A)(3))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 2-238
Recommendation: This Proposal should be accepted to add new text to the requirement in Section 210.52(A)(3).
Substantiation: The substantiation for this proposal provides clear safety rationale for this requirement. The panel members appear to be laboring over issues of placement of such a floor receptacle for most practical access. This is not the role of the Code-Making Panel, but rather, a matter for designers, and may change over time with lifestyle preferences. In its statement, the Panel insinuates that placement of a receptacle under furnishings is an inherent hazard. Floor mounted receptacles are not prohibited by the Code in residential construction and are increasingly preferred even in rooms much smaller than is recommended in this proposal. There is little if any Code restriction for their placement respective of typical floor plans, furniture arrangement or traffic patterns. The Panel should refocus on the safety hazard that has been clearly and authoritatively substantiated and also recognize that the minimum size of the room in the proposal is quite large.
Panel Meeting Action: Reject
Panel Statement: A floor mounted receptacle installed at least six 6 ft. from the wall would not necessarily be appropriate for all room layouts.
In addition, the submitter has not provided any evidence that any safety issues have been experienced.
The panel suggests that the submitter provide, during the next code cycle, specific information that problems related to safety exist.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
LAROCCA, R.: In large rooms such as "great rooms" that have become increasingly popular, the only requirement is for receptacles to be installed along the wall space. If receptacles are not included in the open floor space, extension cords will be used to provide power to lamps and other appliances used in the open central area of the room. Cords used in such a manner will be run under carpets and rugs and may be damaged creating a potential fire or shock hazard, or create a tripping hazard if left exposed. Requiring one or more floor receptacles in large rooms would help prevent these potentially hazardous conditions.
PAULEY, J.: NEMA continues to support the concept that the addition of a floor outlet in these larger rooms will decrease the need to apply extension cords to accommodate furniture layout that is often not next to the walls due to the size of the room.
WEBER, R.: The proposal should have been accepted. With today's large homes, room size allows for furniture placement away from walls and receptacles. Home owners must resort to using extension cords which create trip hazards or placing them under rugs creating fire hazards.

2-123 Log #2804 NEC-P02 **Final Action: Accept**
(210.52(A)(3))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-237
Recommendation: Continue to Reject Proposal 2-237.
Substantiation: NO documentation was ever provided to show the current provisions of the NEC are a cause of a real fire or other life/fire-safety problem that would be solved if the floor boxes were mandated. The proposed requirement is nothing more than mandating a "convenience outlet that in fact may never be used. The installation and locations of floor boxes in commercial occupancies should be determined by the architect based on the needs of the building occupant.
Panel Meeting Action: Accept
Panel Statement: The original proposal deals with office buildings and hotels/motels, however, the proposal is made to the section of the Code that applies to dwelling units.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-124 Log #2805 NEC-P02 **Final Action: Accept**
(210.52(A)(3) (New))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-238
Recommendation: Continue to Reject Proposal 2-238.
Substantiation: NO documentation was ever provided to show the current provisions of the NEC are a cause of a real fire or other life/fire-safety problem that would be solved if the floor boxes were mandated. The proposed requirement is nothing more than mandating a "convenience outlet that in fact may never be used. The installation and locations of floor boxes not adjacent to a fixed room diver, etc., in any occupancy, especially residential, should be determined by the architect based on the needs of the occupants.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
LAROCCA, R.: See my Explanation of Negative on Comment 2-122.
WEBER, R.: See my Explanation of Negative Vote on Comment 2-122.
Comment on Affirmative:
BROWN, L.: (See Ballot Comment on 2-122.)

2-125 Log #1958 NEC-P02 **Final Action: Reject**
(210.52(A)(4))

Submitter: Terrence V. Wendt, Electric Company of Omaha
Comment on Proposal No: 2-228
Recommendation: Revise text to read as follows:
Receptacles installed for countertop surfaces and desktop surface) ~~as specified in 210.52(C)~~ shall not be considered as the receptacles required by 210.52(A).
Substantiation: The concept should be expanded to cover more than just kitchen counters, the same hazards exist for wet bar countertops, desktops, etc. Although receptacles are not required, they are usually installed. By specifically singling out one type of countertop, you open the door for receptacles on other countertops or desktops to cover wallspace, causing the use of extension cords hanging off them or on the floor to cover wallspace and creating choking and fire hazards.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the submitter that the conditions requiring receptacles for countertops are the same for desktops.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-126 Log #485 NEC-P02 **Final Action: Accept in Principle**
(210.52(C))

Submitter: Ronald E. Hackett, Village of Buffalo Grove
Comment on Proposal No: 2-241
Recommendation: Revise text to read as follows:
(C) Countertops. In kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units, receptacle outlets for countertop spaces shall be installed in accordance with 210.52(C)(1) through (C)(5).
~~If a range, counter-mounted cooking unit, or sink is installed in an island or peninsular countertop and the width of the countertop behind the range, counter-mounted cooking unit, or sink is less than 300 mm (12 in.), the range, counter-mounted cooking unit, sink is considered to divide the countertop space into two separate countertop spaces as defined in 210.52(C)(4). Each separate countertop space shall comply with the applicable requirements in 210.52(C).~~
(1) Wall Countertop Spaces. A receptacle outlet shall be installed at each wall countertop space that is 300 mm (12 in.) or wider. Receptacle outlets shall be installed so that no point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space.
Exception: Keep as is. No changes required.
(2) Island countertop Spaces. At least one receptacle shall be installed at each island countertop space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater.
If a range or sink is installed in the island countertop space. The range or sink is considered to divide the countertop space into two separate countertop spaces as defined in 210.52(C)(4). Each separate countertop space shall require at least one receptacle outlet for that countertop space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater.
(3) Peninsular Countertop Spaces. At least one receptacle shall be installed at each peninsular countertop space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater. A peninsular countertop is measured form the connecting edge.
If a range or sink is installed in the peninsular countertop space. The range or sink is considered to divide the countertop space into two separate countertop spaces as defined in 210.52(C)(4). Each separate countertop space shall require at least one receptacle outlet for that countertop space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater.
(4) Separate Spaces. Keep as is. No changes necessary.
(5) Receptacle Outlet Locations. Keep as is. No changes necessary.
Substantiation: Although the above comment is only a slight revision, it will provide additional clarity. The revised layout is more logical and easier to understand when applying 210.52(C). With the above revision, requirements for countertop spaces are more user friendly. Removing the second paragraph of 210.52(C) and relocating revised text under their proper heading, helps alleviate one from jumping back and forth from place to place. Also, unnecessary redundancy is removed. Separate space requirements are now all located in 210.52(C)(4), where they belong.
The second paragraph of 210.21(C) indicates a measurement of 300 mm (12 in.). This 300 mm (12 in.) or less measurement has no merit by itself. It makes no sense, is confusing, and is not practical for a countertop space with no wall space. 210.21(C) is where one would go to find the requirement for an island with no wall space, but has a range or sink installed. For example, an island has no wall space but has a range or sink. There is no logical reason to base whether you have separate spaces where the width behind the range or sink is less than 12 in. What if this dimension behind a range was 30 in.? It would be safe to conclude that this countertop space would be larger for this island, but 210.52(C) indicates that we do not create separate spaces.
The criteria for what constitutes separate spaces on an island with no wall space should be whether a 24 in. by 12 in. space is created. This would be consistent with code language already found in the NEC. It should not be based on whether the width behind the range or sink is 12 in. or less. What difference does the width behind a sink or range (on an island with NO WALL space) make when determining the receptacle outlet requirements? Currently, in this application, the code is not necessarily concerned with the space behind the ranges or sinks when determining if a receptacle outlet is required. However, we should be focused and concerned with the countertop space that is created to the right and left of the range or sink. If this is not true, then separate spaces is not relevant and 210.52(C)(1) and 210.52(C)(2) should only apply. In short, only one receptacle outlet is required. Period!
210.52(C) is confusing. See IAEI News Article for July-August 2009. Dwelling units. What is being taught is not necessarily consistent with the National Electrical Code. I know that code users understand the content from the IAEA News Article, but they have a hard time understanding 210.52(C) as written in the NEC. The IAEI Article is reasonable, clear, and precise. After reading the article, you have a clear understanding for countertop requirements.
If the intent of 210.52(C) is what is explained in the IAEI Article, then the code needs to be revised for clarity. With the new innovative kitchen designs and layouts, the "first generation" islands were basic and simple. These small rectangular islands are a thing of the past. The code is remiss if we don't have clear and precise code language when dealing with fancy, ornate and expensive kitchen islands and peninsulas.
With that said, is the code clear on the application for an island that has wall space directly behind a range or sink? Yes, where an island or peninsular has wall space behind a range or sink, 210.52(C)(1) and 210(C)(1) exception applies. Figure 210.52(C)(1) works because it defines the wall space behind a range or sink. The figure is located in 210.52(C)(1), wall countertop space. The wall space makes all the difference in the world. This revision removes confusion and intends to simplify the requirements.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel agrees with the submitter that relocating the text specified in 210.52 would improve clarity and has done so with the panel action on Proposal 2-242.
See the panel action and statement on Proposal 2-242.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-127 Log #2504 NEC-P02 **Final Action: Reject**
(210.52(C)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-246
Recommendation: Accept the proposal.
Substantiation: The panel statement is incorrect. The maximum uncovered distance on a conventional counter is about 5 ft (2 ft plus the counter depth plus a potential return of less than 1 foot), and this space is no more usable than a similar space in the middle of a wall for which no additional receptacle placement need be considered.
Panel Meeting Action: Reject
Panel Statement: The panel intends that this space be included in the wall line measurement. Exempting the space could result in receptacles being spaced 6 ft. apart where the counter continues along the wall line.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-128 Log #1957 NEC-P02 **Final Action: Accept in Part**
(210.52(C)(3) Exception)

Submitter: Terrence V. Wendt, Electric Company of Omaha
Comment on Proposal No: 2-251
Recommendation: Revise text to read as follows:
~~Exception: A receptacle in a small countertop space shall be permitted to serve as the receptacle peninsular countertop space where the spaces are continguous and the receptacle is located within 1.8 m (6 ft) at the outside edge of the peninsula.~~
FPN: A surface at countertop height out of similar or like material with no base cabinets underneath, capable of having chairs or stools underneath it, should not be counted as kitchen countertop space.
Substantiation: If the submitter's problem is with having inspectors consider tabletop style extension as countertops, the a fine print note should be adequate to make clear the intention of the code. The exception, as written, would be a step backwards in providing adequate outlets on peninsulars and to reducing hazards from extension cord usage.
Panel Meeting Action: Accept in Part
The panel Accepts the deletion of the Exception, and Rejects that addition of the Fine Print Note.
Panel Statement: The submitter's recommended FPN is inappropriate since it contains an interpretation and, in addition, the panel does not agree that this is not countertop space.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

BROWN, L.: This same Technical Committee put this Exception into the NEC during the ROP phase with the statement, "The panel has accepted the submitter's recommendation but added additional words to make it clear that the 6-ft measurement is from the end of the peninsula itself." This clarification provided that the receptacle did not need to be located at the far end of a peninsula, when the receptacle is only required to serve the peninsula from some point.

2-129 Log #2505 NEC-P02 **Final Action: Reject**
(210.52(C)(3) Exception (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-251
Recommendation: Continue to accept the proposal in the form modified by the panel.
Substantiation: This comment is intended to respond to the comments in the voting. Peninsular counters are routinely used as permanently installed kitchen tables, which may or may not have cabinets below them, and for which a receptacle placement at the outer end becomes not something a "dwelling unit owner needs" but rather something the dwelling unit owner will ferociously resist. The most protracted issues that I ever had to confront in my many prior years as an inspector, and I had to do so repeatedly, all had to do with disputed receptacle placements on kitchen peninsulas and islands. The disputes were never with the installing electrical contractors, only the owners. One owner battled unsuccessfully for over a year (with his certificate of occupancy duly held up for the entire time) to get an exemption from a receptacle placement in a kitchen island. This proposal is a reasonable compromise that has been frequently applied in the field, sometimes through the use of the creative interpretation described in the substantiation.
Panel Meeting Action: Reject
Panel Statement: After additional consideration, the panel concluded that the peninsular countertop should be supplied by a receptacle located in that space.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Vote and Ballot Comment on Public Comment 2-128.
Comment on Affirmative:
WEBER, R.: The panel should continue to reject this comment. This would allow for a 4 foot peninsula to be installed without a receptacle to serve countertop appliances. It may not be practical or even possible for a wall mounted countertop receptacle to serve a peninsula. With the product standard for appliances reducing the cord length to 18 inches an appliance may not be able to reach a wall mounted receptacle outlet from the peninsula. This creates a safety hazard as homeowners may resort to using extension cords to supply those appliances.

2-130 Log #2512 NEC-P02 **Final Action: Accept**
(210.52(C)(3) Exception (New))

Submitter: Donald M. King, Rep. IBEW
Comment on Proposal No: 2-251
Recommendation: Delete Exception as follows:
~~Exception: A receptacle in a wall countertop space shall be permitted to serve as the receptacle for a peninsular countertop space where the spaces are contiguous and the receptacle is located within 1.8 m (6 ft) of the outside end of the peninsula.~~
Substantiation: The submitter did not present adequate substantiation to support his recommendation to eliminate the requirement for a minimum of one receptacle to serve peninsular countertop spaces. The present Code text clearly defines the minimum receptacle requirements for these spaces and there has not been sufficient substantiation presented to diminish those requirements. Also, consideration needs to be given to the fact that the receptacle installed at the wall countertop space in the submitter's substantiation is intended to serve the countertop space for that area to meet the requirements 210.52(C)(1) and should not be utilized to serve additional countertop space regardless of whether or not that countertop space is contiguous.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: This is a reasonable Exception.
Comment on Affirmative:
WEBER, R.: See my Explanation of Affirmative Vote on Comment 2-129.

2-131 Log #1827 NEC-P02 **Final Action: Accept**
(210.52(C)(4))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 2-242
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(4) Separate Spaces. Countertop spaces separated by rangetops, refrigerators, or sinks shall be considered as separate countertop spaces in applying the requirements of 210.52(C)(1). If a range, counter-mounted cooking unit, or sink is installed in an island or peninsular countertop and the depth ~~width~~ of the countertop behind the range, counter-mounted cooking unit, or sink is less than 300 mm (12 in.), the range, counter-mounted cooking unit, or sink is considered to divide the countertop space into two separate countertop spaces ~~as defined in 210.52(C)(4)~~. Each separate countertop space shall comply with the applicable requirements in 210.52(C).
Substantiation: The issue is not the width of the countertop space behind a range, counter-mounted cooking unit or sink but the depth of the space in determining if the range, counter-mounted cooking unit or sink. For example, if the peninsular or island countertop depth is 24 inches (a common depth), and the depth of the countertop remaining behind the counter-mounted cooking unit is less than 12 inches, the counter-mounted cooking unit has divided the countertop into two spaces and a receptacle outlet is required for each space. If the counter space behind the counter-mounted cooking unit is 12 inches or more, the peninsula or island counter space has not been divided by the counter-mounted cooking unit and one receptacle is required.
The phrase "as defined in 210.52(C)(4)" is not needed as the phrase is located in 210.52(C)(4).
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-132 Log #1226 NEC-P02 **Final Action: Accept in Principle**
(210.52(C)(5))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 2-253
Recommendation: This proposal should be accepted with the following change:
Receptacle outlets shall be located in, on, or above, but not more than 500 mm (20 in.) above the countertop. Receptacle outlets located in countertops shall be listed for the application. Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(1), Exception, or appliances occupying dedicated space shall not be considered as these required outlets.
Substantiation: This proposal would permit innovative receptacle constructions and housing designs that could be safely used in a countertop. The additional language in this comment requires outlets to be specifically listed for use in this application.
The Panel Action retains the present design prescriptions that have restricted innovation that might eliminate the continued permission afforded by the "Exception to (5)". This exception is a compromise to the safety intent of the requirement in 210.52(C)(5). The Panel statement that "The present text permits "tombstone style" receptacles to be used", and that "The receptacle would still be 'above' the countertop", is an example of how closed-minded the interpretation of the requirement is. One example of an existing technology used in floor applications is provided. This technology, if adapted for a countertop, could provide safe and aesthetically pleasing access to a receptacle from the top of the counter but below the countertop surface ("in the counter"). Such a design also meets the existing requirement that a receptacle cannot be mounted face-up. In floor applications, these listed products are subjected to scrub water exclusion tests, which demonstrates that protection from spills such as can occur in a countertop application, is feasible.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
"Receptacle outlets shall be located on, or above, but not more than 500 mm (20 in.) above the countertop. Receptacle outlet assemblies listed for the application shall be permitted to be installed in countertops."
Add an Information Note to read as follows:
"Information Note: See section 406.4(E) for requirements for installation of receptacles in countertops."
Panel Statement: The panel has revised the recommended text to clarify that installations in countertops are required to be listed receptacle assemblies.
The panel has added an Informational Note to address the requirements of 406.4(E) regarding the installation of receptacles installed in countertops in the face-up position.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-133 Log #1419 NEC-P02 **Final Action: Reject**
(210.52(C)(5))

Submitter: John E. Staires, City of Tulsa, Oklahoma
Comment on Proposal No: 2-256
Recommendation: Revise text as follows:
~~Exception to (5): To comply with the conditions specified in (1) or (2), receptacle outlets shall be permitted to be mounted not more than 300 mm (12 in.) below the countertop. Receptacles mounted below a countertop in accordance with this exception shall not be located where the countertop extends more than 150 mm (6 in.) beyond its support base.~~
~~(1) Construction for the physically impaired~~
~~(2) On island and peninsula countertops where the countertop is flat across its entire surface (no backsplashes, dividers, etc.) and there are no means to mount a receptacle within 500 mm (20 in.) above the countertop, such as an overhead cabinet.~~
Exception to (5): To accommodate construction for the physically impaired, receptacles shall be permitted to be mounted not more than 300 mm (12 in.) below the countertop. Receptacles mounted below a conountertop in accordance witht his exception shall not be located where the countertop extends more than 150 mm (6 in.) beyond its support base.
Substantiation: In rejecting Proposal 2-256, the panel statement on Proposal 2-249 was referenced. To quote the last sentence of the Panel Statement on Proposal 2-249, "Deleting the section entirely would leave substantial areas of modern kitchens without any receptacles". Proposal 2-256 would not reduce the number of receptacles required in modern kitchens, but would only affect the placement of required countertop receptacles. By permitting receptacles to be placed below the countertop in accordance with the existing wording of 210.52(C)(5), occupants, and particularly children, are subjected to the hazard posed by small appliances energized by receptacles below the countertop. Children are injured every year by pulling appliances off of countertops by the cord.
Panel Meeting Action: Reject
Panel Statement: The submitter's proposed revised text removes language that permits the installation of receptacles below countertop surfaces which is one intent of this section.
The panel recognizes that not all countertop designs will allow for receptacles to be installed above the countertop and has permitted limited installation below the countertop surface to ensure that receptacles can be installed to serve those countertop spaces.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: It is also important to realize that persons with certain disabilities need the receptacles to be located below the countertop.

2-134 Log #2506 NEC-P02 **Final Action: Accept**
(210.52(C)(5))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-255
Recommendation: Continue to reject the proposal.
Substantiation: The panel statement is exactly correct. The approach in the NEC provides a reasonable balance for surfaces that are frequently permanently installed kitchen tables, and for which owners will actively resist, to the point of filing legislation in their state legislatures, tombstone outlets or other placements above extremely expensive countertop surfaces. The passion with which many of our citizens approach the construction detail on these surfaces simply has to be experienced to be fully appreciated.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-135 Log #1224 NEC-P02 **Final Action: Accept in Principle**
(210.52(D))

TCC Action: The Technical Correlating Committee revises the Informational Note as follows to provide the proper section reference:
"Informational Note: See 406.5(E) for requirements for installation of receptacles in countertops."
Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 2-258
Recommendation: Continue to accept proposal 2-258 in principle but revise 210.52(D) as follows:
(D) Bathrooms. In dwelling units, at least one receptacle outlet shall be installed in bathrooms within 900 mm (3 ft) of the outside edge of each basin. The receptacle outlet shall be located on a wall or partition that is adjacent to the basin or basin countertop, located on or in the countertop, or installed on the side or face of the basin cabinet not more than 300 mm (12 in.) below the countertop.
Substantiation: Also see comment on proposal 2-253. The Panel Action only addresses part of the original proposal and retains some design prescription. Similar to the present text in 210.52(C)(5), the proposed text would restrict innovation that would improve safety. Small bathroom appliances such as hot curling irons and high wattage blow dryers are accessible to small children when plugged into receptacles "installed on the side or face of the basin cabinet". Providing more options for mounting required receptacles from the counter surface will help address this safety issue. The Panel Action to not include the above recommended text and its statement reference to "tombstone" style receptacles is design limiting. One example of an existing technology used in floor applications is provided. This technology, if adapted for a bathroom countertop, could provide safe and aesthetically pleasing access to a receptacle from the top of the counter but below the countertop surface ("in the counter"). Such a design also meets the existing requirement that a receptacle cannot be mounted face-up. In floor applications, these listed products are subjected to scrub water exclusion tests which demonstrates that protection from spills and splashing water such as can occur in bathroom countertop applications, is feasible.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
"(D) Bathrooms. In dwelling units, at least one receptacle outlet shall be installed in bathrooms within 900 mm (3 ft) of the outside edge of each basin. The receptacle outlet shall be located on a wall or partition that is adjacent to the basin or basin countertop, located on the countertop, or installed on the side or face of the basin cabinet not more than 300 mm (12 in.) below the countertop. Receptacle outlet assemblies listed for the application shall be permitted to be installed in the countertop.
Informational Note: See section 406.4(E) for requirements for installation of receptacles in countertops."
Panel Statement: The panel has revised the recommended text to clarify that installations in countertops are required to be listed receptacle assemblies.
In addition, the panel has added an Informational Note to address the requirements of 406.4(E) regarding the installation of receptacles.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-136 Log #2088 NEC-P02 **Final Action: Reject**
(210.52(E))

Submitter: Joseph A. Ross, Ross Electrical Assessments
Comment on Proposal No: 2-261
Recommendation: Accept this proposal.
Substantiation: I am aware that it was "an outdoor receptacle located over a brick walkway" that prompted a change for the 2008 NEC. It's reassuring to note that the panel statement clearly permits an outdoor receptacle to be located above concrete, brick, hot top, and mulch; now, take one small step for mankind and permit the outdoor receptacle to be located above a wooden deck that is assessable from grade. This existing text of the 2008 NEC; to be a violation or not to be a violation is based on the length of a person's arm??
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms that the outdoor receptacle must be accessible while standing at grade level. The requirement to be accessible while standing at grade level was to address situations where the receptacles would be located well above grade, such as located over a garage, and a cord would be required to be run from the second level down the stairs for utilization equipment at grade.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
WEBER, R.: Dwellings built on sloped elevations requiring stairs to access the dwelling become subjective with respect to receptacles installed outdoors. The term "while standing" at grade clarifies the specific location of the receptacle.

2-137 Log #2302 NEC-P02 **Final Action: Reject**
(210.52(E))

Submitter: Raymond J. Millet, Jr., Commack, NY
Comment on Proposal No: 2-261
Recommendation: The proposal should be Accepted in Part. Accept the changes in (1) and (2). Paragraph (3), which restates the 2008 NEC provisions, need not be considered here because it may be changed by other CMP 2 activity and it was not the intended focus of the proposal.
Substantiation: The "most effective use of the required receptacle" is where it will be the most routinely used. No other definition would seem to make sense, and CMP 2 has not provided any substantiation for anything to the contrary. The proposal recognizes a receptacle on a readily accessible low deck, which is the most likely point of use. The statement that "additional receptacles that are installed for a porch or deck are permitted to be installed" is both true and beside the point. In fact, the current NEC requires receptacle placements in most of these locations; the more appropriate action would be to accept this comment and then note that additional receptacles can always be installed

where accessible while standing at grade, if so desired. CMP 2 should also reconsider the substantiation presented in Proposal 2-260, which provides many other practical objections to the present wording.

This comment was endorsed by a unanimous vote at the Eastern Section business meeting on October 7, 2009.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on comment 2-136.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-138 Log #2507 NEC-P02 **Final Action: Reject**
(210.52(E))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-261
Recommendation: The proposal should be accepted in part. Accept the changes in (1) and (2). Paragraph (3) which restates the 2008 NEC provisions need not be considered here because it is being changed and is not the intended focus of this proposal.
Substantiation: The "most effective use of the required receptacle" is where it will be the most routinely used. No other definition would seem to make sense, and CMP 2 has not provided any substantiation for anything to the contrary. The proposal recognizes a receptacle on a readily accessible low deck, which is the most likely point of use. The statement that "additional receptacles that are installed for a porch or deck are permitted to be installed" is both true and beside the point. In fact, the current NEC requires receptacle placements in most of these locations; the more appropriate action would be to accept this proposal and then note that additional receptacles can always be installed where accessible while standing at grade, if so desired. CMP 2 should also reconsider the substantiation presented in Proposal 2-260, which provides many other practical objections to the present wording.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-136.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-139 Log #2790 NEC-P02 **Final Action: Reject**
(210.52(E))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-261
Recommendation: The proposal should be accepted in part. Accept the changes in (1) and (2).

Paragraph (3), which restates the 2008 NEC provisions, need not be considered here because it may be changed by other CMP-2 activity and it was not the intended focus of the proposal.
Substantiation: The "most effective use of the required receptacle" is where it will be the most routinely used. No other definition would seem to make sense, and CMP-2 has not provided any substantiation for anything to the contrary. The proposal recognizes a receptacle on a readily accessible low deck, which is the most likely point of use. The statement that "additional receptacles that are installed for a porch or deck are permitted to be installed" is both true and beside the point. In fact, the current NEC requires receptacle placements in most of these locations; the more appropriate action would be to accept this comment and then note that additional receptacles can always be installed where accessible while standing at grade, if so desired. CMP-2 should also reconsider the substantiation presented in Proposal 2-260, which provides many other practical objections to the present wording.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-136.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-140 Log #2806 NEC-P02 **Final Action: Reject**
(210.52(E)(3) and Exception to (3))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-265
Recommendation: Accept Proposal 2-265.
Substantiation: This proposal submitted by the IAEI provides better wording on the intent of this provision and it's Exception. This guidance is needed as, if there is no minimum dimension for a balcony, the opening area and guardrail afforded for a door in an exterior wall, installed for aesthetics or ventilation, would now be considered a "balcony". These include the safety guardrail at second floor double doors that are used for natural ventilation. This arrangement consists of a simple guardrail that may extend a few inches out from the face of the building. There is no usable, occupiable, or habitable space, it is just a guardrail. In addition, a simple architectural balcony that extends a foot or so out in front of these doors. There is hardly any area for more than one person to stand, let alone participate in any activity except looking. The Exception was included in the 2008 NEC as it provided the means to define the usable area of a deck or balcony.
Panel Meeting Action: Reject
Panel Statement: The panel has maintained their position that there should not be a minimum square footage for a balcony, deck, or porch to require a receptacle. As such, there is no need to revise the previous Exception into the main paragraph.

See the panel action and statement on Comment 2-141.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

BROWN, L.: This type of change should be modified during the adoption process to match Exception #3 of the 2008 NEC. As noted in NAHB's ballot comment on Proposal 2-265, As pointed out during the development of this new provision last cycle, if there is no minimum dimension for a balcony, the opening area and guardrail afforded for a door in an exterior wall, installed for aesthetics or ventilation, would now be considered a "balcony".

It is truly unfortunate that most of the member of Panel 2 are not that familiar with the many types of architectural projections that will now be labeled as a balcony. These include the safety guardrail at second floor double doors that are used for natural ventilation. This arrangement consists of a simple guardrail that may extend a few inches out from the face of the building. There is no usable, occupiable, or habitable space, it is just a guardrail. In addition, a simple architectural balcony that extends a foot or so out in front of these doors. There is hardly any area for more than one person to stand, let alone participate in any activity except looking. The Exception was included in the 2008 NEC as it provided the means to define the usable area of a deck or balcony. Without this exception the manufacture's have gotten another mandate into the NEC to require more of their products without providing substantiation that a problematic fire or life-safety situation exists.

WILKINSON, R.: Should have been an accept as it would have established a minimum size balcony.

2-141 Log #2807 NEC-P02 **Final Action: Reject**
(210.52(E)(3) Exception)

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-266
Recommendation: Reject Proposal 2-266.
Substantiation: As pointed out during the development of this new provision last cycle, if there is no minimum dimension for a balcony, the opening area and guardrail afforded for a door in an exterior wall, installed for aesthetics or ventilation, would now be considered a "balcony". It is truly unfortunate that most of the members of Panel 2 are not that familiar with the many types of architectural projections that will now be labeled as a balcony. These include the safety guardrail at second floor double doors that are used for natural ventilation. This arrangement consists of a simple guardrail that may extend a few inches out from the face of the building. There is no usable, occupiable, or habitable space, it is just a guardrail. In addition, a simple architectural balcony that extends a foot or so out in front of these doors. There is hardly any area for more than one person to stand, let alone participate in any activity except looking. The Exception was included in the 2008 NEC as it provided the means to define the usable area of a deck or balcony. Without this exception, the manufactures have gotten another mandate into the NEC to require more of their products without providing substantiation that a problematic fire or life-safety situation exists.
Panel Meeting Action: Reject
Panel Statement: Smaller balconies, decks, or porches, that are accessible and intended for use by occupants, also present the conditions for use of electrical equipment that may result in cords passing through doors and windows if a receptacle is not provided.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

BROWN, L.: This type of change should be modified during the adoption process to match Exception #3 of the 2008 NEC. As noted in NAHB's ballot comment on Proposal 2-265, As pointed out during the development of this new provision last cycle, if there is no minimum dimension for a balcony, the opening area and guardrail afforded for a door in an exterior wall, installed for aesthetics or ventilation, would now be considered a "balcony".

It is truly unfortunate that most of the member of Panel 2 are not that familiar with the many types of architectural projections that will now be labeled as a balcony. These include the safety guardrail at second floor double doors that are used for natural ventilation. This arrangement consists of a simple guardrail that may extend a few inches out from the face of the building. There is no usable, occupiable, or habitable space, it is just a guardrail. In addition, a simple architectural balcony that extends a foot or so out in front of these doors. There is hardly any area for more than one person to stand, let alone participate in any activity except looking. The Exception was included in the 2008 NEC as it provided the means to define the usable area of a deck or balcony. Without this exception the manufacture's have gotten another mandate into the NEC to require more of their products without providing substantiation that a problematic fire or life-safety situation exists.

WILKINSON, R.: Should be a reject as a guard rail in front of a window could be considered a balcony under current provisions.

2-142 Log #1206 NEC-P02 **Final Action: Reject**
(210.52(G))

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 2-269
Recommendation: This Proposal should have been Accepted or Accepted in Principle. The proposal should be revised to read as follows:
In 210.52(G)(1), add an additional sentence to read: "Where a garage accommodates more than two vehicles, there shall be at least one receptacle per wall with the exception of the wall with installed garage doors."
Substantiation: One receptacle per garage is not enough. Many of these receptacles are inaccessible when a car is parked in the garage. Usually, extension cords are needed to access the receptacle when power tools, vacuum cleaners or other electrical equipment is used. These extension cords can be driven over by cars, cause a tripping hazard or can lie across puddles on the floor causing a possible shock hazard to the home owner. The proposed language only adds two receptacles to the garage when the garage can handle two or more cars.
Panel Meeting Action: Reject
Panel Statement: There is no evidence that additional receptacles in a garage will reduce the use of extension cords.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This comment should have been accepted in principal. See my Explanation of Negative Vote for Comment 2-143.

2-143 Log #718 NEC-P02 **Final Action: Reject**
(210.52(G)(1))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-269
Recommendation: The Proposal should be Accepted in Principle. The added sentence should read: "Where the garage is larger than 53 m2 (575 ft2), an additional receptacle shall be provided for each additional 23 m2 (250 ft2)."
Substantiation: This proposed revised wording addresses the Panel's Statement that the Proposal was based on the number of vehicles and there was no definition of a "vehicle space".
The revised text defines the area involved, not the number of vehicles or vehicle spaces. The internal size of a two-car garage is approximately 25 ft x 23 ft (575 ft2). Each additional 250 ft2 (20 ft x 12.5 ft) would accommodate an additional vehicle or provide storage or work space. Many people without basements have a workshop with power tools in the garage. When the single receptacle is not near the workshop area, they have to use an extension cord with a power strip and frequently leave the cord plugged in and laying on the floor; not a good safety practice.
If there was a room in a house larger than 25 ft x 23 ft (575 ft2), would the panel consider a single receptacle to be adequate? I do not think that it is necessary to have receptacles every 12 ft in a garage but it appears to be logical and reasonable to have more than one receptacle in very large garages.
As I stated in the Proposal, the use of very long extension cords can be a serious safety hazard.
Panel Meeting Action: Reject
Panel Statement: There is no justification to require receptacles based on the size of the garage.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This comment should have been accepted. I disagree with the Panel statement that "There is no justification to require receptacles based on the size of the garage." The justification as indicated in the submitter's substantiation is to prevent the use of extension cords in multiple vehicle garages. The safety benefits of minimum receptacle spacing requirements is well documented and should apply for garages.

2-144 Log #2183 NEC-P02 **Final Action: Reject**
(210.52(G)(1))

Submitter: Michael McGlone, Strafford, NH
Comment on Proposal No: 2-269
Recommendation: Accept the proposal.
Substantiation: The added sentence addresses a common problem and promotes safety.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-142.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This comment should be accepted. See my Explanation of Negative Vote on Comment 2-143.

2-145 Log #1035 NEC-P02 **Final Action: Reject**
(210.52(H))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-272
Recommendation: The Proposal should be Accepted.
Substantiation: Lack of receptacles in hallways wider than 4 1/2 ft can create a safety hazard as explained in the Proposal. The revision would only apply when the hallway is wide enough to accommodate a piece of furniture in addition to the walkway.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any substantiation to justify the change.
In addition, the panel does not agree that having a 4.5 ft wide hallway creates an area that requires receptacle spacing by 210.52.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This comment should have been accepted. As was pointed out by the submitter of this comment where portions of hallways are wider than 4.5 feet there is a need for minimum receptacle outlet requirements to prevent the use of extension cords that would otherwise be used to supply lamps and other electrical equipment in these areas.

2-146 Log #1207 NEC-P02 **Final Action: Reject**
(210.52(H))

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 2-272
Recommendation: This proposal should have been Accepted.
Substantiation: The submitter is correct in his substantiation. 4.5 feet wide hallways are small rooms where furniture and lighting are commonly used. A single receptacle is inadequate to supply the electrical needs for these hallways. Extension cords are commonly used to supply the lighting. These extension cords have been installed under the carpet or rugs to reach the opposite wall. Extension cords under the carpet or rugs create a fire hazard.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-145.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: See my Explanation of Negative Vote for Comment 2-145.
Comment on Affirmative:
WEBER, R.: This panelist disagrees that 4.5 feet wide hallways create small rooms. A hallway 15 feet long and 4.5 feet wide creates an area 67.5 square feet. The model residential building code requires a room to have an area at least 70 square feet and to be at least 7 feet in any horizontal dimension.

2-147 Log #573 NEC-P02 **Final Action: Reject**
(210.55)

Submitter: Matthew Smith, Little Diversified Architectural Consulting
Comment on Proposal No: 2-276
Recommendation: The new section 210.55 requires a listed floor box be placed in all meeting rooms. While these may be required for large meeting rooms to prevent tripping, in small rooms only capable of hosting 4 or 5 people the wall is typically convenient to the table and power strips and extension cords are not required.
Proposed:
210.55 Meeting Rooms. In meeting rooms greater than or equal to100sq. ft. located in office buildings and hotels/motels, a receptacle outlet in a listed floor box shall be installed in the center of each room. For a dividable meeting room a single receptacle outlet in a listed floor box shall be installed in the center of each partitioned area.
Substantiation: Owners and architects generally prefer multiple small meeting rooms to be used for small group meetings. Requiring floorboxes for each of these rooms increases cost to the owner without increasing safety or affecting the number of powerstrips as described in the original substantiation.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided sufficient substantiation to require a floor box in a 100 sq. ft. meeting room.
Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
WEBER, R.: This comment should have been accepted in principle. The need for a floor receptacle in meeting rooms is obvious. Cords are constantly being run across walkways and relocatable power strips are being daisy chained together to meet the power requirements for meetings and other functions. The area should be increased to 625 square feet to address these larger types of meeting rooms. The placement of the floor outlet should be a design issue and left up to the designer or installer. Wherever a single floor outlet is placed in a meeting room it will not be able to effectively serve all requirements and needs, but in many instances it will be able to reduce the reliance on extension cords thereby reducing trip hazards and increasing overall safety.

2-148 Log #1258 NEC-P02 **Final Action: Accept**
(210.55)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 2-276
Recommendation: This proposal should have been rejected.
Substantiation: While it may be reasonable to require a receptacle outlet somewhere in a meeting room, the requirement for one in the center of the floor area does nothing to improve safety. In fact, in many rooms, a receptacle in the center of the room will be less safe, particularly where the seating in the room is set up classroom-style, with group tables, or in a circular or U-shaped configuration. Since meeting rooms may be configured in many different ways for different meetings, very often a floor box in the center of the room will be in the middle of an egress pathway. This proposal only requires a listed floor box, and not any particular design, so a cord plugged into such a box where the receptacle is approximately flush with the floor surface will mean a cord and plug will probably extend vertically from the box in the middle of the floor and will create a worse tripping hazard than a cord laying flat on the floor. (Or will the next step be to require all extension cords to have angle plugs? - which would then not work in recessed floor boxes.)

The second sentence of the proposal requires a floor box in the center of each partitioned area. In large ballrooms that can be divided in many different ways using different arrangements of partitions, there may be many "centers," and the floor boxes will be scattered about in such a way that in some configurations none will be located in a safe or convenient location even though many are available. The substantiation mentions the use of daisy-chained extension cords and implies that this proposal would somehow alleviate that problem, but it would only change the point of origin. Laptop computers and projection equipment are also mentioned, but a floor box in the center of a room, particularly a large room, would be unlikely to be near the point where a projector must be located, and laptop computers could be anywhere.

This proposal would reliably solve the stated problem in only one case: where the room is used for a large conference table that is located in the center of the room, so that cords originate under the table. No doubt it would also be of benefit to the manufacturers of floor boxes. This is a design issue that can only be resolved by design, and even then a designer cannot anticipate every possible use or arrangement of "meeting rooms" which are also commonly used for dances, receptions, banquets, and other gatherings that are not at all like the common business meeting or seminar. In fact, a designer may not even be able to identify which side of a room will be the front. The author of this comment has spent thousands of hours in meeting rooms in countless configurations, and those with floor boxes in the wrong places like this proposal would require are often less safe than the rooms with cords extending from the walls and temporarily taped flat to the floors. (Not that standard practice is actually good practice.) Since the NEC is explicitly not a design document, the proposal is inappropriate and should have been rejected.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 8 Negative: 4
Explanation of Negative:
KING, D.: The addition of receptacles in meeting rooms will reduce the use of extension cords in those spaces. The increased use of laptop computers and projection equipment in these type of meeting rooms has led to multiple plug strips and cords being used on a regular basis to power that equipment.

LAROCCA, R.: In meeting rooms such as found in office buildings, hotels, and motels it has become common practice to run multiple extension cords from the receptacle outlets in the perimeter of the room to the center of the room to accommodate the wide spread use of projectors, PCs, and other information technology equipment. Cords used in such a manner are run under carpets and rugs or are taped to the floor. The cords used in this way may run hotter due to restricted air flow, may be damaged creating a potential fire or shock hazard, or may result in a tripping hazard if left exposed and loose. Requiring a listed floor box and receptacle in these rooms would help prevent these potentially hazardous conditions.

PAULEY, J.: NEMA continues to support the need for additional outlets in meeting rooms. At every business meeting in these rooms, the evidence of additional outlets is shown through the extensive use of extension cords and the misuse of temporary power taps.

WEBER, R.: See my Explanation of Negative Vote on Comment 2-147.

2-149 Log #1983 NEC-P02 **Final Action: Accept**
(210.55 (New))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 2-276
Recommendation: This proposal should be rejected.
Substantiation: This is a design issue and not a code issue. Also there is no reason to believe that the center of the room would be the correct location for this outlet. The placement in the center of the room may not solve the problem that the proposal is attempting to address…that is the elimination of the use of cords.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KING, D.: See my Explanation of Negative Vote on Comment 2-148.
LAROCCA, R.: See my Explanation of Negative on Comment 2-148.
WEBER, R.: See my Explanation of Negative Vote on Comment 2-147.

2-150 Log #2244 NEC-P02 **Final Action: Accept**
(210.55 (New))

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 2-276
Recommendation: Proposal 2-276 should be rejected.
Substantiation: In accordance with 90.1(B), the NEC contains rules that are considered minimally necessary for safety, and compliance with those rules should result in an installation that is essentially free from hazard but not necessarily efficient, or in this case, convenient and adequate for good service. In addition, 90.1(B) goes on to state that the NEC is not intended as a design specification. From an electrical inspector's prospective, this proposed change is very ambiguous and would be very problematic to enforce. Also, the use, or misuse, of listed cord sets or listed relocatable power taps (i.e. power strips) is regulated by the fire code, not the NEC. The concern for safety is warranted, but revising the NEC in this manner is not appropriate.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KING, D.: See my Explanation of Negative Vote on Comment 2-148.
LAROCCA, R.: See my Explanation of Negative on Comment 2-148.
WEBER, R.: See my Explanation of Negative Vote on Comment 2-147.

2-151 Log #2508 NEC-P02 **Final Action: Reject**
(210.55 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-276
Recommendation: Accept the proposal in principle. In each of the two locations in the proposal, change "receptacle outlet in a listed floor box" to "receptacle outlet in the floor". In the second sentence, delete the word "single."
Substantiation: Outlets are not located in boxes; boxes that provide "the point on the wiring system at which current is taken to supply utilization equipment" are the outlets. In addition, 314.27(C) specifically requires that boxes be specifically listed for floor applications where floor receptacles are to be used. CMP 9 has jurisdiction over the standards of product acceptance for boxes used for this purpose, not CMP 2. The wording of this comment is editorially correct. In addition, there should be no distinction between the character of the receptacle outlet in each location. Some floor receptacles are configured as duplex receptacles and some as single receptacles; no substantiation was presented to justify limiting the device chosen in a partitioned meeting room to a single receptacle, while imposing no such limitation on an unpartitioned space. If "single" is intended to require a receptacle in each of the partitioned spaces, the phrasing at the end of the proposal ("center of each partitioned area") is clear and definitely accomplishes this purpose.
Panel Meeting Action: Reject
Panel Statement: After consideration of all the comments, the panel has reversed its decision to require a receptacle floor outlet in meeting rooms. As such, the change recommended by the submitter is unnecessary.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
WEBER, R.: See my Explanation of Negative Vote on Comment 2-147.

2-152 Log #2800 NEC-P02 **Final Action: Accept**
(210.55 (New))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-276
Recommendation: Reject Proposal 2-276.
Substantiation: NO documentation was ever provided to show the current provisions of the NEC are a cause of a real fire or other life/fire-safety problem that would be solved if the floor boxes were mandated. The proposed requirement is nothing more than mandating a "convenience outlet that in fact may never be used. The installation and locations of floor boxes in commercial occupancies should be determined by the architect based on the needs of the building occupant. This type of "convenience" outlet should not be mandated in the NEC through a change proposed by the representatives of the product manufacturers. It is unfortunate that the scope of the NEC does not relate to the NEC being the "minimum" requirements for "practical safeguarding" for electrical installations. If it were this type of product mandate could never be accepted in good conscience.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KING, D.: See my Explanation of Negative Vote on Comment 2-148.
LAROCCA, R.: See my Explanation of Negative on Comment 2-148.
WEBER, R.: See my Explanation of Negative Vote on Comment 2-147.

2-153 Log #2801 NEC-P02 **Final Action: Accept**
(210.55 (New))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-275
Recommendation: Reject Proposal 2-275.
Substantiation: NO documentation was ever provided to show the current provisions of the NEC are a cause of a real fire or other life/fire-safety problem that would be solved if the floor boxes were mandated. The proposed requirement is nothing more than mandating a "convenience outlet that in fact may never be used. The installation and locations of floor boxes in commercial occupancies should be determined by the architect based on the needs of the building occupant. This type of "convenience" outlet should not be mandated in the NEC through a change proposed by the representatives of the product manufacturers. It is unfortunate that the scope of the NEC does not relate to the NEC being the "minimum" requirements for "practical safeguarding" for electrical installations. If it were this type of product mandate could never be accepted in good conscience.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KING, D.: See my Explanation of Negative Vote on Comment 2-148.
LAROCCA, R.: See my Explanation of Negative on Comment 2-148.
WEBER, R.: See my Explanation of Negative Vote on Comment 2-147.

2-154 Log #2871 NEC-P02 **Final Action: Accept**
(210.55)

Submitter: Tom Baker, Puget Sound Electrical Training
Comment on Proposal No: 2-276
Recommendation: Delete the proposed new language
Substantiation: The assumption is that this receptacle will be used with a digital projector and laptop, or similar. Based on giving hundreds of presentations in varied locations, there is no assurance that a floor receptacle in the center of the room will be in the correct location for use in a presentation. The distance from the projector to the screen is dependent on the lens of the projector, screen size and size of the room. My projector has a wide throw lens and will fill a 7ft x 7ft screen at 12 feet, others will need to be much further away.
In large conference rooms the center of the room would be too far from the front to use without an extension cord.
The easy and safe solution is an extension cord from a wall receptacle and use "Gaffers Tape" to secure the cord to the floor.
A better proposal would be to require receptacles on the perimeter walls for use with an extension cord. These receptacles could be used for other purposes, such as food warmers, whereas the floor receptacle is limited to use for presentations.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KING, D.: See my Explanation of Negative Vote on Comment 2-148.
LAROCCA, R.: See my Explanation of Negative on Comment 2-148.
WEBER, R.: See my Explanation of Negative Vote on Comment 2-147.

2-155 Log #2893 NEC-P02 **Final Action: Accept**
(210.55 (New))

Submitter: Jeremy Barrows, Dover, NH
Comment on Proposal No: 2-276
Recommendation: All of the text in this proposal should be deleted. There is no need for the proposition to add Article 210.55.
Substantiation: The proposed code is more of a matter of convenience. Installers should not be required by the NEC to install a receptacle in a floor box in the center of the meeting room. If there is a need for a floor box with a receptacle it should be included in the blueprints and the decision should be left up to the owner of the building, the architect or person in charge of the job. The outlets in the room should solely fall under Article 210.52.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KING, D.: See my Explanation of Negative Vote on Comment 2-148.
LAROCCA, R.: See my Explanation of Negative on Comment 2-148.
WEBER, R.: See my Explanation of Negative Vote on Comment 2-147.

2-156 Log #2509 NEC-P02 **Final Action: Accept**
(210.60(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-278
Recommendation: The proposal should be rejected.
Substantiation: The additional sentence and its supporting substantiation describe receptacles that are not receptacle outlets and therefore do not comply with 210.52(A). A receptacle in a portable luminaire, or in cord-and-plug connected (an assumption based never having seen hotel furnishings connected with flexible conduit), movable furniture or in an appliance, is not a receptacle outlet because the equipment in which it is installed is not part of the wiring system. This comment assumes that this equipment is cord-and-plug connected based on the substantiation and based on the submitter's observations over the years. The objectives of the proposal were addressed several cycles ago when the readily accessible rule was added to 210.60(B). It may be that the proposal submitter's hotel room described in the substantiation was wired prior to that change (1996 NEC), or possibly an inspection was missed, but this proposal misapplies rules for permanent wiring and is unnecessary.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-157 Log #1036 NEC-P02 **Final Action: Reject**
(210.70(1))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-284
Recommendation: The Proposal should be Accepted.
Substantiation: The Proposal should refer to 210.70(A)(1).
Where there are multiple entries to a room, there should be a wall switch for the lighting outlet at each entry to prevent occupants having to walk across the room in the dark, creating a safety hazard for the occupant, particularly for elderly people. It is a safety issue rather than a convenience design consideration. The Panel should not ignore safety considerations. A lawyer could very easily use the Proposal and the Panel Statement in support of a law suit.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the submitter's statement that having a wall switch at each entry is a safety consideration.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-158 Log #2122 NEC-P02 **Final Action: Reject**
(210.70(1))

Submitter: Greg Chontow, Hopatcong, NJ
Comment on Proposal No: 2-284
Recommendation: A wall switch shall control at least one lighting outlet at every entry to every habitable room and bathroom.
Substantiation: It is my intent to insure the safety of the occupants. The present wording does not take into consideration multiple entrances to a room, allowing the occupant to enter in the dark, creating a tripping hazard. This wording was first introduced in the 1975 NEC, understanding the effects of a room without a switch controlled lighting outlet. As dwellings get larger, it is more common for rooms with multiple entrances. CMP2 feels this is a design consideration, however, I believe this is a safety issue as there is a great possibility of a trip and fall. The CDC's National Center for Injury Prevention and Control lists nonfatal unintentional falls at #1 with 29.1% of the U.S. population affected. Greater illumination can decrease these numbers.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-157.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-159 Log #1037 NEC-P02 **Final Action: Reject**
(210.70(A)(1))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-285
Recommendation: The Proposal should be Accepted in Principle and Proposal 2-284 should be Accepted.
Substantiation: Where there are multiple entries to a room, there should be a wall switch for the lighting outlet at each entry to prevent occupants having to walk across the room in the dark, creating a safety hazard for the occupant, particularly for elderly people. It is a safety issue rather than a convenience design consideration. The Panel should not ignore safety considerations. A lawyer could very easily use the Proposal and the Panel Statement in support of a law suit.
Proposal 2-284 specifies a lighting outlet while Proposal 2-285 only requires a wall switch.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-157.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-160 Log #1038 NEC-P02 **Final Action: Reject**
(210.70(A)(1))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-287
Recommendation: The Proposal should be Accepted in Principle and Proposal 2-284 should be Accepted.
Substantiation: Where there are multiple entries to a room, there should be a wall switch for the lighting outlet at each entry to prevent occupants having to walk across the room in the dark, creating a safety hazard for the occupant, particularly for elderly people. It is a safety issue rather than a convenience design consideration. The Panel should not ignore safety considerations. A lawyer could very easily use the Proposal and the Panel Statement in support of a law suit.
Proposal 2-284 specifies a lighting outlet while Proposal 2-287 only requires a wall switch.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-157.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-161 Log #2252 NEC-P02 **Final Action: Reject**
(210.70(A)(1))

Submitter: Marcus K. Everngam, Town of Madbury, NH
Comment on Proposal No: 2-288
Recommendation: The following is the text from the original proposal:
Submitter: Joel Green, Evergreen, CO
Recommendation: Revise text to read as follows:
(A)(1) Habitable Rooms. At least one wall switch-controlled lighting outlet shall be installed in every habitable room and bathroom. At least one point of control shall be at the **usual point of entry** to the room.
Substantiation: Currently, there is no requirement for the control to be located near entry or exit locations. Entering into a dark room and being required to cross the room to turn on the lights may cause tripping.
Panel Meeting Action: Reject
Panel Statement: The term **"usual point of entry"** is vague and difficult to determine. There are instances where a switch may be located outside of that room.
Substantiation: The panel's statement that "The term **"usual point of entry"** is vague and difficult to determine." should give rise to the need for either carefully defining the term, or eliminating its use from the code. A clearly better solution is to require a control at **"all points of entry."** A good example is a basement which is accessible from internal stairs and a bulkhead: How does an inspector determine what the usual point of entry is? In the summer the bulkhead might be most frequently used and in the winter the bulkhead might never be used. The safest, most reliable and most convenient solution would be to have a control at both entrances. It is better for builders, installers and inspectors if there is a clear standard which does not require interpretation by anyone.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-157.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 215 — FEEDERS

2-162 Log #2375 NEC-P02 **Final Action: Reject**
(215.2)

Submitter: James E. Degnan, Sparling
Comment on Proposal No: 2-300
Recommendation: The new text of proposal 2-300 is recommended.
Substantiation: The panel is requested to review their panel statement on this proposal and the subsequent panel action with consideration to the following:
Section 220.87 says "The calculation of a feeder or service load for existing installations shall be permitted to use actual maximum demand to determine existing load under all of the following conditions:" This statement says that the actual maximum demand becomes the existing load. Condition (2) does not state that 125% of the measured load becomes the existing load, it states that 125% of the load has to be less than the feeder rating. The panel statement: "The 125% factor in 220.87 is intended to be a safety factor to increase the load." is not in agreement with the present text of the code. Please clarify the panel statement (or clarify the code?)
Additional points offered for the panel's consideration:
1. If a load is being added to an existing feeder then the *conditions* of 220.87 (2) and (3) can be clearly evaluated and apply within the purveyance of Article 220, as nothing is being done to change a feeder size. However, if a new feeder is replacing an existing feeder, and the new feeder serves existing and new loads, then the conditions of (2) and (3) are no longer *conditional*, they instead need to become part of the criteria for sizing a new feeder, and belong in Article 215. However according to Article 215, a "load" has to be continuous or non continuous, and an existing load that is based on a 15 minute demand window, it is neither. Therefore there is a need to clarify the NEC, and proposal 2-300 is a means to accomplish this.
2. Proposal 2-300 retains what I, the submitter, think is the intent of the present code language: When sizing a feeder based on a load determined by 220.87 (1), a safety margin is needed to determine the feeder size. The 25% is a clear safety margin, and accomplishes a combination of allowing for an unforeseen load and derating for some portion of the measured load having the potential to be continuous. The part of this proposal that becomes "new code" is the addition of the Exception for 100% rated devices serving existing loads, with the safety margin being reduced to 10%. The 25% safety margin includes a consideration for an aspect of continuous load that would not be necessary for 100% rated devices.
3. I think the code should not be interpreted as the panel has done in their statement. If the "load" becomes a 125% of the measured demand load, it would have implications on the sizing of other electrical equipment besides feeders, such as transformers and generators that are rated for continuous operation at 100% of their nameplate, and can be "loaded" accordingly. In reality the measured demand load can be substantially less than the load calculated in accordance with other provisions of Article 220, and Section 220.87 permits effective utilization of an electrical system that has a history of low utilization. This is particularly valuable with transformers, which perform most efficiently when operated in the upper range of their loading capability. Requiring a 25% increase in "load' assessment and resulting lower loading of transformers would be contrary to the goals of the federal government's energy saving goals, including the energy star program.
Also consider a large emergency power plant with four (or more) paralleled generators serving a combination of loads. Often these power plants are constructed to accommodate growth, and the loading calculations utilize Section 220.87. If the 25% margin is applied to the load, it is conceivable that the fourth generator could never be utilized.
Panel Meeting Action: Reject
Panel Statement: Section 220.87 is intended to allow additional loads to be added to an existing service or feeder if the service or feeder system is adequate according to 220.87. Load calculations belong in Article 220, not in Article 215.

Moving the material to Article 215 would treat the 125 percent as a conductor sizing factor only.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-163 Log #1441 NEC-P02 **Final Action: Reject**
(215.2(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-295
Recommendation: Accept the proposal as related to the penultimate paragraph of (A)(1) which I inadvertently failed to note.
Substantiation: Same as the proposal. The requirement is unreasonable and should be deleted. It also does not correlate with Exceptions No. 1 and No. 2.
Panel Meeting Action: Reject
Panel Statement: The submitter appears to be referring to the 2008 NEC text, and not the text as revised by the panel at the proposal stage.

The requirement is not unreasonable. It establishes a minimum grounded circuit conductor in the feeder to handle a L-N fault in the same manner than a minimum size EGC is needed for an L-G fault.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-164 Log #2748 NEC-P02 **Final Action: Accept**
(215.2(A)(2))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-298
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-165 Log #2788 NEC-P02 **Final Action: Accept**
(215.2(A)(2))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-298
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-166 Log #2749 NEC-P02 **Final Action: Accept**
(215.2(A)(3))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-299
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-167 Log #1583 NEC-P02 **Final Action: Accept**
(215.10 Exception No. 3 (New))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 2-309
Recommendation: Continue to reject this proposal.
Substantiation: This proposal should continue to be rejected, not only for the reasons given in the panel statement, but because it jeopardizes life-safety. The reasons for requiring ground-fault protection of equipment in certain applications are well documented. The damage than can result from a ground fault on such a system may render a substantial portion of the system inoperative, resulting in a lengthy outage potentially worse than that envisioned by the submitter, or worse yet start a life threatening fire. Further, restraint of the GFPE may increase the downstream arc flash hazard for maintenance workers.

The late J.R. Dunki-Jacobs, a recognized authority on ground-fault protection, stated in his book *Industrial Power System Grounding Design Handbook* (pages 186, 189) that, "If an arcing line-to ground fault is initiated in a solidly grounded system on one of three bare buses in a metal enclosure, the hot ionized gases that are developed by the fault can be expected to cause escalation to an arcing multi-phase fault within 1 or 2 cycles (0.0167 to 0.033 sec) of time." He went on to state, "Escalating arcing-ground faults have shown themselves to be extremely devastating…" and "Unquestionably then, engineering attention to their immediate suppression must be proactive and immediate, rather than reactive. Not only for reason of minimizing the released arc energy to maximize personnel safety, but also to avert arcing-fault escalation." The suggestion that an audible and visual signal device would be of any value is ludicrous.

System reliability and blackout prevention can be achieved by proper system design, equipment selection and coordination. The GFPE restraint called for in this proposal is unnecessary and a potential threat to life-safety.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-168 Log #2227 NEC-P02 **Final Action: Reject**
(215.10 Exception No. 3 (New))

Submitter: Malcolm Allison, Ferraz Shawmut / Rep. National Electric Fuse Association
Comment on Proposal No: 2-309
Recommendation: Modify the proposed text to read:
Exception No 3: Normal Source ground fault protection on the line side of a transfer switch supplying emergency and legally required standby systems shall be permitted to be restrained for ground faults on the loadside of the transfer switch, provided that audible and visual signal devices indicate whenever a ground fault relay has been restrained, and instructions on the course of action to be taken in the event of an indicated ground fault are located at or near the sensor location.
Substantiation: The CMP 2 Panel Statement to the original proposal was right on target. It pointed out that the provisions for health care are covered in 517.17, so this comment has removed all reference to health care systems. The Panel Statement also mentions that the process to achieve selective coordination is a design issue. And again, CMP 2 was correct. With that in mind, designers want to be able to utilize ground fault protection for the normal source, and at the same time, provide selective coordination for emergency and legally required standby devices and all overcurrent devices on their line side. This can easily be accomplished by allowing the normal side ground fault protection to be restrained for all ground faults on the load side of the transfer switch. It provides an allowance, similar to that found in 700.26 and 701.17, which permits ground fault protection to be totally omitted on the alternate source side of emergency and legally required standby systems. This comment will provide that added ability, without endangering any equipment protection on the normal source side of the transfer switch. The requirement for indication is included to correlate with the requirement found in 700.7(D).
Panel Meeting Action: Reject
Panel Statement: The purpose of having ground fault protection of equipment is to avoid major damage to the equipment from arcing ground faults. Allowing the devices to be restrained works against that goal.

The selectivity of the ground fault systems can be accomplished by applying multiple levels of ground-fault devices and appropriately coordinating those devices.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 220 — BRANCH-CIRCUIT, FEEDER, AND SERVICE CALCULATIONS

2-169 Log #2510 NEC-P02 **Final Action: Accept**
(220.5(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-317
Recommendation: The proposal should be accepted.
Substantiation: The panel statement is not responsive. Of course the NEC permits what the proposal suggests; it is what the NEC has said for twenty five years, since the 1984 NEC. Surprisingly, it did not always do so, although this is the usual approach for rounding. From the 1940 NEC (when first addressed) through the 1965 NEC, the Code allowed calculations to be truncated, with any decimal fractions dropped. From the 1968 through the 1981 editions, the Code, erroneously, allowed an exact decimal fraction of 0.5 to be dropped. These inconsistencies perhaps explain the numerous questions in the field, which have resulted in the many proposals over the years. This cycle is no exception, with one proposal originating within the panel. CMP 2 should take this opportunity to further clarify what, admittedly, this submitter thought was always clear.

The substantiation for the 1984 correction (Proposal 2-181 from none other than Mike Holt) stated, correctly, that "recognized mathematical processes round off decimals at 0.5 and larger to the next higher number." CMP 11 added the following statement on a related proposal (11-83) of the same authorship: "Round-off instructions as indicated by the submitter are built into calculators and computer software. Such standardized instructions are in the interest of safety and should be recognized in the NEC." Both panels then rejected adverse comments (2-236 and 11-49) stating that an ASTM document required 0.5 fractions to be rounded to the nearest whole even number, which could be either greater or lesser than the amount. That seems to have settled the technical question as a matter of the written record, but we are evidently left with an abundance of field inconsistencies with respect to how rounding should be done.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-170 Log #1591 NEC-P02 **Final Action: Reject**
(220.12)

Submitter: Jim Pauley, Schneider Electric
Comment on Proposal No: 2-320
Recommendation: Reconsider and accept the proposal.
Substantiation: We need to bridge the large gap between the NEC and the energy codes. I agree with Mr. Orlowski's comment that we should not sacrifice safety for non-safety related requirements. However, this proposal is written to protect the safety needed and to begin to bridge the gap with the energy codes. It only allows the lower VA values from the energy code to be used where the code is adopted by the local authority. As such, the point made in the panel statement about energy codes not being uniformly adopted is rendered moot. If the locality has not adopted an energy code, then the NEC values prevail.

Relative to the safety related aspects of the load calculations. The proposal requires that a power monitoring system be installed and designed with alarm levels related to the expected lighting loads. This provides a system of continual feedback to the building owner regarding the expected lighting load. The proposal further restricts the use of the demand factors in 220.42. As a result, the electrical safety aspects are not compromised.

The need for providing a way to bridge this gap is getting more and more significant. We require a lighting load calculation of 3.5VA/sq ft for office buildings. ASHRAE 90.1-2007 limits the lighting load to 1VA/sq ft for the general interior space of office buildings.

Accepting Proposal 2-320 will provide a safe path forward to allow the energy saving designs to capture additional savings in material and resources within the electrical infrastructure itself and provide appropriate safeguards to ensure that the limits are maintained.
Panel Meeting Action: Reject
Panel Statement: The energy codes are not uniformly applied throughout the country, therefore, no specific load requirements are possible based on these codes. The NEC specifies the minimum load requirements based on electrical safety.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

PAULEY, J.: The comment should have been accepted. NEMA supports efforts to better coordinate the NEC with other codes such as the energy codes. Given the importance of energy efficiency and the safeguards built into the original proposal, this would have been a reasonable way to provide some level or coordination with the energy codes. The panel statement was addressed in the recommended wording and in the comment substantiation.

2-171 Log #39 NEC-P02 **Final Action: Accept**
(220.14)

Submitter: Code-Making Panel 18,
Comment on Proposal No: 2-324
Recommendation: Panel 18 members agree and endorse Panel 2's action to reject the proposal and note that UL STP did not elect to include thermal receptacle requirements in the standard.
Substantiation: Panel 18 offers the following substantiation for this comment: No specific detail was provided with respect to where this proposed text is to appear in Article 406. Code-Making Panel 18 suggests that it should have been added as 406.2 (new). Code-Making Panel 18 is also aware of a CSDS proposal to revise the ANSI/UL 498 Standard for Attachment Plugs and Receptacles, to include thermal sensing technology, which did not achieve consensus.

This Comment was developed by a CMP-18 Task Group and balloted through the entire panel with the following ballot results:

13 Eligible to vote
9 Affirmative (Alternate T.K. McGowan voted for Principal M.S. O'Boyle)
3 Ballots Not Returned (S.A. Larson, J.F. Pierce, and S.K. Todd)
1 Abstention (Alternate R.D. Gottwald voted for Principal M.J. Kochan)

Mr. Gottwald's reason for abstaining is as follows: "I do not have the knowledge to address this subject appropriately."
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-172 Log #429a NEC-P02 **Final Action: Accept**
(220.14(G))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-237
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Panel Statement: The panel notes that the comment on proposal number should be 2-327.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-173 Log #331 NEC-P02 **Final Action: Accept**
(220.14(I))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-328
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-174 Log #332 NEC-P02 **Final Action: Accept**
(220.14(L))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-331
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-175 Log #1440 NEC-P02 **Final Action: Reject**
(220.51)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-337
Recommendation: Accept the proposal with the following revisions:

Fixed electric space heating loads shall be calculated at not less than 100 percent of the total load. The ampacity of service, feeder, and branch circuit conductors supplying fixed electric space heating loads shall not be less than 125 percent of such loads, plus not less than other loads supplied. In no case, shall a feeder or service load current rating be less than the largest branch circuit supplied. Where conductors supply a fixed electric space heating load(s), and in addition a motor load, the ampacity of the conductors shall be not less than 125 percent of the heating load(s) or the largest motor load, whichever is larger, plus all other load(s).

Exception: Where reduced heating of the conductors result from units operating on duty-cycle, intermittently, or from all units not operating simultaneously, the authority having jurisdiction may grant permission for feeders and service conductors to have an ampacity less than specified in this section, if the conductors have an ampacity not less than the load(s) so determined.
Substantiation: Example (D)(3) in Annex (D) indicates overcurrent protection not less than 125 percent for continuous loads which require a conductor ampacity or 125 percent. Feeder and service conductors supplying continuous loads can overheat overcurrent device terminals the same as a branch circuit. The 125 percent provision applied only to the larger of the heating load or largest motor, whichever is greater, should be permitted to avoid a required 125 percent factor to both, which is excessive, and allows for temporary overload (usually 125 percent) and the heating effects at terminals. If this comment is rejected, the example referred to in the Annex should be changed to prevent confusion.
Panel Meeting Action: Reject
Panel Statement: The submitter's concern is already handled by the rule in 424.3(B) for branch circuits. The rules in 210.19(A) and 215.2 already take into account the need for sizing for continuous loads. Placing those rules in Article 220 is improper, since that article deals with load calculations.

The panel notes that the submitter's substantiation pointing to Example (D)(3) has nothing to do with 220.51 and fixed electric space heating.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-176 Log #2750 NEC-P02 **Final Action: Accept**
(220.51 Exception)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-338
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-177 Log #1439 NEC-P02 **Final Action: Reject**
(220.52(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-339
Recommendation: Accept the revised Exception.
Substantiation: Additional 20-ampere small appliance circuits do not increase actual load and should be excluded from required load calculation as is the circuit covered by 210.52(B)(1), Exception No. 2. Is there any difference? Where the number of general lighting circuits is increased over what is required by the square foot area, the load (3 watts per square foot) is not increased. The proposal would encourage such additional circuits for improved efficiency and reliability.
Panel Meeting Action: Reject
Panel Statement: For large kitchens, it is not uncommon to include additional small appliance branch circuits that may, indeed, increase the overall load because of the use of the kitchen.

The submitter has not substantiated that this long standing rule needs to be changed.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-178 Log #1438 NEC-P02 **Final Action: Reject**
(220.54)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-343
Recommendation: Accept the proposal with the following revisions:

Electric Clothes Dryers, Dwelling Units. The load for 208-volt and 240-volt electric clothes dryers in dwelling units shall be not less that 5000 watts (volt-amperes) or the nameplate rating, whichever is larger, for each 208-volt and 240-volt dryer outlet. Table 220.54 shall be permitted for electric dryers.
Substantiation: The minimum 500 watt requirement should be limited to 208-volt and 240-volt dryers. The load for 120-volt dryers is covered by 220.52(B).
Panel Meeting Action: Reject
Panel Statement: A designer cannot always anticipate the load for appliances.

In addition, the submitter did not provide substantiation to indicate that the dryer load should be reduced.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-179 Log #2179 NEC-P02 **Final Action: Reject**
(Table 220.55, Note 4)

Submitter: Wayne E. Morris, Association of Home Appliance Manufacturers
Comment on Proposal No: 2-347
Recommendation: The Code-Making Panel should accept proposal 2-347.
Substantiation: The current code does not appropriately address the load requirement of a multi-cavity oven. No differentiation currently exists between a single oven and a multi-cavity oven, and this proposal addresses this oversight.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided sufficient information about "multi-cavity wall-mounted
ovens" to justify a change in the NEC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-180 Log #2751 NEC-P02 **Final Action: Accept**
(220.82(A))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-352
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-181 Log #333 NEC-P02 **Final Action: Accept**
(220.84(A)(2) Exception)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-357
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-182 Log #2752 NEC-P02 **Final Action: Accept**
(220.84(A)(3))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-358
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-183 Log #2380 NEC-P02 **Final Action: Reject**
(220.86 Exception and Table 220.86)

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facility Executives
Comment on Proposal No: 2-364
Recommendation: Accept in Principle proposal 2-364 with the following modification to the existing text.

Exception: If the school facility will be similar in occupancy classification, electrical system design, and facility management, to the type of school facility already under management, a 3-year baseline of historical demand data shall be permitted to be used as the calculated feeder or service load by a registered professional engineer.

This meets the criterion asserted in the committee's rejection of the original proposal. For the convenience of the committee, the Panel Statement is reproduced below:

Panel Statement: "There is no clear definition on how "similar" the installation would need to be in order for the demand data to be accurately applied in a new installation."

Substantiation: Sometimes it looks like our national fire safety objectives are at odds with national energy conservation goals. Electric space heating and air-conditioning underlie a broadening discussion about the demand increments in this Table. A registered professional engineer ought to be able to verify occupancy equivalency with an architect and be able to apply judgment in the use of energy consumption data now available from advanced metering technologies.

The scenario this proposal addresses can be described as follows:

School District Alpha built Elementary School Beta ten years ago and wants to build another Elementary School Gamma from the same set of plans prepared by A-E consultant Delta. (Many A-E's have prototype school buildings with, say, 1200A services calculated using NEC Chapter 2 methods) We want Delta's registered professional engineer to be able to size the service to Gamma according to 3-years of data from School District Alpha and Elementary School Beta energy reports. This happens frequently in an $100 Billion industry.

I have discussed this issue with energy experts and electrical designers who serve our industry and no one has any memory of a school transformer ever being overloaded. Quite the opposite; the utilities come along and slash the transformer size -- implied from the service conductor sizing of Table 220.86 -- sometimes by 50% in order to run the transformer closer to its nameplate capacity. Utilities are under pressure to expand this practice. I see this personally in the attachments to utility load letters that I have to fill out for a new service. These standard forms now look more like Schedules A through D of IRS Form 1040 in terms of me needing to identify just about every lamp and receptacle and fractional-hp motor in order for the service planner to justify the selection of the service transformer.

I see three parallel universes in full motion: public utility commissions (aligned with best safety practice asserted in the NESC), state bureaus of construction codes (aligned with the NEC and local variants of ICC building codes), and the energy commissions (aligned with DOE documents and ASHRAE 90.1). More overlap of the goals of these agencies needs to occur within the next NEC cycle or two. Perhaps innovations in material sciences in the near future will yield branch circuit wiring that it increases fire safety in disruptive ways; we have seen recently transformer manufacturers working with the DOE to get their efficiency numbers up. For the moment, acceptance of this proposal will continue the technical narrative of adaption of the NEC.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide data to support this change. As with past work on various calculations, it is necessary for the panel to see examples, along with specific data of how the criteria would be applied.

Similar schools may not have the same electrical load. Utilizing examples with specific data would allow a determination of parameters common to similar schools.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-184 Log #2753 NEC-P02 **Final Action: Accept**
(220.88)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-365
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-185 Log #2754 NEC-P02 **Final Action: Accept**
(220.102(B))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-369
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-186 Log #2755 NEC-P02 **Final Action: Accept**
(220.103)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-370
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 225 — OUTSIDE BRANCH CIRCUITS AND FEEDERS

4-6 Log #70 NEC-P04 **Final Action: Accept**
(225.2)

TCC Action: The Technical Correlating Committee correlated the actions of Code-Making Panel 4 and made NEC Style Manual corrections.

The Technical Correlating Committee directs that the revised text will now read as follows:

"225.2 Definition.

Delete the definition of Electric Supply Station.

Substation. An enclosed assemblage of equipment, (e.g., switches, circuitbreakers, buses, and transformers) under the control of qualified persons,through which electric energy is passed for the purpose of switching or modifying its characteristics.

225.3 Other Articles.

Editorially relocate 225.2 to 225.3 to create a new 225.2.

225.8 Calculation of Loads 600 Volts, Nominal, or Less.

Editorially relocate 225.3 to 225.8 to create a new 225.2.

III. Over 600 Volts

225.50 Sizing of Conductors. The sizing of conductors over 600 volts shall be in accordance with 210.19(B) for branch circuits and 215.2(B) for feeders.

225.51 Isolating Switches. Where oil switches or air, oil, vacuum, or sulfur hexafluoride circuit breakers constitute a building disconnecting means, an isolating switch with visible break contacts and meeting the requirements of 230.204(B), (C), and (D) shall be installed on the supply side of the disconnecting means and all associated equipment.

Exception: The isolating switch shall not be required where the disconnecting means is mounted on removable truck panels or metal-enclosed switchgear units that cannot be opened unless the circuit is disconnected and that, when removed from the normal operating position, automatically disconnect the circuit breaker or switch from all energized parts.

225.52 Disconnecting Means

(A) Location. A building or structure disconnecting means shall be located in accordance with 225.32, or it shall be electrically operated by a similarly located remote control device.

(B) Type. Each building or structure disconnect shall simultaneously disconnect all ungrounded supply conductors it controls and shall have a fault-closing rating not less than the maximum available short-circuit current available at its supply terminals.

Exception: Where the individual disconnecting means consist of fused cutouts, the simultaneous disconnection of all ungrounded supply conductors shall not be required provided that there is a means to disconnect the load before opening the cutouts. A permanent legible sign shall be installed adjacent to the fused cutouts indicating the above requirement.

Where fused switches or separately mounted fuses are installed, the fuse characteristics shall be permitted to contribute to the fault closing rating of the disconnecting means.

(C) Locking

Disconnecting means shall be capable of being locked in the open position. The provisions for locking shall remain in place with or without the lock installed.

Exception: Where an individual disconnecting means consist of fused cutouts, a suitable enclosure, capable of being locked and sized to contain all cutout fuse holders shall be installed at a convenient location to the fused cutouts.

(D) Indicating

Disconnecting means shall clearly indicate whether they are in the open "off" or closed "on" position.

(E) Uniform Position

Where disconnecting means handles are operated vertically the "up" position of the handle shall be the "on" position.

Exception: A switching device having more than one "on" position, such as a double throw switch, shall not be required to comply with this requirement.

(F) Identification. Where a building or structure has any combination of feeders, branch circuits, or services passing through it or supplying it, a permanent plaque or directory shall be installed at each feeder and branch circuit disconnect location denoting all other services, feeders, , or branch circuits supplying that building or structure or passing through that building or structure and the area served by each.

225.56 Inspections and Tests

(A) Pre-Energization and Operating Tests. The complete electrical system shall be performance tested when first installed on site. Each protective, switching, and control circuit shall be adjusted in accordance with recommendations of the protective device study and tested by actual operation using current injection or equivalent methods as necessary to ensure that each and every such circuit operates correctly to the satisfaction of the authority having jurisdiction.

(1) Instrument Transformers. All instrument transformers shall be tested to verify correct polarity and burden.

(2) Protective Relays. Each protective relay shall be demonstrated to operate by injecting current (and/or voltage) at the associated instrument transformer output terminal and observing that the associated switching and signaling functions occur correctly and in proper time and sequence to accomplish the protective function intended.

(3) Switching Circuits. Each switching circuit shall be observed to operate the associated equipment being switched.

(4) Control and Signal Circuits. Each control or signal circuit shall be observed to perform it's proper control function or produce a correct signal output.

(5) Metering Circuits. All metering circuits shall be verified to operate correctly from potential and current sources similarly to protective relay circuits.

(6) Acceptance Tests. Complete acceptance tests shall be performed after the station installation is completed, on all assemblies, equipment, conductors, control and protective systems as applicable to verify the integrity of all the systems.

(7) Relays and Metering Utilizing Phase Differences. All relays and metering which use phase differences for operation shall be verified by measuring phase angles at the relay under actual load conditions after operation commences.

(B) Test Report. A test report covering the results of the tests required in 225.56(A) shall be delivered to the authority having jurisdiction prior to energization.

Informational Note For acceptance specifications refer to NETA ATS-2007 Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems published by the InterNational Electrical Testing Association .

225.60 Clearances over Roadways, Walkways, Rail, Water, and Open Land.

(A) 22 kV, Nominal, to Ground or Less. The clearances over roadways, walkways, rail, water, and open land for conductors and live parts up to 22 kV, nominal, to ground or less shall be not less than the values shown in Table 225.60.

Table 225.60 Clearances over Roadways, Walkways, Rail, Water, and Open Land

*****Insert Table Here (not shown)*****

(B) Over 22 kV Nominal to Ground. Clearances for the categories shown in Table 225.60 shall be increased by 10 mm (0.4 in.) per kV above 22,000 volts.

(C) Special Cases. For special cases, such as where crossings will be made over lakes, rivers, or areas using large vehicles such as mining operations, specific designs shall be engineered considering the special circumstances and shall be approved by the authority having jurisdiction.

Informational Note : For additional information, see ANSI C2-2007, National Electrical Safety Code.

225.61 Clearances over Buildings and Other Structures.

(A) 22 kV Nominal to Ground or Less. The clearances over buildings and other structures for conductors and live parts up to 22 kV, nominal, to ground or less shall be not less than the values shown in Table 225.61.

Table 225.61 Clearances over Buildings and Other Structures

*****Insert Table 225.61 Here (not shown)*****

(B) Over 22 kV Nominal to Ground. Clearances for the categories shown in Table 225.61 shall be increased by 10 mm (0.4 in.) per kV above 22,000 volts.

Informational Note: For additional information, see ANSI C2-2007, National Electrical Safety Code.

225.70 Substations

(A) Warning Signs.

(1) General. A permanent, legible warning notice carrying the wording "DANGER — HIGH VOLTAGE" shall be placed in a conspicuous position in the following areas:

(a) At all entrances to electrical equipment vaults, electrical equipment rooms, areas, or enclosures; and

(b) At points of access to conductors on all high voltage conduit systems and cable systems; and

(c) On all cable trays containing high-voltage conductors with the

maximum spacing of warning notices not to exceed 3 m (10 ft.)

(2) Isolating Equipment. Permanent legible signs shall be installed at isolating equipment warning against operating it while carrying current, unless the equipment is interlocked so that it cannot be operated under load.

(3) Fuse Locations. Suitable warning signs shall be erected in a conspicuous place adjacent to fuses, warning operators not to replace fuses while the circuit is energized.

(4) Backfeed. The following steps shall be taken where the possibility of backfeed exists:

(a) Each group-operated isolating switch or disconnecting means shall bear a warning notice to the effect that contacts on either side of the device may be energized; and

(b) A permanent, legible, single-line diagram of the station switching arrangement, clearly identifying each point of connection to the high-voltage section, shall be provided in a conspicuous location within sight of each point of connection.

(5) Metal Enclosed and Metal Clad Switchgear. Where metal enclosed switchgear is installed the following steps shall be taken:

(a) A permanent, legible, single-line diagram of the switchgear shall be provided in a readily visible location within sight of the switchgear and this diagram shall clearly identify interlocks, isolation means, and all possible sources of voltage to the installation under normal or emergency conditions, including all equipment contained in each cubicle, and the marking on the switchgear shall cross-reference the diagram.

Exception to (a): Where the equipment consists solely of a single cubicle or metal-enclosed unit substation containing only one set of high-voltage switching devices, diagrams shall not be required.

(b) Permanent, legible signs shall be installed on panels or doors that give access to live parts over 600 volts, nominal, carrying the wording "DANGER — HIGH VOLTAGE" to warn of the danger of opening while energized.

(c) Where the panel gives access to parts that can only be de-energized and visibly isolated by the serving utility, the warning shall add that access is limited to the serving utility or following an authorization of the serving utility."

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-21
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comment expressed in the voting.

The text must comply with the NEC Style Manual.

The proposed text includes definitions in 225.2 that are not used in Article 225 or in the NEC. All text must be written in accordance with 90.5(A) in mandatory language.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

See panel action taken on Comment 4-8.

In addition, change the text in Proposal 4-21 to read as follows as follows:

(2) Protective Relays. Each protective relay ~~will~~ shall be demonstrated to operate by injecting current (and/or voltage) at the associated instrument transformer output terminal and observing that the associated switching and signaling functions occur correctly and in proper time and sequence to accomplish the protective function intended.

(3) Switching Circuits. Each switching circuit will shall be observed to operate the associated equipment being switched.

(4) Control and Signal Circuits. Each control or signal circuit ~~will~~ shall be observed to perform it's proper control function or produce a correct signal output.

(5) Metering Circuits. All metering circuits ~~will~~ shall be verified to operate correctly from potential and current sources similarly to protective relay circuits.

(7) Relays and Metering Utilizing Phase Differences. All relays and metering which use phase differences for operation shall be verified by measuring phase angles at the relay under actual load conditions after operation commences.~~, which may be at a later date than Pre-energization tests.~~

Panel Statement: See the panel action on comment 4-8.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:

MCDANIEL, R.: EEI Negative Ballot Statement:

See my explanation of negative ballot on Comments 4-7 and 4-9. In addition, the Panel's changes on Comment 4-6 for items (2) Protective Relays; (3) Switching Circuits; (4) Control and Signal Circuits; (5) Metering Circuits; and (7) Relays and Metering Utilizing Phase Differences read as performance type requirements that would appear more appropriate in a work practice standard such as NFPA 70B.

4-7 Log #1388 NEC-P04 **Final Action: Reject**
(225.2)

TCC Action: The Technical Correlating Committee will establish a Task Group to provide additional definitions and requirements related to indoor and outdoor electrical substations for the 2014 NEC Code cycle.

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 4-21
Recommendation: Please reconsider and reject this proposal.
Substantiation: The proposal provides benefits for the inclusion of medium and high voltage substation and premises wiring installation requirements in the NEC. However, bringing NESC requirements into the NEC without the context of NESC basic provisions that are considered necessary for the safety of qualified personnel and the public under the specified conditions will result in an incomplete or unsafe installation.

We recommend and it may be more appropriate to create a task force to consider these items in a general area such as Article 110. For example, requirements for an electric substation apply to both outdoor and indoor applications and do not fall under the scope of Article 225. These requirements should be considered in a more general area.

We recommend a new article be written for Chapter 1 (possibly Article 120, entitled "Requirements for Electrical Installations over 600 Volts") that incorporates these concepts and integrates existing NEC text.

Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action on Proposal 4-21, as modified by the actions taken on Comments 4-6 and 4-8.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:

MCDANIEL, R.: EEI Negative Ballot Statement:

The proposal provides benefits for the inclusion of medium and high voltage substation and premises wiring installation requirements in the NEC. However, bringing NESC requirements into the NEC without the context of NESC basic provisions that are considered necessary for the safety of qualified personnel and the public under the specified conditions will result in an incomplete or unsafe installation.

We recommend and it may be more appropriate to create a task force to consider these items in a general area such as Article 110. For example, requirements for an electric substation apply to both outdoor and indoor applications and do not fall under the scope of Article 225. These requirements should be considered in a more general area.

We recommend a new article be written for Chapter 1 (possibly Article 120, entitled "Requirements for Electrical Installations over 600 Volts") that incorporates these concepts and integrates existing NEC text.

Comment on Affirmative:

ROGERS, J.: The submitter raises a good discussion point as to whether or not these requirements should be limited to Article 225 and that should be reviewed in the future. The inclusion of requirements such as these is necessary as these installations exist on property beyond the service point and thus are not covered by the NESC and the current NEC does not contain sufficient requirements for installations such as these. Further discussion and more clarifying language will be needed in the next NEC cycle.

4-8 Log #1974 NEC-P04 **Final Action: Accept**
(225.2)

Submitter: Neil F. LaBrake, Jr., National Grid USA
Comment on Proposal No: 4-21
Recommendation: Delete proposed definitions for electric supply station and generating station.
Substantiation: The terms "electric supply station" and "generating station" relate to installations not covered by the NEC pursuant to 90.2(B)(5). In addition, these terms and installation types do not appear in the 2008 NEC. These installations are covered by the National Electrical Safety Code (NESC). For further information regarding this comment, please refer to the article on "Connecting Premises Wiring to Supply Lines" published by the International Association of Electrical Inspectors in their September/October 2009 magazine (http://www.iaei.org/magazine/?p=4329#more-4329) on page 93.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:

ROGERS, J.: The submitter is correct in requesting the removal of these definitions at this time. These definitions and the installations they define will need to be reviewed in the next NEC cycle as there are installations on private property and on the customer side of the service point that meet these definitions in principle and yet they are not covered in the NEC.

4-9 Log #2255 NEC-P04 **Final Action: Reject**
(225.2)

TCC Action: The Technical Correlating Committee will establish a Task Group to provide additional definitions and requirements related to indoor and outdoor electrical substations for the 2014 NEC Code cycle.
Submitter: Roger D. McDaniel, Georgia Power Company / Rep. Edition Electric Institute
Comment on Proposal No: 4-21
Recommendation: This proposal should be rejected. Delete all wording of proposal 4-21.
Substantiation: This proposal should be rejected.

The proposal provides benefits for the inclusion of medium and high voltage substation and premises wiring installation requirements in the NEC. However, bringing NESC requirements into the NEC without the context of NESC basic provisions that are considered necessary for the safety of qualified personnel and the public under the specified conditions will result in an incomplete or unsafe installation.

We recommend and it may be more appropriate to create a task force to consider these items in a general area such as Article 110. For example, requirements for an electric substation apply to both outdoor and indoor applications and do not fall under the scope of Article 225. These requirements should be considered in a more general area.

We recommend a new article be written for Chapter 1 (possibly Article 120, entitled "Requirements for Electrical Installations over 600 Volts") that incorporates these concepts and integrates existing NEC text."
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 4-7.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:

MCDANIEL, R.: EEI Negative Ballot Statement:

The proposal provides benefits for the inclusion of medium and high voltage substation and premises wiring installation requirements in the NEC. However, bringing NESC requirements into the NEC without the context of NESC basic provisions that are considered necessary for the safety of qualified personnel and the public under the specified conditions will result in an incomplete or unsafe installation.

We recommend and it may be more appropriate to create a task force to consider these items in a general area such as Article 110. For example, requirements for an electric substation apply to both outdoor and indoor applications and do not fall under the scope of Article 225. These requirements should be considered in a more general area.

We recommend a new article be written for Chapter 1 (possibly Article 120, entitled "Requirements for Electrical Installations over 600 Volts") that incorporates these concepts and integrates existing NEC text.
Comment on Affirmative:

ROGERS, J.: The submitter raises a good discussion point as to whether or not these requirements should be limited to Article 225 and that should be reviewed in the future. The inclusion of requirements such as these is necessary as these installations exist on property beyond the service point and thus are not covered by the NESC and the current NEC does not contain sufficient requirements for installations such as these. Further discussion and more clarifying language will be needed in the next NEC cycle.

4-10 Log #2511 NEC-P04 **Final Action: Accept in Principle**
(225.2, 225.3, and 225, Part III)

TCC Action: The Technical Correlating Committee will establish a Task Group to provide additional definitions and requirements related to indoor and outdoor electrical substations for the 2014 NEC Code cycle.
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-21
Recommendation: Accept the proposal as modified by CMP 4 in principle and in part. Make the following modifications to the ROP action:

I. Reject the definitions proposed for 225.2.

II. Add the words "600 Volts Nominal, or Less" to the title of Part II (to read "More Than One Building or Other Structure, 600 Volts Nominal, or Less.")

III. In 225.52(A), add the phrase "or it shall be operable by mechanical linkage from a readily accessible location" at the end.

IV. In 225.52(B) Exception, revise the second sentence to read as follows: "A permanent and legible sign shall be installed immediately adjacent to the fused cutouts worded "DISCONNECT LOAD BEFORE OPENING CUTOUTS".

V. In 225.52(C), revise the rule to read as follows: "The disconnecting means shall be capable of being locked in the open position." Revise the exception to read as follows: "Where the disconnecting means consist of individual fused cutouts, a suitable enclosure, capable of being locked and sized to contain all cutout fuseholders shall be installed. It shall be at a location that is accessible to personnel during or immediately after the process of operating the cutouts."

VI. In 225.52(E) Exception, revise to read as follows: "Vertically operated disconnecting means having multiple sources of supply shall be permitted to be in the closed ("on") position with the handle in either the up or down position."

VII. In 225.52(F), Add commas around the clause "or passing through that building or structure".

VIII. Reject 225.56 and 225.70, or, if the sections are retained and this portion of this comment is rejected, then make additional changes as set forth in parts IX through XX of this comment.

IX. In 225.56(A), revise the first sentence to read as follows: "The complete electrical system design, including settings for protective, switching, and control circuits, shall be prepared in advance and made available on request to the authority having jurisdiction." In the second sentence, change "recommendations of the protective device study" to "the system design".

X. In 225.56(A)(2), change "will" to "shall" and change "(and/or voltage)" to "(or voltage or both current and voltage as necessary)".

XI. In 225.56(A)(3), change "will" to "shall".

XII. In 225.56(A)(4), change "will" to "shall" and correct the spelling if "its" (changed from "it's").

XIII. In 225.56(A)(5), change "will" to "shall" and change "similarly to" to "in a similar manner as".

XIV. In 225.56(A)(7), change "which" to "that" and convert the final wording ("after operation commences, which may be at a later date than Pre-energization tests") into a sentence as follows: "The verification shall be performed during an approved time period after operation commences".

XV. In 225.56(B) (FPN) [Informational Note], change the opening wording to read: "For an example of acceptance specifications …".

XVI. In 225.70(A)(1) and 225.70(A)(5)(b), add "KEEP OUT" to the required warning labels.

XVII. In 225.70(A)(1)(a) through (c), convert the letters (a), (b), and (c) to (1), (2), and (3) respectively.

XVIII. In 225.70(A)(3), Revise the text to read as follows: "A permanent and legible sign shall be installed immediately adjacent to the fuseholders worded "DISCONNECT CIRCUIT BEFORE REPLACING FUSES."

XIX. In 225.70(A)(4), revise the provision to read as follows: (4) Backfeed. Installations where the possibility of backfeed exists shall comply with (a) and (b).

(a) A permanent sign shall be installed on the switch enclosure or immediately adjacent to open switches with the following words or equivalent: "WARNING — CONTACTS ON EITHER SIDE OF THIS DEVICE MAY BE ENERGIZED BY BACKFEED."

(b) A permanent and legible single-line diagram of the station switching arrangement, clearly identifying each point of connection to the high-voltage section, shall be provided where is it is within view and not more than 1.8 m (6 ft) of each point of connection.

XX. In 225.70(A)(5)(c), change "the panel gives access" to "a panel or door gives access".
Substantiation: I. The first two definitions ("Electric Supply Station" and "Generating Station") are not used in the NEC. CMP 4, by rejecting the portion of Proposal 4-18 that used the term "Electric Supply Station", will not be inserting even this term into the 2011 NEC. The final definition ("substation") defines a species of equipment and belongs in Chapter 4 (Article 490), or in Article 100 (still under the jurisdiction of CMP 9) due to the use of the term in multiple articles.

II. Because Part III will now have the entirety of requirements for these over 600 volt applications, Part II must be clarified as not applying to over 600 volt installations unless a specific cross reference is made, as in 225.52(A).

III. This wording provides correlation with the CMP 4 action on Proposal 4-169 covering 230.205(A). There is no reason to treat the applications differently.

IV. The use of the words "above" or "below" in reference to the location of text in the NEC is not permitted by the NEC Style Manual, at 3.3.4. In addition, this signage requirement will benefit from clear prescriptive language, as suggested in this comment.

V. The opening portion of this part of the comment is a companion action to one by this submitter that correctly words and relocates the content of Proposal 1-63 which describes the attributes of a lock-open disconnecting means for the purpose of code enforcement. Since that comment will not be on CMP 4's agenda, the action text (to be located in the general part of Article 110 and therefore applicable to all voltages) is reproduced here: "Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

CMP 9 has already accepted language in Article 490 that presumes this concept is defined in Chapter One and need not be repeated in dozens of locations throughout the NEC. Companion proposals are being submitted in all instances where contrary action occurred during the ROP stage, providing a vehicle for this economy of wording. By this comment the TCC is encouraged to ensure that this concept is applied in a consistent manner.

The second part of this item addresses the fuseholder storage enclosure. It breaks the requirement into two sentences for readability and uses more prescriptive language than "convenient" for the purpose of making the rule more consistently applied and enforceable.

VI. This wording avoids the phrase "need not" because it is not a permissible form in an exception by the NEC Style Manual, at 3.1.4.1. The wording "the handle in either the up or down position" occurs in the parallel requirement in 404.7 Exception No. 1.

VII. The commas emphasize that the mere fact of passing through is enough to generate a label, and make the sentence more readable. They also clarify that the wording "and the area served by each" applies to both circumstances.

VIII. As covered in the comment in the voting, the scope of these two proposed sections encompasses many applications that appear to be beyond the scope of Article 225, specifically substations in general. These sections should be reported as "hold" since they involve topics that cannot be addressed in this cycle because they involve equipment that is covered in Article 490. If these sections are held as suggested, the TCC can reassign them to CMP 9 for action in the 2014 NEC cycle.

IX. The ROP wording refers to a "protective device study" which is not defined or described in any provision of the original proposal. This wording attempts a slightly more flexible approach that is intuitively obvious, and also ensures that the AHJ has the opportunity to review the design. The term "system design" is more familiar and the wording specifically captures "protective, switching, and control circuits" as being included in such a design.

X. This is a mandatory rule and the NEC Style Manual, at 3.1.1, requires "shall" in such cases. The second change removes the term "and/or", which is a term to be avoided as covered in Annex B of the NEC Style Manual.

XI. This is a mandatory rule and the NEC Style Manual, at 3.1.1, requires "shall" in such cases.

XII. This is a mandatory rule and the NEC Style Manual, at 3.1.1, requires "shall" in such cases. The spelling change applies because it denotes the possessive and not a two-word contraction.

XIII. This is a mandatory rule and the NEC Style Manual, at 3.1.1, requires "shall" in such cases. The other wording change is grammatical; in this context the word is used in the sense of "in a similar manner to" and not as an adverb, which would modify the verb "operate" and miss the "potential and current sources". The proposed wording in this comment clearly describes the intent.

XIV. The change from "which" to "that" is grammatical because it does not open a subordinate clause. The second part of this item eliminates the improper use of the word "may" (See the NEC Style Manual at 3.1.2) and gives the AHJ the authority to supervise the amount of time that may elapse before the testing is completed. The sentence in this comment is more clearly written because the tests are not to be done prior to the installation being put into service, and therefore both the impermissible word "may" and its permissible substitute "shall be permitted to be" are both incorrect.

XV. As worded, this note is, in effect, an incorporation of the requirements of another, non-NFPA standard into the NEC. This is not permitted because the other standard may change in an unpredictable way outside the control of NFPA. Instead the non-mandatory "an example of" is used for these purposes, as required in the NEC Style Manual at 3.1.3. See, for example, the many references to UL standards in the power-limited cabling articles [such as the note following 725.179(D) and many other locations]. In all instances, the reference is to an example or method, with the door left open to other options. Of course, the named method, as a practical matter, will be the one routinely used.

XVI. It has been established over the course of extensive litigation that waning signs must include a command so the viewer knows what he or she is supposed to do or not do. This is the reason that all such warnings throughout the NEC were converted in the 1990s to add a command in the wording. See, for example, 110.34(C).

XVII. This is a list, and the NEC Style Manual, at 2.1.5.1, requires the use of numbers for such items "in any subdivision level."

XVIII. This wording is prescriptive and less ambiguous than that accepted in the ROP.

XIX. The NEC is an installation code, not a work practice, and its provisions should stipulate installation requirements rather than a work sequence. The format in this comment [e.g. "shall comply with (a) and (b)"] is more consistent with NEC practice for that reason. The warning in (a) is prescriptive, definitive, and familiar, being based on 404.6(C) Exception. Responding to a comment in the voting, this subject is covered for 600-volt and below applications, in Article 404. The positioning rule in (b) is also less ambiguous, and avoids a misuse of the defined terminology "within sight" because a warning label 50 ft away is unlikely to accomplish its intended purpose.

XX. The circumstance described in 225.70(A)(5)(b), and which could involve the utility access problem, applies equally to a panel or to a door, and the language should apply to both.

Panel Meeting Action: Accept in Principle

Panel Statement: The panel reaffirms its action on Proposal 4-21 as modified by the actions and statements on Comments 4-6 and 4-8 that address the submitter's concerns.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

4-11 Log #71 NEC-P04 **Final Action: Accept**
(225.21)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-33

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal with respect to "agreeing" with the submitter, yet providing no specific reason for the panel action.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel continues to Reject Proposal 4-33, and modifies its panel statement on Proposal 4-33 to read as follows:

The present NEC text for this section refers the reader to 230.51, that provides specific conductor support details for cables other than service and individual open conductors. The requirements in Articles 225 and 230 are in addition to those found in Chapter 3.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

4-12 Log #2395 NEC-P04 **Final Action: Accept**
(225.27 (New))

Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 4-35

Recommendation: Revise accepted text to read as follows:

225.X. Raceway Seal. Where a ~~feeder~~ raceway enters a building or structure from an underground distribution system, it shall be sealed in accordance with 300.5(G). Spare or unused raceways shall also be sealed. Sealants shall be identified for use with the cable insulation, shield, or other components.

Substantiation: While I agree with the submitter and thepanel, the need for raceway seal is not dependent on the type circuit installed; service, feeder, branch circuit, or spare. The size of the circuit and associated raceway, nor the need to minimize the entrance of moisture into enclosures is not limited by the type circuit installed.

Panel Meeting Action: Accept

Number Eligible to Vote: 10

Ballot Results: Affirmative: 9 Negative: 1

Explanation of Negative:

SIGMUND, J.: I am voting against this comment. There should be an exception for industrial locations, where conditions of maintenance and supervision would insure that incursions from foreign objects through underground conduits to energized switchgear would not occur.

4-13 Log #1787 NEC-P04 **Final Action: Reject**
(225.27 Exception (New))

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 4-35

Recommendation: Add Exception as follows:

Exception: In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified personnel will be installing and maintaining the underground feeders, a seal will not be required on all underground conduits.

Substantiation: Unintended entry of foreign objects or cables through underground ducts are much less likely in an industrial establishment where the maintenance and supervision requires strict permitting and control of construction work.

Panel Meeting Action: Reject

Panel Statement: The comment attempts to introduce new language. The submitter is incorrect in his assumption that raceways are less subject to incursion by foreign elements because they are located in industrial locations.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 9 Negative: 1

Explanation of Negative:

SIGMUND, J.: I am voting against this comment. There should be an exception for industrial locations, where conditions of maintenance and supervision would insure that incursions from foreign objects through underground conduits to energized switchgear would not occur.

4-14 Log #1041 NEC-P04 **Final Action: Accept**
(225.30 (New))

TCC Action: The Technical Correlating Committee editorially revised the text of the last sentence of the comment recommendation to conform with the text of Proposal 4-37 to read as follows:

"Where a branch circuit or feeder originates in these additional buildings or other structures, only one feeder or branch circuit shall be permitted to supply power back to the original building or structure, unless permitted in 225.30(A) through (E)."

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 4-37
Recommendation: Revise text to read as follows:

Where more than one building or other structure is on the same property and under single management, each additional building or other structure that is served by a branch circuit or feeder on the load side of the service disconnecting means shall be supplied by only one feeder or branch circuit unless permitted in 225.30(A) through (E). For the purpose of this section, a multiwire branch circuit shall be considered a single circuit. Where a branch circuit or feeder originated in these additional buildings or other structures only one feeder or branch circuit shall be permitted to supply power back to the original building or structure unless permitted in 225.30(A) through (E).
Substantiation: The panel deleted existing code text for the multiwire branch circuit being considered as a single circuit without substantiation. This provision is important to users and inspectors to ensure uniform enforcement and clarity.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-15 Log #2100 NEC-P04 **Final Action: Reject**
(225.32)

Submitter: Larry LeVoir, City of Irvine
Comment on Proposal No: 4-41
Recommendation: Accept the proposal.
Substantiation: I understand that CMP 4 has had to tackle this problem. It appeared at one point a consesus had been reached, but the proposal was dropped for the 2002 NEC. It seems as though CMP 13 was able to reach a consensus on this issue as it applies to feeders from generators. Please reference 700.12(B)(6), 701.11(B)(5), and 702.11. With these code sections one could install a feeder overcurrent device on the outside of the first building 40 feet and visible from the second building and a generator 40 feet from the same second building. The feeder conductors from the feeder overcurrent device on the outside of the first building would require a disconnecting means in accordance with section 225.32 where the conductors enter the second building but feeder conductors from the generator would not as long as they are installed per sections 700.12(B)(6), 701.11(B)(5), and 702.11 whichever is applicable. There is no difference I am aware of in these feeder conductors (aside from the source), but yet we have different rules for the same types of conductors. While an argument could made regarding the Emergency or Legally Required Systems as being "special", one could not make that argument for the Optional Standby Conductors. At the very least this should be forwarded to the TCC as a conflict in the code.
Panel Meeting Action: Reject
Panel Statement: The submitter has not presented any additional technical rationale for compromising the basic safety requirement for a disconnect at each building where feeders either supply or travel through the building.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-16 Log #334 NEC-P04 **Final Action: Accept**
(225.33(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-43
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-17 Log #1828 NEC-P04 **Final Action: Hold**
(225.36)

TCC Action: The panel action on this comment has resulted in technical revisions without the benefit of public review.

The Technical Correlating Committee directs that this comment, and the referenced Proposal, be reported as "Hold" in accordance with Section 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 4-49
Recommendation: Accept the Proposal.
Substantiation: The proposal should be accepted as it corrects a serious flaw in this section. The allowance of using a set of 3-way or 4-way switches as a building disconnecting means violates the very core purpose of a disconnecting means. The person who may be working on the system at the building or structure served should be able to operate the disconnecting means at the building or structure and, after testing for absence of voltage, work on the electrical system in confidence. The worker should not have to be concerned that another person could restore power from another location to the equipment being worked upon.

Try as I have, it is difficult to understand the Panel's Statement in rejecting the proposal. The Panel states, "The reference to 3-way and 4-way switches should be retained." The Panel does not state why? It is illogical to retain the permission to use 3-way and 4-way switches as the disconnecting means. This sentence is not responsive to the proposal or the substantiation.

The Panel should explore the training apprentice electricians receive on disconnecting equipment before working on previously energized conductors and equipment. It is safe to say none of the training would teach it is okay to rely on 3 or 4-way switches for disconnecting means.

The Panel statement, "These may be snap switches but the disconnecting functionality of these devices is quite different and could be interpreted as not being acceptable as a disconnect for a building." The disconnecting functionality is quite different from what? The Panel continues "…and could be interpreted as not being acceptable as a disconnect for a building." I agree with this statement. If the Panel makes that conclusion, why wasn't the Proposal accepted. Sorry, the Panel Statement makes little sense.

Finally, the Panel states, "In this proposal the submitter has made an effort to mark the additional wording and the deleted wording but there is wording in the proposal that is not identified as new or changed that is not in the code." I have carefully compared the submitted text with that in the 2008 NEC and can't find a discrepancy. I do apologize, however, if I inadvertently missed some words.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 4-18.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-18 Log #2544 NEC-P04 **Final Action: Hold**
(225.36)

TCC Action: The panel action on this comment has resulted in technical revisions without the benefit of public review.

The Technical Correlating Committee directs that this comment, and the referenced Proposal, be reported as "Hold" in accordance with Section 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-46
Recommendation: Accept the proposal in principle. Revise both the existing text and the exception in 225.36 as follows:
225.36 ~~Suitable for Service Equipment~~ Type. The disconnecting means specified in 225.31 shall be comprised of a circuit breaker, molded case switch, general use switch, or a snap switch. Where applied in accordance with 250.32(B) Exception, the disconnecting means shall be suitable for use as service equipment.
Exception: For garages and outbuildings on residential property, a ~~snap switch or a~~ set of 3-way or 4-way snap switches shall be permitted as the disconnecting means.
Substantiation: Although it is true that the SUSE requirement also involves greater spacings, these are only justified in instances where there is a true service exposure, with no overcurrent protection ahead of the equipment. The principal wiring difference is that identified in the proposal, namely, that a regrounding provision must be incorporated. This, in turn, is only a factor in the 250.32(B) Exception applications.

Since this proposal was offered, this submitter has been challenged to show, in terms of technical merit as opposed to code language, as to why a snap switch could not be used at a commercial occupancy. I can think of no good reason whatsoever, and this comment modifies the original proposal accordingly. All the requirements in 225.38 will be met by a snap switch with the requisite poles.

The panel statement, that the original proposal did not comply with 4.3.3 of the Regulations, is incorrect. The proposal suggested that the section should be "revised to read as follows." Therefore, the wording to be changed was precisely described (namely, the entirety of 225.36) and the new wording was precisely indicated (namely the statement of how the section wording should read). This proposal fully meets the provisions of 4.3.3(c) of the Regulations.

Although the standard proposal form suggests a preference for legislative formatting, it is only a preference ("should be in legislative format") and is not enforceable, although for the convenience of CMP 4, this comment does use legislative formatting. The Regulations do not require legislative formatting, and it is a serious violation of the Regulations for a Technical Committee to refuse to entertain a proposal simply because it did not employ legislative formatting. Untold thousands of proposals and comments have been acted on according to their merits by NEC code making panels over the decades, including within the current cycle, which did not use this formatting. The submitter recognizes that in this case CMP 4 did the right thing in providing an appropriate technical response allowing the rebuttal offered in this comment. However, the statement is still troublesome.

Panel Meeting Action: Accept in Part

Revise text to read as follows:

Type. The disconnecting means specified in 225.31 shall be comprised of a circuit breaker, molded case switch, general use switch, a snap switch, or other approved means. Where applied in accordance with 250.32(B) Exception, the disconnecting means shall be suitable for use as service equipment.

~~Exception: For garages and outbuildings on residential property, a snap switch or a set of 3-way or 4-way snap switches...".~~

Panel Statement: The panel Accepts the main text as submitted.

The panel Rejects the Exception allowing three way and four way switches for use as a building disconnecting means.

The panel added "other approved means" to recognize that the items listed are not an all inclusive list of available types of disconnects.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 9 Negative: 1

Explanation of Negative:

YOUNG, J.: First there are a number of problems with the Panel Action and Statement on this Comment. The Panel Action should have been reported as Accept in Principle in Part. This is confirmed in the Panel Action and the Panel Statement which indicates that the main text is accepted as submitted but in fact the main text is modified from what was submitted.

The Panel Statement indicates the exception is rejected as though it was being proposed but the exception is in the present Code and the Comment was only to revise the exception. The CMP rejected the proposed change but went further and deleted the exception completely which was not what was proposed and no substantiation is provided.

Second and more important is that the CMP made significant changes in the requirements that are unsubstantiated and incorrect.

· 225.36 is the requirement that the building disconnect be suitable for use as service equipment. With the change in the title and the revised wording there is no longer a requirement for the building disconnecting means to be suitable for use as service equipment except in those cases where it is connected in accordance with 250.32(B) Exception.

· If not connected in accordance with 250.32(B) it is not required to be suitable for use as service equipment. A conditional reference to 250.32(B) Exception is not correct.

· Equipment is suitable for use as service equipment based on its design, construction, listing and application. It does not become suitable only by how it is applied as the new wording indicates.

· The existing exception to 225.36 is only for garages and outbuildings on residential property. With the deletion of the exception and the inclusion of snap switches as well as general use switches in the main text a snap switch or a general use switch can be used in any application as the disconnect for any building.

· Snap switches and general use switches do not have short circuit current ratings nor are these devices normally used with a fuse so they also do not provide overcurrent protection.

· Snap switches and general use switches are not used as the disconnect in service equipment and are actually component type devices for mounting in boxes. As such they are not even close to meeting the requirements of service equipment.

· A list of devices that are acceptable as the disconnect was added. This is only a list of the disconnect function and as such misses all the requirements associated with service equipment.

· While the list does include "other approved means" the list does not include some items such as a bolted pressure switch or an enclosed or dead front switch - UL 98 device - that is covered in Article 408. Possibly these would fall in "other approved means" but how is it determined what is approved? It would appear from the list that fuses would never be used as part of the building disconnect.

Last the Panel action on this Comment does not agree with the Panel action on Comment 4-20.

Comment on Affirmative:

DEATON, R.: **Affirmative Statement on Comment 4-18**

The 2008 NEC text of 225.36 reads as follows:

225.36 Suitable for Service Equipment.

The disconnecting means specified in 225.31 shall be suitable for use as service equipment.

Exception: For garages and outbuildings on residential property, a snap switch or a set of 3-way or 4-way snap switches shall be permitted as the disconnecting means.

The ROP shows that proposals 4-46 and 4-47, dealing with the main text, and 4-48 and 4-49, dealing with the exception, were all rejected. The general idea behind those proposals are as follows:

4-46 would have required the disconnect to be a circuit breaker, molded case switch, or general use switch, and would have required that the disconnect be suitable for use as service equipment if the installation were made in accordance to 250.32(B), which applies where there is a separate ground at the remote building or structure. Rejection was based on clarity issues and content not conforming to section 4.3.3.

4-47 would have inserted a fine print note with a reference to UL 869 A (Reference Standard for Service Equipment). Rejection was based on the fact that the equipment suitable for use as service equipment is marked as such.

4-48 and 4-49 would have removed 3-way and 4-way switches from the permitted disconnecting means. 4-48 had an additional requirement that the snap switch have a current rating at least that of the circuit conductors. Rejection was based on the fact that the panel wanted to retain the exception as is.

Three public comments on 225.36 were received (4-17, 4-18, 4-19). The panel action centered on 4-17 and resulted in 225.36 reading as follows (the exception is no longer present):

Type. The disconnecting means specified in 225.31 shall be comprised of a circuit breaker, molded case switch, general use switch, a snap switch, or other approved means. Where applied in accordance with 250.32(B), the disconnecting means shall be suitable for use as service equipment.

The net result in 225.36 is that the suitable for use as service equipment exception has been extended from garages and outbuildings on a residential premises to any installation where there is not a ground at the remote building or structure.

Also relevant to this issue is section 225.38. From the 2008 NEC:

225.38 Disconnect Construction.

Disconnecting means shall meet the requirements of 225.38(A) through (D).

Exception: For garages and outbuildings on residential property, snap switches or sets of 3-way or 4-way snap switches shall be permitted as the disconnecting means.

The ROP shows only one proposal, 4-51, to the above text. This proposal would have deleted the 3-way and 4-way switches from the exception. The panel rejected the proposal, desiring to retain the exception as is.

Only one public comment, 4-20, was received, which called upon the panel to accept proposal 4-51. The panel was favorably impressed by the added substantiation, reversed its stance in the ROP and accepted comment 4-20. The net result is that 225.38 will not read as follows (strikethrough text is being deleted):

225.38 Disconnect Construction.

Disconnecting means shall meet the requirements of 225.38(A) through (D).

Exception: For garages and outbuildings on residential property, snap switches ~~or sets of 3-way or 4-way snap switches~~ shall be permitted as the disconnecting means.

Two logical conflicts result from these actions:

1) Given a residential premises with garage or outbuilding not having a grounding electrode, 225.36 would allow a circuit breaker, molded case switch, general use switch, snap switch, or other approved disconnecting means, all of which need not be suitable for use as service equipment. However, 225.38 would allow only the choice of a snap switch among those items.

2) Given a non-residential premises where there is a garage or outbuilding with no grounding electrode, 225.36 would allow a circuit breaker, molded case switch, general use switch, snap switch, or other approved disconnecting means, all of which need not be suitable for use as service equipment. However, 225.38 would require that the disconnect be suitable for use as service equipment.

This comment is being offered to point out the logical conflict, realizing that resolution may not be practical until the next code cycle. This comment is being submitted under the direction of IEEE-SA Standards Coordinating Committee 18.

4-19 Log #1437 NEC-P04 **Final Action: Hold**
(225.36 Exception)

TCC Action: The panel action on this comment has resulted in technical revisions without the benefit of public review.
The Technical Correlating Committee directs that this comment, and the referenced Proposal, be reported as "Hold" in accordance with Section 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.
Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-48
Recommendation: Accept the proposal with the following revision:
For detached garages and outbuildings on dwelling premises, a snap switch shall be permitted as the structure disconnecting means. Where the structure disconnecting means is a 3-way or 4-way snap switch, an additional disconnecting means complying with 225.31 and 225.32 shall be provided as the garage or outbuilding.
Substantiation: A 3-way or 4-way snap switch does not comply with 225.31 and 225.32 and doesn't indicate or have a marked on and off position, therefore, for a circuit not actually supplying load, one may not know if the circuit is energized or not which could be hazardous to a homeowner who is not a qualified person. This provision is less strict for dwelling premises than for premises that have qualified persons.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 4-17.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-20 Log #1829 NEC-P04 **Final Action: Hold**
(225.38)

TCC Action: The panel action on this comment has resulted in technical revisions without the benefit of public review.
The Technical Correlating Committee directs that this comment, and the referenced Proposal, be reported as "Hold" in accordance with Section 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 4-51
Recommendation: Accept the Proposal.
Substantiation: The proposal should be accepted as it corrects a serious flaw in this section. The allowance of using a set of 3-way or 4-way switches as a building disconnecting means violates the very core purpose of a disconnecting means. The person who may be working on the system at the building or structure served should be able to operate the disconnecting means at the building or structure and, after testing for absence of voltage, work on the electrical system in confidence. The worker should not have to be concerned that another person could restore power from another location to the equipment being worked upon.
Try as I have, it is difficult to understand the Panel's Statement in rejecting the proposal. The Panel states, "The reference to 3-way and 4-way switches should be retained." The Panel does not state why? It is illogical to retain the permission to use 3-way and 4-way switches as the disconnecting means. This sentence is not responsive to the proposal or the substantiation.
The Panel should explore the training apprentice electricians receive on disconnecting equipment before working on previously energized conductors and equipment. It is safe to say none of the training would teach it is okay to rely on 3 or 4-way switches for disconnecting means.
The Panel statement, "These may be snap switches but the disconnecting functionality of these devices is quite different and could be interpreted as not being acceptable as a disconnect for a building." The disconnecting functionality is quite different from what? The Panel continues "…and could be interpreted as not being acceptable as a disconnect for a building." I agree with this statement. If the Panel makes that conclusion, why wasn't the Proposal accepted. Sorry, the Panel Statement makes little sense.
Finally, the Panel states, "In this proposal the submitter has made an effort to mark the additional wording and the deleted wording but there is wording in the proposal that is not identified as new or changed that is not in the code." I have carefully compared the submitted text with that in the 2008 NEC and can't find a discrepancy. I do apologize, however, if I inadvertently missed some words.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-21 Log #1709 NEC-P04 **Final Action: Reject**
(225.39(A), (B), and (D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-52
Recommendation: Accept the proposed revised as follows:
(A) One Circuit Installation. For installations consisting of a single branch circuit the branch circuit, feeder, and service disconnecting means shall have a rating not less than 15-amperes.
(B) Two Circuit Installation. For installations consisting of two 2-wire branch circuits, a 2-wire feeder and service disconnecting means shall have a rating not less than 30-amperes. For installations consisting of two multiwire branch circuits or two 3-phase branch circuits, the feeder and service disconnecting means shall have a rating not less than 30-amperes. (D) No change.
Substantiation: In (A), the disconnecting means at the building served may be a circuit breaker or fused switch which makes the single circuit supply conductors a feeder.
In (B), the 30 ampere minimum rating should only apply if the feeder is two-wire, since a 3-wire 15-ampere feeder can supply two 2-wire branch circuits. Provisions should be specified where the installation consists of two multiwire circuits or two 3- phase circuits.
Panel Meeting Action: Reject
Panel Statement: The submitter has not presented any sound technical rationale for the recommended change. Service disconnects are not covered in Article 225.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-22 Log #335 NEC-P04 **Final Action: Accept**
(225.60(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-54
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-23 Log #336 NEC-P04 **Final Action: Accept**
(225.61(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-55
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

ARTICLE 230 — SERVICES

4-24 Log #2545 NEC-P04 **Final Action: Accept in Principle**
(230.6)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-64
Recommendation: Accept the proposal in principle and in part. Continue to reject item (5). Accept item (6) [which will become (5)] reworded as follows:
(5) Where installed within rigid metal conduit (Type RMC) or intermediate metal conduit (Type IMC) used to accommodate the clearance requirements in 230.24 and routed directly through an eave but not a wall of a building.
Substantiation: At the most recent IAEI Section Meeting, considerable discussion took place around whether service conductors travelling within an outer building wall had actually entered the building. The consensus was that as soon as the outer membrane had been penetrated, the conductors had entered the building. This submitter fully endorses this conclusion, but it makes service masts of the sort described in the proposal substantiation problematic. Do they penetrate the outer building membrane? Of course they do. Does anyone in their right mind want to disallow such masts? Probably not, but the panel statement that the application is "clearly outside the building" is incorrect in this instance.
This proposal addresses the question, but limits the application to heavy wall steel raceways. Remember that masts are not necessarily steel pipe; a heavy timber with cable on it is a mast within the provisions of 230.28. This section clearly indicates this by addressing raceway masts as simply one possibility in the second sentence. Heavy wall conduit masts have been used for this purpose for generations without objections. The proposal further qualifies the acceptable use to a direct pass-through. The submitter was once presented, as an inspector, with a conduit run that went up the outside of a building, then horizontally through an eave cavity some ten feet, and then up to its eventual weatherhead.
Panel Meeting Action: Accept in Principle
Revise the proposed text to read as follows:
(5) Where installed in overhead service masts on the outside surface of the building traveling through the eave of that building to meet the requirements of 230.24.
Panel Statement: The addition of item six in Proposal 4-46, renumbered as item 5, will clarify what the is allowed.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:
ROGERS, J.: This change is not really necessary and the Panel should retain the rejection and rationale used in the ROP stage. In addition the change made by the Panel at the ROC meeting creates a greater enforcement problem.
Comment on Affirmative:
STAFFORD, T.: It appears that the panel statement is incorrect and incomplete as noted on the ballot document.

4-25 Log #1884 NEC-P04 **Final Action: Reject**
(230.6(5) (New))

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facilities Professionals
Comment on Proposal No: 4-65
Recommendation: Accept the proposal *In Principle in Part* with the following addition to the original 2008 text of Section 230.6(2):
(5) Where conductors are installed in rigid metal conduit that is supported within an enclosure having a three hour (minimum) fire smoke rating and a device providing short circuit protection is present at the supply end of the service conductors.
Substantiation: The addition of this exception, admittedly difficult because it is extends the already difficult concept of a service conductor being "outside the building", has the practical effect of reducing construction costs for service entrance raceway without increasing risk. Where some installations are supplied by a serving utility that offers the Owner additional service cable short circuit protection, those installations should be permitted relaxation of the concrete encasement requirement. The combination of the less expensive architectural construction and the utility-supplied short circuit protection, should accomplish safety objectives.
Panel Meeting Action: Reject
Panel Statement: Service-entrance conductors are subject to high arc flash energies that may burn through metallic conduit and blow through architectural treatments that provide 3 hour fire rating (typically 2 layers of dry wall). The masonry requirement has effectively protected buildings from service-entrance conductor failures and the resulting generation of heat and gas. The masonry requirement should remain.
The concrete or brick is to provide physical protection. Designs should consider service-entrance disconnects and overcurrent devices to be located as close as practical to the entry of the service conductors into the building. Feeders extending up into the building will have disconnecting means and overcurrent protection under the control of the premises owner.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-26 Log #1708 NEC-P04 **Final Action: Reject**
(230.7)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-66
Recommendation: Accept revised as follows: Circuit conductors other than service conductors shall not be installed in the same raceway, cable, conduit body, or auxiliary gutter.
FPN: See 300.3(2) for service conductors operating at over 600 volts.
Substantiation: Auxiliary gutters are not specifically included in 230.43 which begs the question; can they enclose service conductors? Reference to 300.3(2) should be noted to avoid possible conflict.
Panel Meeting Action: Reject
Panel Statement: Auxiliary gutters are recognized as an acceptable wiring method in 230.43. Redefining acceptable wiring methods in this section is redundant.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-27 Log #2546 NEC-P04 **Final Action: Accept**
(230.7)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-66
Recommendation: Continue to reject the proposal.
Substantiation: Auxiliary gutters are not raceways. CMP 4 should refer to the CMP8 panel statement on this topic on Proposal 8-10. CMP 4 may be interested in some historical information on this topic. The clear implication presented by the choice of wiring methods listed in the current raceway definition in Article 100 is that raceways are for extended lengths of run, and that more limited enclosed channels such as those within equipment are not to be so classified. This interpretation has been thoroughly tested. If any such enclosed channel were classified as a raceway, then surely an auxiliary gutter would be so classified. In the 1993 NEC cycle CMP 8 initially accepted a proposal to place "auxiliary gutters" into the list, and then unanimously reversed course in the face of negative comments from this comment submitter, NEMA, and others. The issues of auxiliary gutters and panelboard gutter spaces is particularly pressing because 230.7 forbids the sharing of raceways between service conductors and other conductors. If such enclosures are deemed to be raceways, then much service wiring as we know it could be construed as contrary to the NEC.
The issue of medium voltage and 600 volt or lower conductors in the same service raceway is virtually never attempted and need not be covered here. If necessary, 300.3(C)(2) adequately covers the question.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-28 Log #72 NEC-P04 **Final Action: Accept**
(230.24)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-76
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal since the text does not comply with the NEC Style Manual requiring mandatory text and including the subject of the rules being referenced.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel revises the text of Proposal 4-76 to read as follows:
(E) Clearance from Communication Wires and Cables. Clearance from communication wires and cables shall be in accordance with 800.44(A)(4).
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:
ROGERS, J.: This comment and the referenced proposal should both have been rejected. The clearance requirement is already defined in Article 800 and if every requirement like this is cross-referenced the NEC will be larger than a major city telephone directory. The most common problem relative to this that is found in the field is that of telecommunications cables being attached to service masts which is already not allowed in section 230.28.

4-29 Log #2316 NEC-P04 **Final Action: Accept in Principle**
(230.24(E))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 4-76
Recommendation: Change this proposal form (E) to a new informational note.
Substantiation: Rules that tell the Code user to "see" something are hardly enforceable. While this proposal has merit, it would be better as an informational note.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 4-28.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:
ROGERS, J.: This comment should have been rejected for the same reasons outlined in my comment on comment 4-28. This submitter was correct, however, in recommending that if this language were to appear in the NEC at least limit it to an informational note and not a mandatory code requirement.

4-30 Log #2547 NEC-P04 **Final Action: Hold**
(230.30)

TCC Action: The Technical Correlating Committee directs that the panel action on Comment 4-30 and Proposal 4-93 be reported as "Hold " consistent with Section 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.
The text added by the panel, "listed direct burial cable", permits any listed direct burial cable to be installed for use as underground service cables and is inconsistent with the requirements of Chapter 3 (e.g., UF cable as covered in 340.12(1)).
The Technical Correlating Committee action to "Hold" will permit the panel to resolve correlation issues during the 2014 NEC revision cycle.
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-93
Recommendation: Accept the proposal as modified by CMP 4 in principle. Make the following two changes:
1. Change item (7) to read (7) Listed Type USE underground service entrance cable.
2. Add a new item (8) to read (8) Type IGS cable.
Substantiation: These changes are necessary for correlation within Chapter Three. As worded in the Final Action on Proposal 4-93, Type UF cable could be used for this purpose, even though it does not appear for comparable service entrance uses in 230.43 and it is prohibited for such use in 340.12(1). This wording limits the underground cable selection accordingly. The second item correlates with 326.10(1) and 230.43(2); there clearly is no good reason to disallow this wiring method, uncommon though it may be, from one of its customary uses.
Panel Meeting Action: Accept in Principle
The panel Accepts in Principle the text of Proposal 4-93 as modified by Code-Making Panel 4 to read as follows:
1. (8) Listed direct burial cable.
Panel Statement: The addition of item (8) with the panel's revised wording is more appropriate.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
ROGERS, J.: This comment is fine as amended except the word "cable" should be changed to "cable(s)."
ZGONENA, T.: This panel action did not address the submitters concern regarding potential misuse of UF cable and conductors in service entrance applications. Neither ballot options will correct the problem with this revision.
The TCC can correct this issue without changing the intent of the panel or submitter by adding the following text to the new (7) and (8):
(7) Listed direct burial cable permitted to be used as service conductors in Chapter 3.
(8) Listed direct burial conductor permitted to be used as service conductors in Chapter 3.

4-31 Log #2446 NEC-P04 **Final Action: Hold**
(230.30(B))

TCC Action: The Technical Correlating Committee directs that the panel action on Comment 4-30 and Proposal 4-93 be reported as "Hold " consistent with Section 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.
The text added by the panel, "listed direct burial cable", permits any listed direct burial cable to be installed for use as underground service cables and is inconsistent with the requirements of Chapter 3 (e.g., UF cable as covered in 340.12(1)).
The Technical Correlating Committee action to "Hold" will permit the panel to resolve correlation issues during the 2014 NEC revision cycle.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 4-93
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(B) Wiring Methods. Underground service conductors shall be installed in accordance with the applicable requirements of this code covering the type of wiring method used and shall be limited to the following methods:
(1) Type RMC conduit
(2) Type IMC conduit
(3) Type NUCC conduit
(4) Type HDPE conduit
(5) Type PVC conduit
(6) Type RTRC conduit
(7) Listed direct-burial conductors.
(8) Type MC cable that is identified for direct burial.
Substantiation: Type MC cable is available with an impervious jacket that is listed, labeled and marked as being suitable for direct burial. This cable that is so identified is suitable for use for underground service conductors and must be added to the list of acceptable wiring methods included in new 230.30(B).
Section 230.43 recognizes Type MC cable for use as a wiring method for services. This same "Use Permitted" is stated in 330.10(A)(1).
Though stated in the negative tense rather than the positive, 330.12(2)(a) states that Type MC cables are is not permitted for direct burial or concrete encasement unless identified for direct burial. So, if Type MC cable *is* identified for direct burial, it should be included in the list of acceptable wiring methods in 230.30.
The UL White book in the product category for Type MC Cable, "METAL-CLAD CABLE (PJAZ)" states, "Cable suitable for use in cable trays, direct sunlight or direct burial application is so marked. Cable marked for direct burial is also considered acceptable for encasement in concrete."
Please include Type MC cable that is identified for direct burial in the list of acceptable wiring methods in new Section 230.30(B).
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 4-30.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
ZGONENA, T.: See comment on 4-30.

4-32 Log #2548 NEC-P04 **Final Action: Accept**
(230.40 Exception No. 1)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-101
Recommendation: Accept the proposal in principle, reworded to reflect the terminology changes around service drops and laterals, and to reflect the scope of 230.2(E), as follows (legislative text used in reference to the original proposal submittal):
Add the following wording to the end of the existing exception: "If the number of service disconnect locations for any given classification of service does not exceed six, the requirements of 230.2(E) shall apply at each location. If the number of service disconnect locations exceeds six for any given supply classification, all service disconnect locations for all supply characteristics, together with any branch circuit or feeder supply sources if applicable, shall be clearly described using suitable graphics or text or both on one or more plaque(s) located in an approved, readily accessible location(s) on the building or structure served and as near as practicable to the point(s) of attachment or entry(ies) for each service drop or service lateral, and for each set of overhead or underground service conductors ~~service drop or lateral~~.

Substantiation: The submitter appreciates the concerns expressed in the panel statement and offers this comment to address the issues raised. It is true that there may be a feeder or branch circuit sources and they need to be addressed, and this comment includes them in the required information. However, it seems excessive to require placarding at every branch-circuit or feeder entry when the usual emergency application will involve an attempt by emergency service personnel to first disconnect service sources; in such cases the plaques required by this proposal and comment will clearly indicate the additional source locations and allow for additional disconnection as necessary.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-33 Log #2245 NEC-P04 **Final Action: Accept**
(230.40 Exception No. 3)

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 4-102
Recommendation: Continue to accept the submitter's proposal with the following revision: A single-family dwelling unit and ~~a separate structure(s)~~ its accessory structures shall be permitted to have one set of service-entrance conductors run to each from a single service drop or lateral.
Substantiation: This is a companion comment to companion Proposal 1-104. Previously, for a single-family dwelling premises, it has been interpreted that only one additional accessory structure could be supplied with a separate set of service-entrance conductors supplied from the same service drop or service lateral. It's very common for there to be two or more accessory structures on a single-family dwelling premises, especially in suburban, exurban or rural areas. This welcomed change will add clarity to the NEC and conformity with installation practices that have already been widely accepted by numerous electrical authorities having jurisdiction.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:
ROGERS, J.: I recognize the necessity to potentially serve more than one separate structure on the same property and that why the proposal as referenced was accepted. The submitter has not presented any rationale for changing the language from separate structure(s) to accessory structure(s).

4-34 Log #2246 NEC-P04 **Final Action: Reject**
(230.40 Exception No. 3)

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 4-104
Recommendation: This proposal should have been accepted. In lieu of accepting Proposal 4-104, revise the 2008 NEC as follows: A single-family dwelling unit and a separate structure shall be permitted to have one set of service-entrance conductors run to each from a single service drop or lateral. The sets of service-entrance conductors shall originate at a common location on one of the buildings.
Substantiation: This is a companion comment to companion Proposal 1-102. Previously, for a single-family dwelling premises, it has been interpreted that only one additional accessory structure could be supplied with a separate set of service-entrance conductors supplied from the same service drop or service lateral, regardless if the sets of service-entrance conductors originate from a common location on one of the buildings, or on a yard pole a few feet away from the buildings served. It's very common for there to be two or more accessory structures on a single-family dwelling premises, especially in suburban, exurban and rural areas.

When 230.40 Exception No. 3 first appeared in the 1996 NEC, the book published by the International Association of Electrical Inspectors and titled "IAEI Analysis of 1996 National Electrical Code" had the following commentary in pertinent part: "…This new exception will allow one set of service-entrance conductors to be run from a 'common location' (emphasis added) on one building, such as a wireway or meter-socket enclosure(s) to the other structure. As indicated, the service drop or lateral is permitted to be run to either building…These service conductors must remain outside the structure… The service disconnecting means for each set of service-entrance conductors must be located to comply with Section 230-70(a)…It is not intended that the disconnecting means for both buildings be located at a common location on one of the building. The substantiation for the change covers the case where an existing service in a dwelling is not adequate for an additional load to be added for a remote building like a garage or workshop…".

NEC 240.40 Exception No. 3 and its limitation of extending service-entrance conductors to one additional building from a single service drop or lateral is reasonable and understandable from a safety perspective if the sets of service-entrance conductors originate from a common location on one of the buildings, such as what is described in the book entitled "IAEI Analysis of 1996 National Electrical Code".

However, if it is not the intent in 230.40 Exception No. 3 that the sets of service-entrance conductors originate at a common location on one of the buildings, then 230.40 Exception No. 3 is not necessary. Depending on the location of the service point on the property, or the location of common premises service equipment on a center yard pole, pedestal, or equipment pad, or the specific configuration of the installation, existing rules in Article 230 and Article 225 would be used for supplying electricity to more than one building on a multi-building premises, be it residential or otherwise.
Panel Meeting Action: Reject
Panel Statement: The submitter has not presented proper technical substantiation for this language, and, in addition, is adding new language that has not had public review.

The fact that the Exception allows multiple sets of service entrance conductors supplied by one service drop or lateral by default requires this connection to originate in one location.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-35 Log #2549 NEC-P04 **Final Action: Accept**
(230.40 Exception No. 4)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-105
Recommendation: Accept the proposal in principle. Change "multiple occupancy structures" to "multiple occupancy buildings."
Substantiation: The definition of "building" in Article 100 as slated to be revised in this code cycle fairly clearly indicates that any structure likely to be the subject of 210.25 is a building. This term is more properly descriptive and therefore more user friendly. The proposal submitter and CMP 4 are both correct that this exception needs to reflect the changes in 210.25 that now make it applicable to commercial occupancies.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-36 Log #73 NEC-P04 **Final Action: Accept**
(230.44)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-112
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 4-113.

See the Technical Correlating Committee action on Proposal 4-113.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The ROP draft correctly locates the text as intended by the panel, and is shown below:

"230.44 Cable Trays. Cable tray systems shall be permitted to support service-entrance conductors. Cable trays used to support service-entrance conductors shall contain only service-entrance conductors and shall be limited to the following methods:

(1) Service-entrance cables
(2) Type MC cable
(3) Mineral-insulated, metal-sheathed cable
(4) Type IGS cable
(5) Single Thermoplastic-Insulated Conductors 1/0 and larger with CT rating [ROP 4-113]

Such cable trays shall be identified with permanently affixed labels with the wording "Service-Entrance Conductors."

The labels shall be located so as to be visible after installation and placed so that the service-entrance conductors may be readily traced through the entire length of the cable tray. [ROP 4-112]

Exception: Conductors, other than service-entrance conductors, shall be permitted to be installed in a cable tray with service-entrance conductors, provided a solid fixed barrier of a material compatible with the cable tray is installed to separate the service-entrance conductors from other conductors installed in the cable tray." [ROP 4-112]
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
ROGERS, J.: There was no technical rationale for limiting the conductors utilized to those of the thermoplastic type. If a manufacturer produces conductors that meet the listing requirements required for CT rating those conductors should also be allowed.

4-37 Log #74 NEC-P04 **Final Action: Accept**
(230.44)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-113
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal with respect to both the placement of the added text and the accepted text of the second sentence.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action on Comment 4-36.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-38 Log #655 NEC-P04 **Final Action: Reject**
(230.44)

Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 4-113
Recommendation: Reject this proposal and revise text to read as follows:
Cable tray systems shall be permitted to support service-entrance conductors per 392.3. Cable trays used to support service-entrance conductors shall contain only service-entrance conductors.
Substantiation: There is no substantiation for limiting SE conductors to these four methods. The cable tray is a support system and 392.3(A) and (B) permit all wiring methods plus single conductors under specific conditions. Therefore, the SE conductors could be safely installed in conduit which is supported by the cable tray as well as other methods. The present language is sufficient as the SE conductors can be used safely per 392.3(A) and (B). If this committee feels a reference to 392.3 is necessary, then add it, but do not limit to the four methods in the proposal.
Panel Meeting Action: Reject
Panel Statement: The submitter has not presented any technical data to support expanding service conductors beyond the wiring methods defined in this section. The panel acknowledges that cable trays, as defined in Article 392, can be utilized for the installation of raceways; however, the panel remains firm that this application would be for conductors other than service conductors.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-39 Log #2550 NEC-P04 **Final Action: Accept in Part**
(230.44)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-113
Recommendation: Accept the proposal in principle. Clarify that the added text is “and shall be limited to the following methods:” together with the list of wiring methods (no second sentence being added), to address the issue raised by the TCC. Correct the syntax of the list by using parallel wording as follows:
(1) Type SE cable
(2) Type MC cable
(3) Type MI cable
(4) Type IGS cable
(5) Single conductors if permitted by 392.10(B)
Substantiation: This list only slightly differs from the parallel language requirement of 3.3.5 in the NEC Style Manual and fully complies with the remainder of that section. The reference in Article 392 reflects the CMP 8 reorganization of Proposal 8-235a; the current reference would be to 392.3(B). This reference fully addresses the sizing limitations as well as the surface marking requirements. In addition, it captures the critical industrial occupancy limitation and also the rung spacing limitations for smaller cables, neither of which were addressed in the original proposal.
Panel Meeting Action: Accept in Part
The panel Accepts all of the recommended text changes, and Rejects item (5) that shall remain as written in Proposal 4-113.
Panel Statement: The panel reaffirms the text used in item 5 of Proposal 4-113 as it provides the specific definition of the conductors allowed.
392.10(B) is too narrow in that it limits the use to industrial establishments.
In addition, see the panel action on Comment 4-36.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-40 Log #75 NEC-P04 **Final Action: Accept**
(230.53)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-120
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal and identify the specific lack of conformance with 4.3.3(b) of the NFPA Regulations Governing Committee Projects.
This appears to be an NEC Style Manual issue concerning “possibly unenforceable and vague” terms.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel revises the panel statement on Proposal 4-120 to read as follows:
“The proposal does not meet the requirements of 4.3.3(c) of the NFPA Regulations Governing Committee Projects.”
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
ROGERS, J.: The submitter has presented language that is vague and unenforceable as addressed in section 3.2.1 of the NEC Style Manual. The use of the words “if practicable” are definitely vague and unenforceable. In addition the submitter is attempting to extend a service raceway requirement to enclosures and other equipment with no documented technical rationale.

4-41 Log #1712 NEC-P04 **Final Action: Reject**
(230.53)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-120
Recommendation: Delete, or accept the proposal revised as follows: Where exposed to the weather, raceways meter assemblies, fittings, and enclosures shall be approved for use in wet locations. If practical, raceways shall be arranged to drain.
Substantiation: 110.3 (A)(1), 110.8, 110.26 (F)(2) and other provisions re; wet locations apply. Auxillary gutters are not listed as a raceway in Article 100 but are included in 230.43. Since most electrical equipment in wet locations is listed, the protocols for listing will cover provisions for draining, if necessary. Many service mast installations, in California, for example rise from the service equipment either exposed or within a wall; should the raceway drain into the service equipment?
Panel Meeting Action: Reject
Panel Statement: This section is intended to apply to raceways as stated.
The submitter is attempting to extend the requirement to enclosures as well. The panel reaffirms that all raceways exposed to the environment must be arranged to drain.
In addition, the submitter has suggested multiple options which does not conform to NFPA Regulations Governing Committee Projects regarding the form for comment submission.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-42 Log #1711 NEC-P04 **Final Action: Accept**
(230.66)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-126
Recommendation: Accept the proposal.
Substantiation: Any unlisted equipment can be marked as suitable for service equipment. This is not an assurance that it is suitable. Snap switches are required to be listed; why not service equipment?
Panel Meeting Action: Accept
Panel Statement: The panel reaffirms its action and statement on Proposal 4-126.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-43 Log #2525 NEC-P04 **Final Action: Accept**
(230.66)

Submitter: Timothy P. Zgonena, Underwriters Laboratories Inc.
Comment on Proposal No: 4-126
Recommendation: Propose to accept the original proposal.
Substantiation: Comment on panel action for Proposal 4-126:

The panel action to Reject this proposal was not appropriate, and the panel statement does not justify a rejection of the proposal. Adding the words "listed and" does not make the marking any more specific than the existing requirement, and does not change the meaning of the remaining portion of the sentence. Adding the words "listed and" would only require that the service equipment must be listed, it does not affect the marking of the equipment. It does not specify that the equipment marking specifically state "suitable only for use as service equipment", nor does it require the equipment marking to specifically state "suitable for use as service equipment". Equipment with EITHER of these markings is indeed marked to identify it as being suitable for use as service equipment. Requiring the service equipment to be listed and marked to identify it as being suitable for service equipment will help to ensure that the equipment is actually designed for use as service equipment, and has been determined by an independent agency to comply with the appropriate requirements for service equipment.

If the panel still considers the proposed wording to be confusing, it is suggested that the wording be revised as follows:

230.66 Marking. Service equipment rated at 600 V or less shall be marked to identify it as being suitable for use as service equipment. All service equipment shall be Listed. Individual meter socket enclosures shall not be considered service equipment.

This would clearly not change the existing marking requirement, but would require all service equipment to be Listed.

Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-44 Log #1710 NEC-P04 **Final Action: Reject**
(230.70(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-135
Recommendation: Delete this section.
Substantiation: "Prevailing" is defined as "having superior force or influence"; "generally current"; which does not appear to be as appropriate as "wet", "hazardous locations"; and other conditions covered elsewhere in the NEC. Articles 500 through 517 already apply. See 4.1 of the NEC Style Manual.
Panel Meeting Action: Reject
Panel Statement: The submitter is requesting the deletion of a section, and this request has not had any public review.

The panel reaffirms that this section is necessary and the submitter has not presented any technical substantiation to support its removal.

Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-45 Log #337 NEC-P04 **Final Action: Accept**
(230.71(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-136
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.

Panel Meeting Action: Accept
Panel Statement: See the panel action on Comment 4-16.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-46 Log #2147 NEC-P04 **Final Action: Reject**
(230.71(A))

Submitter: Randolph J. Ivans, Underwriters Laboratories Inc.
Comment on Proposal No: 4-148
Recommendation: Accept this proposal in principle by revising the proposal.
Add new text to read as follows:
230.71(A) (Second Paragraph): For the purpose of this section, disconnecting means installed as part of listed equipment and used solely for the following shall not be considered a service disconnecting means:
(1) Power monitoring equipment
(2) Surge-protective device(s)
(3) Control circuit of the ground-fault protective system
(4) Power-operable service disconnecting means
(5) Communications equipment under the exclusive control of a utility
Substantiation: This comment is being made in conjunction with my comment on proposal number 4-148 to add new text to paragraph 230.82. If the proposal to add the new text to 230.82 is accepted, then a new item needs to be added to paragraph 230.71(A) to exclude disconnecting means installed as part of this listed equipment.
Panel Meeting Action: Reject
Panel Statement: The panel is unclear as to what the submitter is attempting to achieve since the proposed text relates to a different section of the code.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:

ROGERS, J.: I voted with the Panel on this comment and the referenced proposal due to the fact that these technologies are currently being developed and the NEC cannot be utilized as a constraint on new technologies. However, I remain deeply concerned relative to the listing, installation and maintenance of these devices as no definitive technical information was placed before the Panel for their review. These devices clearly represent one of those questionable areas of what rules apply, NESC or NEC and who inspects the installation. The Panel made an appropriate move to limit the allowance to being under the control of the serving electric utility but that still leaves many questions especially when considering how these requirements will be very different in different areas of the country.

4-47 Log #2101 NEC-P04 **Final Action: Reject**
(230.71(A)(4))

Submitter: Larry LeVoir, City of Irvine
Comment on Proposal No: 4-137
Recommendation: Accept the proposal.
Substantiation: I understand that CMP 4 has had to tackle this problem. It appeared at one point a consesus had been reached, but the proposal was dropped for the 2002 NEC. It seems as though CMP 13 was able to reach a consensus on this issue as it applies to feeders from generators. Please reference 700.12(B)(6), 701.11(B)(5), and 702.11. With these code sections one could install a service disconnect outside of the building 40 feet away and visible from the building and a generator 40 feet from the same building. The feeder conductors from the service disconnect outside the building would require a disconnecting means in accordance with section 225.32 where the conductors enter the building but feeder conductors from the generator would not as long as they are installed per sections 700.12(B)(6), 701.11(B)(5), and 702.11 whichever is applicable. There is no difference I am aware of in these feeder conductors (aside from the source), but yet we have different rules for the same types of conductors. While an argument could made regarding the Emergency or Legally Required Systems as being "special", one could not make that argument for the Optional Standby Conductors. At the very least this should be forwarded to the TCC as a conflict in the code.
Panel Meeting Action: Reject
Panel Statement: The submitter has not presented any additional technical rationale for compromising the basic safety requirement for a disconnect at each building where service conductors enter the building.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-48 Log #2527 NEC-P04 **Final Action: Accept in Principle**
(230.72(A) Exception (New))

Submitter: Timothy P. Zgonena, Underwriters Laboratories Inc.
Comment on Proposal No: 4-140
Recommendation: Propose to accept the original proposal from the submitter.
Substantiation: The panel action to reject this proposal was not appropriate. The proposal should be accepted. Although 230.2(E) does provide identification requirements when there is more than one service, it does NOT require the identification of the location of each service disconnecting means when only one service is provided. 230.2(E) only requires identification of other services, branch circuits, or feeders that supply the building or structure. If there is only one service, but multiple service disconnects for that service, it is not required to identify the location of each service disconnect. Presumably, this is because the disconnects are all grouped together in accordance with 230.72. However, the exception to 230.72 allows the water pump disconnecting means to be located remotely. Since this could be one of the six disconnects allowed, and is therefore associated with just one service, 230.2(E) is not applicable, and therefore the submitter's concerns are NOT addressed in 230.2(E).
Panel Meeting Action: Accept in Principle
Panel Statement: The panel supports the concept, however, recognizes that an additional provision is needed.
See the panel action on Comment 4-49.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-49 Log #2551 NEC-P04 **Final Action: Accept**
(230.72(A) Exception (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-140
Recommendation: Accept the proposal in principle. Do not create an additional exception. Add the following text to the existing exception: "If remotely installed in accordance with this exception, a plaque shall be posted at the location of the remaining grouped disconnects denoting its location."
Substantiation: It is simpler to retain a single exception with the new rule folded in. The requirement only applies when the exception is operational, so it is less confusing to group the text together. The comments in the voting, establishing the need for this provision, are entirely correct.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-50 Log #601 NEC-P04 **Final Action: Accept in Principle**
(230.77)

Submitter: Richard R. Verrier, City of Biddeford
Comment on Proposal No: 4-145
Recommendation: Revise text to read as follows:
The service disconnecting means shall plainly indicate whether it is in the ~~open~~ off or ~~closed~~ on position.
Substantiation: The confusion describing the position indicator is contrary to other professions, i.e., you open a faucet to allow water flow and close it to shut it off. (open door close door)!!!
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
The service disconnecting means shall plainly indicate whether it is in the open (off) or closed (on) position.
Panel Statement: The panel accepts the submitter's concept and adds the word "(off)" after the word "open" and the word "(on)" after the word "closed" for clarification.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-51 Log #2148 NEC-P04 **Final Action: Accept in Principle**
(230.82)

Submitter: Randolph J. Ivans, Underwriters Laboratories Inc.
Comment on Proposal No: 4-148
Recommendation: Accept this proposal in principle by revising the original proposal.
Add new text to read as follows:
(9) Connections used only to supply listed communications equipment under the exclusive control of a utility, if suitable overcurrent protection and disconnecting means are provided. A disconnecting means is not required if the supply is installed as part of a meter socket or meter socket extender such that access can only be gained with the meter removed and power is disconnected upon removal of the meter.
Substantiation: The intent of the original proposal is valid and necessary to accommodate new equipment and installations associated with Smart Grid applications and life-line (i.e. emergency calling) communications equipment powered at the premises. The proposed rewording more clearly defines the equipment and intended installation and use. Companion comments to add new text to paragraphs 230.71(A) addressing disconnecting means and 230.94 addressing overcurrent protection completes the proposal.
● The substantiation provided with the original proposal is valid but did not go into enough detail on the installation and performance requirements for modern systems, or on the safety of the equipment, for the panel to make an informed decision.
The following are among the requirements needed for the safe operation and installation of the new generation of metering and communications equipment.
● Providing reliable power and continued operation of the communications equipment should an event such as a fire cause the main service breaker to open. With modern broadband systems serving as an information pipeline handling large amounts of data as well as traditional voice services, this equipment is increasingly responsible for things like alarm services, medical and emergency monitoring systems in addition to the traditional life-line "911" call.
● Accommodating wireless communications or wire line communications from the power service monitoring equipment to the responsible utility without the risk of interference from premises based equipment or building construction.
● Ability of the utility to monitor power and control usage via the communications equipment including a complete power disconnect at the premises. Power can be controlled during emergencies, peak load demand times, service discontinuation, and the like.
● The ability to turn power back on at a premises where power has been disconnected via a communications link powered prior to the main disconnect. This can also be used to turn on power for a new customer without having to roll a truck.
● Access for installation and repair is required by the utility or utilities without having to enter the premises
● Installation of the utility provided equipment without imposing on the premises wiring system
● Powering of utility installed communications and monitoring equipment so that it is not charged to the customer
The new proposal includes a listing requirement to ensure critical safety items are addressed. These include but are not limited to current and withstand ratings, ability to safely clear faults in the connected equipment, accessibility, servicing issues, disconnects, grounding, isolation of connected circuits, resistance to environmental conditions and the like.
In the proposed rewording I use "connections" instead of "taps" based on the panel action on Proposal 4-152.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
(9) Connections used only to supply listed communications equipment under the exclusive control of the serving electric utility, if suitable overcurrent protection and disconnecting means are provided. For installations of equipment by the serving electric utility, a disconnecting means is not required if the supply is installed as part of a meter socket such that access can only be gained with the meter removed.
Panel Statement: The revised wording more clearly reflects the intent of the panel, and provides further clarity and enhances usability and enforceability.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
ROGERS, J.: I voted with the Panel on this comment and the referenced proposal due to the fact that these technologies are currently being developed and the NEC cannot be utilized as a constraint on new technologies. However, I remain deeply concerned relative to the listing, installation and maintenance of these devices as no definitive technical information was placed before the Panel for their review. These devices clearly represent one of those questionable areas of what rules apply, NESC or NEC and who inspects the installation. The Panel made an appropriate move to limit the allowance to being under the control of the serving electric utility but that still leaves many questions especially when considering how these requirements will be very different in different areas of the country.

4-52 Log #2552 NEC-P04 **Final Action: Reject**
(230.82)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-149
Recommendation: Accept the proposal in principle. Do not rewrite 230.82. Revise 230.82(3) in the 2008 NEC as follows:

(3) Meter disconnect switches nominally rated not in excess of 600 volts that have a short-circuit current rating equal to or greater than the available short-circuit current, provided all metal housings and service enclosures are grounded in accordance with Part VII and bonded in accordance with Part V of Article 250. A meter disconnect switch shall be capable of interrupting the load served. A meter disconnect shall be legibly field marked on its exterior in a manner suitable for the environment substantially as follows:

METER DISCONNECT
NOT SERVICE EQUIPMENT

Substantiation: This comment is intended as a limited compromise that will achieve the principal goal of the many attempts to address this topic over the past few code cycles, namely, to avoid field confusion over the location of the service disconnect. Since these switches are fully rated for the application, they can easily cause confusion, particularly in cases where the serving utility has not locked them in the closed position (the usual orientation) with their own locking equipment. The orderly application of many NEC rules depend on agreement over the exact location of the service equipment, and any lack of clarity in this area is a serious concern.

Note that this section has moved beyond a simple list of items, although it is still formatted and numbered as a list. The content of the various enumerated items are not remotely parallel in format, with some items still list items and with many others containing various rules. It is apparent that the entire section flagrantly violates the NEC Style Manual requirements for lists, as covered at 3.3.5. This submitter intends the submission of a purely editorial proposal for the 2014 NEC cycle that will reformat this section as a combination of list items and rules, without making any substantive technical changes to the content.

Panel Meeting Action: Reject
Panel Statement: The panel does not agree that the additional marking that is being recommended is necessary.

The service disconnect is required to be marked as such in 230.70(B).

The meter disconnect is installed for use by utility companies when servicing the metering equipment and is readily definable as a disconnect ahead of the disconnect that is marked “Service Disconnect”.

Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-53 Log #2528 NEC-P04 **Final Action: Accept**
(230.82(5))

Submitter: Timothy P. Zgonena, Underwriters Laboratories Inc.
Comment on Proposal No: 4-152
Recommendation: Propose to accept the original proposal.
Substantiation: Comment on panel action for Proposal 4-152:

The panel action to accept this proposal was not appropriate. The proposal should be rejected. The word “Taps” is the correct word, in that it requires applying the requirements for tap conductors in this situation. Changing “taps” to connections would allow the connection of conductors which **may** ~~do~~ not meet the requirements of taps.

Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:

ROGERS, J.: The word “Taps” is the correct word, in that it requires applying the requirements for tap conductors in this situation. Changing “taps” to connections would allow the connection of conductors which do not meet the requirements of taps. The Action should be to reject the original proposal.

4-54 Log #2529 NEC-P04 **Final Action: Reject**
(230.90(A) Exception No. 2)

Submitter: Timothy P. Zgonena, Underwriters Laboratories Inc.
Comment on Proposal No: 4-158
Recommendation: Propose to accept the original proposal.
Substantiation: Comment on panel action for Proposal 4-158:

The panel action to reject this proposal was not appropriate. The proposal should be accepted. As the submitter noted, 240.21(B) specifically prohibits the application of 240.4(B) to protection for a feeder tap. If it is unacceptable for a feeder tap, certainly it should also be unacceptable to apply this rule to protection for an ungrounded service conductor.

Panel Meeting Action: Reject
Panel Statement: The connections on the line side of the service disconnect to supply the equipment listed in 230.82 are considered extensions of the service conductors, and are not required to follow the “Feeder Tap” rules in 240.21(B) and 240.21(C).

The conductors supplying this equipment must be sized to be protected by the overcurrent device at the load end of these connections.

Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-55 Log #1994 NEC-P04 **Final Action: Reject**
(230.92)

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 4-161
Recommendation: Revise text to read as follows:

230.92 Locked Service Overcurrent Devices.

Where the service overcurrent devices are locked or sealed or are not readily accessible to the occupant, branch-circuit or feeder overcurrent devices shall be installed on the load side, shall be mounted in a readily accessible location, and shall be equal or ~~of~~ lower ampere rating than the service overcurrent device.

Substantiation: Some installers will still set a disconnect with overcurrent protection in the down stream panel boards (Main disconnect panel). even if it is not necessary that are of the same size as the service The installation is protected by the first overcurrent device. It appears that when a lock is added to the service it would become a violation.

Panel Meeting Action: Reject
Panel Statement: The comment introduces new changes which, if accepted, will not have had an opportunity for public review.

It is intended that the overcurrent device be at a lower rating to help with selective coordination where there is limited or no accessibility to the service disconnect.

Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-56 Log #2149 NEC-P04 **Final Action: Reject**
(230.94 Exception No. 7 (New))

Submitter: Randolph J. Ivans, Underwriters Laboratories Inc.
Comment on Proposal No: 4-148
Recommendation: Accept this proposal in principle by revising the proposal.

Add new text to read as follows:

Exception No. 7: Circuits used only to supply listed communications equipment or under the exclusive control of a utility shall be permitted to be connected on the supply side of the service overcurrent device where separately provided with overcurrent protection suitable for the supply.

Substantiation: This comment is being made in conjunction with my comment on proposal number 4-148 to add new text to paragraph 230.82. If the proposal to add the new text to 230.82 is accepted, then a new exception needs to be added to paragraph 230.94 to accommodate the installation of the circuits on the supply side of the main service overcurrent device.

Panel Meeting Action: Reject
Panel Statement: The panel is unclear as to what the submitter is attempting to achieve since the proposed text relates to a different section of the code.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-57 Log #2229 NEC-P04 **Final Action: Reject**
(230.95 Exception No. 2 (New))

Submitter: Malcolm Allison, Ferraz Shawmut / Rep. National Electric Fuse Association
Comment on Proposal No: 4-165
Recommendation: Modify the proposed text to read:

Exception No 2: Normal Source ground fault protection on the line side of a transfer switch supplying emergency and legally required standby systems shall be permitted to be restrained for ground faults on the loadside of the transfer switch, provided that audible and visual signal devices indicate whenever a ground fault relay has been restrained, and instructions on the course of action to be taken in the event of an indicated ground fault are located at or near the sensor location.

Substantiation: Designers need to be able to utilize ground fault protection for the normal source, and at the same time, provide selective coordination for emergency and legally required standby devices and all overcurrent devices on their line side. This can best be accomplished by allowing the normal side ground fault protection to be restrained for ground faults on the load side of the transfer switch (on the emergency and legally required standby system side). While 700.26 and 701.17 permit ground fault protection to be totally omitted on the alternate source side of emergency and legally required standby systems, this comment simply allows the ground fault protection on the normal source side to be restrained for ground faults on the load side of the transfer switch, on the emergency and legally required standby side. This comment will provide the ability to utilize ground fault protection on the normal source side, and selectively coordinate emergency and legally required standby devices with all upstream devices, without endangering any equipment protection on the normal source side of the transfer switch. The requirement for indication is included to correlate with the requirement found in 700.7(D).

Panel Meeting Action: Reject
Panel Statement: This is a coordination issue and can be handled without revising the NEC.

The requirement should be dealt with in Articles 517, 700, 701, and 708.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-58 Log #2533 NEC-P04 **Final Action: Reject**
(230.95(C))

Submitter: Ron Widup, Shermco Inustries, Inc. / Rep. InterNational Electrical Testing Association (NETA)
Comment on Proposal No: 4-167
Recommendation: The panel should accept in principle, rather than reject, the original proposal.
Substantiation: Based on the panel statement I believe the following substantiation and explanation will correct and amend the original proposal to its proper form.

(C) Performance Testing. The ground-fault protection system shall be performance tested when first installed on
site. The test shall be conducted by primary current injection in accordance with instructions that shall be provided with the equipment and shall by conducted by primary current injection. A written record of this test shall be made and shall be available to the authority having jurisdiction.

Original Panel Statement:

It is not always possible to do primary current injection on an installation.
We believe the panel statement "It is not always possible to do primary current injection on an installation" is incorrect. The proper operation of a ground fault protection system can always be field-tested via primary current injection. We perform these particular tests by primary current injection every day in installations all across the country, many times bases on requirements set forth by the AHJ. When required by the AHJ, there has not been an exception allowed because "we could not do it". And to reiterate, the test is neither complicated nor onerous to the installer and/or owner.

Original Panel Statement:

The additional words could be in conflict with the words in the beginning of the same sentence that instruct to follow the instructions with the equipment.

The panel statement indicated the additional words "could be in conflict with the words in the beginning of the same sentence that instruct to follow the instructions with the equipment". Based on the concern of the committee and their corresponding panel statement, the proposed revised text in this comment clarifies the issue brought forth by the committee. So that the potential conflict in wording is eliminated and in order to further clarify the words, the order has been reversed as shown above.

Original Panel Statement:

Mandating a particular method to conduct performance tests is not within the scope of the NEC.
This is not mandating a particular method, rather it is clarifying a critical performance criteria to ensure the proper operation of a ground fault protection system. We are putting forth a proposal and comment related to a technical clarification for proper performance testing of ground fault protection systems, not what particular method is to be used. The technical clarification/error is that the intent of the code [performance testing] is not met if you do not perform by primary current injection.
This is arguably one the most important sections of the Code when it comes to protecting equipment, minimizing damage, and preventing fires. We have case after case where equipment and/or installation issues existed, yet were found and corrected due to field-testing by primary current injection. To not require performance testing by primary current injection would put >1000 amp 600-volt services at risk.
Panel Meeting Action: Reject
Panel Statement: Testing is to conform with instructions provided by the equipment manufacturer. Mandating a particular method to conduct performance tests is not within the scope of the NEC.

The requirement in the code is to test the system, not individual components.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:

ROGERS, J.: I voted with the Panel on this comment and the referenced proposal but in my opinion this discussion warrants further review. As and AHJ I have always been concerned with test methods in the field for GFPE devices especially when dealing with multiple levels of selectivity and GFPE requirements such as may be encountered in a health care facility. The submitters presented a good demonstration of why they believe the test methods they are recommending should be required. However, some of the Panel members both from manufacturing and utilities had sound technical reasoning for not mandating this test method. I would recommend that the submitters return in the next cycle and ask the Panel Chair if he would consider a task group to research all of the technical pros and cons for further review by the Panel.

4-59 Log #2540 NEC-P04 **Final Action: Reject**
(230.95(C))

Submitter: Roderic Hageman, PRIT Service, Inc.
Comment on Proposal No: 4-166
Recommendation: Add new text to read as follows:

(C) Performance Testing. The ground-fault protection system shall be performance tested when first installed on site. The test shall be conducted in accordance with instructions that shall be provided with the equipment. A written record of this test shall be made and shall be available to the authority having jurisdiction.

FPN No. 1: Ground-fault protection that functions to open the service disconnect affords no protection from faults on the line side of the protective element. It serves only to limit damage to conductors and equipment on the load side in the event of an arcing ground fault on the load side of the protective element.

FPN No. 2: This added protective equipment at the service equipment may make it necessary to review the overall wiring system for proper selective overcurrent protection coordination. Additional installations of ground-fault protective equipment may be needed on feeders and branch circuits where maximum continuity of electric service is necessary.

FPN No. 3: Where ground-fault protection is provided for the service disconnect and interconnection is made with another supply system by a transfer device, means or devices may be needed to ensure proper ground-fault sensing by the ground-fault protection equipment.

FPN No. 4: See 517.17(A) for information on where an additional step of ground-fault protection is required for hospitals and other buildings with critical areas or life support equipment.

FPN No. 5: Instructions provided by the manufacturer for acceptance testing generally greatly exceed the brief instructions posted near the ground fault protection equipment that are to be used in periodic verification. Acceptance testing generally includes instructions on checking for unwanted ground connections on the load side of the ground fault sensor, verification of correct neutral sensor polarity in four-wire systems, and extensive tests to confirm correct operation of ground fault systems for switchgear with multiple sources.
Substantiation: My original proposal, 4-166, changed wording in the body of 230.95 (C) recommending the addition of several specific test procedures. These procedures, if performed properly will uncover many errors that remain in ground fault systems because they cannot be found by simply pushing a test pushbutton. In the CMP-4 Panel Statement my proposal was rejected with three reasons given. I am responding to those three reasons below and changing my request as shown in the comment above.
Reason 1: It is not always possible to do primary current injection on an installation.
Response: Having tested these systems for much of my 35 year career, I can say that I have never encountered a ground fault system that I could not test by primary current injection. I am willing, and I believe able, to describe to CMP-4 how it can be done to any real system that the Panel can describe**.**

Reason 2: The additional words could be in conflict with the words in the beginning of the same sentence that instruct to follow the instructions with the equipment.

Response: I apologize for not considering fully how my additional text would affect the previous text. I can see that rearranging and further modification may have eliminated that issue. However, rather than pursuing that path, I am suggesting that CMP-4 add still another fine print note that will help AHJs seek out the full manufacturer's performance testing instructions, rather than accepting a pushbutton test that does not adequately test the system.

Reason 3: Mandating a particular method to conduct performance tests is not within the scope of the NEC.

Response: Article 230.95(C) is unusual as evidenced by the existing four fine print notes. Rather than attempt to find other examples of code that mandate specific performance tests, I am requesting an additional fine print note as described in my response to Reason 2.

I have supplied a file that is readily available on the Internet (Note: the file was not received by NFPA). It is General Electric's GEI-48907, "Ground Fault Protection Systems Performance Testing". This is an excellent example of one manufacturer's full instructions on how to acceptance test various types of ground fault protection schemes. There is much literature available that supports the position of full testing of these schemes. I encourage CMP-4 to find a way to ensure that this testing gets accomplished. Perhaps my suggested fine print note is a start.
Panel Meeting Action: Reject
Panel Statement: The comment introduces new text that, if accepted, will not have had an opportunity for public review.

As a FPN, it does not provide any new information or clarity.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

Comment on Affirmative:

ROGERS, J.: I voted with the Panel on this comment and the referenced proposal but in my opinion this discussion warrants further review. As and AHJ I have always been concerned with test methods in the field for GFPE devices especially when dealing with multiple levels of selectivity and GFPE requirements such as may be encountered in a health care facility. The submitters presented a good demonstration of why they believe the test methods they are recommending should be required. However, some of the Panel members both from manufacturing and utilities had sound technical reasoning for not mandating this test method. I would recommend that the submitters return in the next cycle and ask the Panel Chair if he would consider a task group to research all of the technical pros and cons for further review by the Panel.

4-60 Log #1788 NEC-P04 **Final Action: Reject**
(230.205(A))

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 4-169
Recommendation: Add Exception as follows:

Exception: In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified personnel will be installing and maintaining the pole top switch, a mechanical linkage or electronic mechanism will not be required.

Substantiation: Pole top switches operated by hot sticks are very common in industrial establishments, with no evidence presented that these type of installations are a safety hazard. In industrial establishments, persons knowledgeable about the operation and limitations of pole top switches will be the ones operating the switch. Operation by hot stick is very reliable, which cannot be said for all mechanical linkages or electronic mechanisms. They may introduce a safety hazard by not working when it is necessary to disconnect a pole top switch. The use of mechanical linkages may also cause a problem in an untrained operator trying to operate a non load break pole top switch with this mechanism.
Panel Meeting Action: Reject
Panel Statement: The submitter has not presented any documented technical rationale for not requiring this enhanced safety device on these installations. There is no rationale to requiring pole top access and hot sticks to open a service disconnecting means.

This is also in conflict with 230.205(B).
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:

SIGMUND, J.: Pole top switches operated by hot sticks are very common in industrial establishments, with no evidence presented that these type of installations are a safety hazard. In industrial establishments, persons knowledgeable about the operation and limitations of pole top switches will be the ones operating the switch. Operation by hot stick is very reliable, which cannot be said for all mechanical linkages or electronic mechanisms. They may introduce a safety hazard by not working when it is necessary to disconnect a pole top switch. The use of mechanical linkages may also cause a problem in an untrained operator trying to operate a non load break pole top switch with this mechanism.

4-61 Log #2553 NEC-P04 **Final Action: Accept**
(230.205(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-169
Recommendation: Continue to accept the proposal.
Substantiation: This comment is to respond to the comment in the voting. The requirement should apply regardless of the degree of training of the on-site electrical staff. Arranging for elaborate means of access to a service disconnect in an emergency, such as a bucket truck and hot sticks, inherently involves unacceptable time delays. The mechanical linkage or remote control actuation options are sufficiently flexible to allow for ready operation without excessive expenditures. Remember that for the 42 years prior to the 2008 NEC, the only placement rule was 230.70(B), which includes a ready access provision with no relief.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:

SIGMUND, J.: Pole top switches operated by hot sticks are very common in industrial establishments, with no evidence presented that these type of installations are a safety hazard. In industrial establishments, persons knowledgeable about the operation and limitations of pole top switches will be the ones operating the switch. Operation by hot stick is very reliable, which cannot be said for all mechanical linkages or electronic mechanisms. They may introduce a safety hazard by not working when it is necessary to disconnect a pole top switch. The use of mechanical linkages may also cause a problem in an untrained operator trying to operate a non load break pole top switch with this mechanism.

4-62 Log #76 NEC-P04 **Final Action: Accept**
(230.208, FPN)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-171
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the "Accept in Principle" action taken on Proposal 6-123.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on comment 4-63.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-63 Log #739 NEC-P04 **Final Action: Accept**
(230.208, FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 4-171
Recommendation: The Proposal should be Accepted in Principle and revised as shown:

"See Table 310.60(C)(67) ~~310.67~~ through Table 310.60(C)(86) ~~310.86~~…"
Substantiation: This revision to the Proposal correlates with the Panel Action on 6-123.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

ARTICLE 240 — OVERCURRENT PROTECTION

10-6 Log #2776 NEC-P10 **Final Action: Accept**
(240.2.Tap Conductors)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 10-11
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-7 Log #1048 NEC-P10 **Final Action: Accept**
(240.4, FPN)

Submitter: Gregory P. Bierals, Samaritan's Purse World Medical Mission
Comment on Proposal No: 10-13
Recommendation: Accept this proposal to add the following new FPN:

FPN: See ICEA P32-382 for information on allowable short-circuit currents for insulated copper and aluminum conductors.
Substantiation: Accept this proposal. The very essence of overcurrent protection invoices the concept of overload, short-circuit, and ground-fault protection. Merely matching a load calculation to a given wire size in an ampacity table is not acceptable without the consideration of possible fault conditions. I have found that most people are unaware that this information is available.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

COOK, D.: The ROP panel action for this item was reject with a panel statement that indicated the submitter had not provided substantiation the tables of Article 310 are inadequate. A review of submitted comment 10-7 reveals no substantiation that the tables are inadequate. Based on ROC panel discussion, I am convinced the ICEA information could possibly provide helpful information to some specific applications, but I'm not convinced the FPN is needed with the general requirements in 240.4. I believe it likely that the users with those special applications are currently aware and using the ICEA information. I can see unnecessary questions raised over designs and installations where conductors are sized based on the requirements in Article 310 and protected based on the requirements in Article 240. If the tables in 310 were inadequate, I would prefer to support enforceable revisions to those tables rather than an unenforceable FPN in 240.4.

HIDAKA, J.: Present product requirements take into account protection of the conductor under short circuit conditions. The submitter has not provided substantiation that the tables of Section 310 are inadequate.

MANCHE, A.: The code panel rejected the original proposal noting the submitter had not provided any substantiation that the tables of Section 310 are inadequate. This comment provides no further substantiation that this FPN should be added to the NEC. The addition of this fine print note will add confusion to the code.

CMP-10 is retracing the exact same tracks taken during the 1987 and 1993 NEC cycle. A review of a few of the points considered during those cycles will establish why these tables should not have been accepted with absolutely no substantiation before CMP-10 in 2009:

1) CMP-10 Panel Statement from Proposal 10-13 in the 1992 TCR with reference to the ICEA documents states "The assumption clearly stated in the documents limit the range of applicability of the documents such that to attempt to use them for all of the protective situations encountered in the code would be a misapplication of the documents."

2) The same discussion also took place in CMP-5 and 6. NEMA's comment 5-103 in the 1992 TCD, addressing the use of the ICEA tables: "In the 1987 Code cycle the ICEA indicated this publications was not suitable for code reference." NEMA was not alone with regard to referencing this issue brought by the ICEA.

The ICEA tables addressed a static electrical system, not a dynamic system as is the case when an overcurrent device is actively protecting the system. It should be noted that conductors do not have withstand ratings. It is a mistake to equate static damage equations (ICEA document) with a withstand rating. Upon the initiation of a fault, an overcurrent protective device will begin to open changing the short circuit current in the conductor. The ICEA formulas or tables do not take that into account, however it is addressed in the UL product standards when a circuit breaker is Listed and the conductors are reviewed for damage during testing. A current limiting fuse or circuit breaker is another example of a dynamic (changing current) protection condition that is not considered by the ICEA formulas and therefore provides false information to the user of the NEC. This comment should be rejected.

10-8 Log #1586 NEC-P10 **Final Action: Reject**
(240.4, FPN)

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 10-13
Recommendation: Continue to reject this proposal.
Substantiation: This proposal should continue to be rejected for the reasons stated in the panel statement, plus two additional reasons. First, the ICEA conductor damage tables referenced in the proposed FPN are based on an initial conductor temperature of 75°C. It is illogical to assume that all the conductors operate at such an elevated temperature. As a matter of fact, in its discussion of the insulation damage formula, the IEEE Green Book (IEEE Std 142-1991, pg. 116) cautions that the initial operating temperature factor in the equation is, "often taken as the conductor maximum operating temperature rating rather than the actual operating temperature. This is a conservative approach but may result in conductor oversizing by one trade size."

This proposal is similar in nature to 2-193. In that submitter's substantiation, he claimed that in some of the testing he had done in homes he had found that the let-through I^2t of 15 amp circuit breakers was as high as 88,804, exceeding the ICEA limit for #14 copper wire. But actual laboratory testing has confirmed that #14 copper wire at room temperature can withstand as much as 250,000 I^2t without insulation damage. Residential type circuit breakers typically let through a small fraction of that amount with a full 10,000 amps of available short circuit current. The let-through in actual applications where the available short circuit current will be considerably lower will likewise be much less than this.

Second, the UL 489 circuit breaker standard requires testing with four feet of wire to insure, among other considerations, that the wire is adequately protected under short circuit conditions. While the UL 248 series of fuse standards does not require similar testing with wire, the short circuit tests in the UL 98 switch standard does, thus insuring that fuses also adequately protect wire under short circuit conditions.

The problem alleged by the submitter is purely theoretical. There is no "real" problem with the listed overcurrent protective devices on the market today, therefore, this proposal is unnecessary.
Panel Meeting Action: Reject
Panel Statement: See Panel Action on Comment 10-7.
To address the submitter's concern that the ICEA tables are limited to a starting temperature of 75°C, the formulas in ICEA P32-382 take into account the initial operating temperature of choice, not only the elevated 75°C starting temperature as incorrectly stated in the Comment.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
HIDAKA, J.: See my Explanation of Negative Vote on Comment 10-7.
MANCHE, A.: See the NEMA voting comment on Comment 10-7.

10-9 Log #1706 NEC-P10 **Final Action: Reject**
(240.5(B)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 10-20
Recommendation: Accept the proposal.
Substantiation: The proposal merely specifies that lower rated overcurrent devices are permitted. It can be interpreted that lesser ratings and intermediate ratings are not literally covered.
Panel Meeting Action: Reject
Panel Statement: As stated in the Panel Statement for Proposal 10-20, "The lower rated overcurrent devices are permitted to be used in the NEC." The submitter has provided no additional substantiation to clarify the advantage of the proposed wording.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-10 Log #2400 NEC-P10 **Final Action: Reject**
(240.7 (New))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 10-24
Recommendation: Add new text to read as follows:
240.7 Equipment Approval. The equipment required or permitted by this Article, after December 31, 2016, shall be acceptable only if listed or field evaluated by a qualified testing laboratory or inspection agency concerned with product evaluation.
Substantiation: Realizing overcurrent devices cannot be evaluated by normal inspection staff in the field, knowing the significance of the overcurrent protective device to the safety of any electrical installation, understanding the cost of listing would never be recovered for some number of unusual overcurrent protective devices, and realizing that time would be required to get through the listing process, this comment attempts to combine several of the proposals from the ROP into a possible solution for approval of overcurrent protective devices. Numerous organizations represented on this committee took public positions opposing self certification. Those positions seem to indicate support of product certification. Based on that support, this comment is offered as an alternative to proposals submitted earlier.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 7 Negative: 5
Explanation of Negative:

BORTHICK, M.: My vote on the panel action for this comment is negative. This action relies upon field evaluations to be made by third party entities that have not had the opportunity to comment on the feasibility of the alternatives to listing as stated in the added language contained in the comment.

DARLING, D.: Much of the overcurrent protective devices for medium voltage installations are designed, manufactured, and tested as per applicable ANSI/IEEE C37 series standards. They are part of an engineered system designed for safety, operability and maintainability. As part of the system they may be modified by the manufacturer for proper application. No substantiation has been provided to limit the use of unlisted devices.

ELDRIDGE, C.: There is generally no problem with listed products until 600 volts is exceeded. There are no listed cutouts and most other medium voltage equipment. Even with the long lead time for this to take effect, the end of 2016, there is not likely to be listed equipment for medium voltage equipment.

FREDERICKS, C.: I'm voting against the panel action to accept
The intention may be good, but this requirement is impractical. There is quite a bit of equipment that is covered by this article, including specialized equipment and high voltage equipment, that is not available with a listing, and it would not be practical to make all of it available with a listing.
Field acceptance testing can be very valuable, including for listed equipment, but there is a big difference between the tests and inspections that are done for a field acceptance test vs. those that are associated with a listing.

MANCHE, A.: NEMA agrees with the submitter that a listed product provides further means of ensuring the product complies with the UL product safety standard, however, there has been no substantiation presented that requiring all overcurrent devices be Listed or field evaluated will enhance safety. It should also be noted that if accepted, this language places product Listing and field evaluation on par as being equivalent in terms of requiring acceptance by the authority having jurisdiction. In order to obtain a Listing, destructive testing is necessary to ensure compliance with the safety standard. Field evaluation is not defined within the NEC and therefore becomes a very subjective evaluation that now must be accepted since it is specifically stated in permissive language. Product Listing would no longer be the preferred method for determining compliance by the AHJ.

Comment on Affirmative:

COOK, D.: Based on the public positions of organizations and individual companies represented on CMP-10, we support this comment in our written ballot to acknowledge and require the proven US Electrical Safety System. We also encourage our partners that have risen in support of this time tested "System", as evidenced by their public positions in OSHA's request for information related to proposals allowing Suppliers Declaration of Conformity as an equivalent basis for equipment approval, to continue to support third party certification as a basis for equipment approval.

10-11 Log #2230 NEC-P10 **Final Action: Reject**
(240.13)

Submitter: Malcolm Allison, Ferraz Shawmut / Rep. National Electric Fuse Association
Comment on Proposal No: 10-28
Recommendation: Change the proposed text as shown below and insert as the final paragraph of 240.13
Normal Source ground fault protection on the line side of a transfer switch supplying emergency and legally required standby systems shall be permitted to be restrained for ground faults on the loadside of the transfer switch, provided that audible and visual signal devices indicate whenever a ground fault relay has been restrained, and instructions on the course of action to be taken in the event of an indicated ground fault are located at or near the sensor location.
Substantiation: Designers need to be able to utilize ground fault protection for the normal source, and at the same time, provide selective coordination for emergency and legally required standby devices and all overcurrent devices on their line side. This can easily be accomplished by allowing the normal side ground fault protection to be restrained for ground faults on the load side of the transfer switch (on the emergency and legally required standby system side). While 700.26 and 701.17 permit ground fault protection to be totally omitted on the alternate source side of emergency and legally required standby systems, this comment simply allows the ground fault protection on the normal source side to be restrained for ground faults on the load side of the transfer switch, on the emergency and legally required standby side. This comment will provide the ability to utilize ground fault protection on the normal source side, and selectively coordinate emergency and legally required standby devices with all upstream devices, without endangering any equipment protection on the normal source side of the transfer switch. The requirement for indication is included to correlate with the requirement found in 700.7(D).
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on proposal on 10-28.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-12 Log #1571 NEC-P10 **Final Action: Accept**
(240.13 Exception (New))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 10-28
Recommendation: Continue to reject this proposal.
Substantiation: This proposal should continue to be rejected, not only for the reasons given in the panel statement, but because it jeopardizes life-safety. The reasons for requiring ground-fault protection of equipment in certain applications are well documented. The damage than can result from a ground fault on such a system may render a substantial portion of the system inoperative, resulting in a lengthy outage potentially worse than that envisioned by the submitter, or worse yet start a life threatening fire. Further, restraint of the GFPE may increase the downstream arc flash hazard for maintenance workers.

The late J.R. Dunki-Jacobs, a recognized authority on ground-fault protection, stated in his book *Industrial Power System Grounding Design Handbook* (pages 186, 189) that, "If an arcing line-to ground fault is initiated in a solidly grounded system on one of three bare buses in a metal enclosure, the hot ionized gases that are developed by the fault can be expected to cause escalation to an arcing multi-phase fault within 1 or 2 cycles (0.0167 to 0.033 sec) of time." He went on to state, "Escalating arcing-ground faults have shown themselves to be extremely devastating…" and "Unquestionably then, engineering attention to their immediate suppression must be proactive and immediate, rather than reactive. Not only for reason of minimizing the released arc energy to maximize personnel safety, but also to avert arcing-fault escalation." The suggestion that an audible and visual signal device would be of any value is ludicrous.

System reliability and blackout prevention can be achieved by proper system design, equipment selection and coordination. The GFPE restraint called for in this proposal is unnecessary and a potential threat to life-safety.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-13 Log #77 NEC-P10 **Final Action: Accept**
(240.15(B)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 10-35
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal since the existing title was changed from "Multiwire Branch Circuit" to "Multiwire Branch Circuits" within the proposed text.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the TCC direction to clarify the panel action on proposal 10-35.
Retain the title of 240.15(B)(1) as written in the 2008 NEC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-14 Log #2359 NEC-P10 **Final Action: Reject**
(240.15(B)(1))

Submitter: Marcus R. Sampson, Lysistrata Electric
Comment on Proposal No: ?????
Recommendation: The panel should accept this proposal and delete 240.15(B)(1) in its entirety.
Substantiation: The reworked text accepted by the panel from proposal 10-30 is confusing. Is there a need for the Code to specifically permit identified handle ties on individual circuit breakers that serve line-to-neutral loads? Or is the intent of this code section to prohibit identified handle ties on individual circuit breakers that serve line-to-line loads? If so, it is kind of a back-door way to get there.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided a proposal number for this comment. This comment does not meet the requirements of 4.4.5(b) of the Regulations Governing Committee Projects as follows:
4.4.5 Content of Comments. Each comment shall include the following:
(b) Identification of the Document, Proposal number to which the Comment is directed, and paragraph of the Document to which the Comment is directed.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-15 Log #1705 NEC-P10 **Final Action: Reject**
(240.16 (New))

TCC Action: Based on the Technical Correlating Committee action on Comment 10-10, the Technical Correlating Committee directs Comment 10-15 be reported as "Reject".
Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 10-42
Recommendation: Accept the proposal.
Substantiation: Electrical components such as overcurrent devices should be listed. Many less critical devices such as snap switches are required to be listed. The AHJ does normally not have the capability, time, or facilities to determine whether they are suitable for their intended functions.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on comment 10-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
ELDRIDGE, C.: See my comment on 10-10.
FREDERICKS, C.: Please see my voting explanation on comment 10-10.
MANCHE, A.: See the NEMA voting statement on Comment 10-10.

10-16 Log #1761 NEC-P10 **Final Action: Hold**
(240.21(B)(1))

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 10-46
Recommendation: Accept this proposal in principle as follows:
240.21(B)(1)(1)(b) should be revised as follows:
"b. Not less than the rating of the switchboard, panelboard, disconnecting means, or control device supplied by the tap conductors or not less than the rating of the overcurrent-protective device at the termination of the tap conductors.
Substantiation: The submitter is correct, the use of the word "device" in 240.21(B)(1)(1)(b) is incorrect. The word "device" is defined in Article 100 as follows:
"**Device.** A unit of an electrical system that carries or controls electric energy as its principal function."

During the discussion on this proposal, it was clear that the panel intends for these "tap conductors" to be provided with overload protection. As presently written, the text permits termination in a device as defined above. The intent of the panel is not met in the present text of this section. The submitter is correct the existing text is confusing and should be clarified.

The present text of 240.21(B)(1)(2) includes more prescriptive text and limits termination of these "tap conductors" to "switchboard, panelboard, disconnecting means, or control devices." The same level of clarity is necessary in 240.21(B)(1)(1)(b). The panel statement refers to the present permission of this section. The submitter seeks only to clarify what is permitted. Clarification is needed.

Panel Meeting Action: Hold

Panel Statement: The panel is only holding the comment. The panel acknowledges that the word "device" leads to ambiguity when it is compared against its definition in Article 100. It is the consensus of the panel that the appropriate resolution for this comment, as well as comments 10-17 and 10-18, would introduce new material that has not been the subject of public review. The panel agreed to form a task group to address this issue during the 2014 revision cycle.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-17 Log #1830 NEC-P10 **Final Action: Hold**
(240.21(B)(1))

Submitter: Phil Simmons, Simmons Electrical Services

Comment on Proposal No: 10-46

Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:

(1) Taps Not over 3 m (10 ft) Long. If the length of the tap conductors does not exceed 3 m (10 ft) and the tap conductors comply with all of the following:

(1) The ampacity of the tap conductors is

a. Not less than the combined calculated loads on the circuits supplied by the tap conductors, and

b. Not less than the rating of the switchboard or other equipment providing overload protection ~~device~~ supplied by the tap conductors, or

c. not less than the rating of the overcurrent protective device at the termination of the tap conductors.

(2) The tap conductors do not extend beyond the switchboard, panelboard, disconnecting means, or control devices they supply.

(3) Except at the point of connection to the feeder, the tap conductors are enclosed in a raceway, which shall extend from the tap to the enclosure of an enclosed switchboard, panelboard, or control devices, or to the back of an open switchboard.

(4) For field installations, if the tap conductors leave the enclosure or vault in which the tap is made, the ampacity of the tap conductors is not less than one-tenth of the rating of the overcurrent device protecting the feeder conductors.

Substantiation: The conditions under which 10-ft tap conductors are permitted to be installed without overcurrent protection appropriate to the ampacity of the tapped conductors where the conductors originate needs to be clarified. The present word "device" must be replaced with more descriptive terms since the definition of "device in Article 100 is, "A unit of an electrical system that carries or controls electric energy as its principal function." Though not intended by 240.24(B)(1)(1)b, the broad definition of device includes wire and other conductors such as busway.

Article 408 permits switchboards to be used without overcurrent protection on their supply side. The phrase "Other equipment providing overload protection" in the Comment might include "A combination of a current transformer and overcurrent relay shall be considered equivalent to an overcurrent trip unit" as stated in 240.15(A).

Panelboards are required to have overcurrent protection on their supply side in 408.36 as are motor control centers in 430.94 and industrial control panels in 409.21. So, it does not appear this equipment can be used for termination of tap conductors unless the conductors terminate in overcurrent protection as provided in 240.21(B)(1)(1)b.

It is recommended that the list below 240.21(B)(1)(1) include a (c) to separate the items in the list.

Panel Meeting Action: Hold

Panel Statement: See panel action and statement on Comment 10-16.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-18 Log #2865 NEC-P10 **Final Action: Hold**
(240.21(B)(1))

Submitter: Don Ganiere, Ottawa, IL

Comment on Proposal No: 10-46

Recommendation: Accept in principle and revise as shown below:

240.21(B)(1)(1)(b) should be revised as follows:

"b. Not less than the rating of the ~~device~~ switchboard, panelboard, disconnecting means, or controller supplied by the tap conductors or not less than the rating of the overcurrent-protective device at the termination of the tap conductors.

Substantiation: The submitter is correct that the use of the word device in the existing text is not correct. The word is much too broad in scope to be used in this code section. Looking at the definition of device in Article 100, we see that it can mean just about anything. The code rule needs to tell the code user exactly what the tap conductor is permitted to be terminated on. The proposed wording of the submitter was a good start, but it needs to be expanded upon a bit. The panel statement says that the removal of the word device and its replacement with specific equipment that the tap conductor can be terminated on narrows the use of the section beyond what the current rule say is correct, however this "narrowing" is exactly what this section needs. This change will give the section some much needed clarity.

Panel Meeting Action: Hold

Panel Statement: See panel action and statement on Comment 10-16.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-19 Log #1762 NEC-P10 **Final Action: Hold**
(240.21(C)(2))

Submitter: James T. Dollard, Jr., IBEW Local 98

Comment on Proposal No: 10-52

Recommendation: This proposal should be accepted in principle by retaining the part accepted in the ROP and by revising 240.21(C)(2) as follows:

240.21(C)(2)(1)(b) should be revised as follows:

"b. Not less than the rating of the switchboard, panelboard, disconnecting means, or control device supplied by the secondary conductors or not less than the rating of the overcurrent-protective device at the termination of the secondary conductors."

Substantiation: The submitter is correct, the use of the word "device" in 240.21(C)(2)(1)(b) is incorrect. The word "device" is defined in Article 100 as follows:

"**Device.** A unit of an electrical system that carries or controls electric energy as its principal function."

During the discussion on this proposal, it was clear that the panel intends for these "tap conductors" to be provided with overload protection. As presently written, the text permits termination in a device as defined above. The intent of the panel is not met in the present text of this section. The submitter is correct the existing text is confusing and should be clarified.

The present text of 240.21(C)(2)(2) includes more prescriptive text and limits termination of these "tap conductors" to "switchboard, panelboard, disconnecting means, or control devices." The same level of clarity is necessary in 240.21(C)(2)(1)(b). The panel statement refers to the present permission of this section. The submitter seeks only to clarify what is permitted. Clarification is needed.

Panel Meeting Action: Hold

Panel Statement: The panel is only holding the comment. The panel acknowledges that the word "device" leads to ambiguity when it is compared against its definition in Article 100. It is the consensus of the panel that the appropriate resolution for this comment, as well as comments 10-20 and 10-21, would introduce new material that has not been the subject of public review. The panel agreed to form a task group to address this issue during the 2014 revision cycle.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-20 Log #1831 NEC-P10 **Final Action: Hold**
(240.21(C)(2))

Submitter: Phil Simmons, Simmons Electrical Services

Comment on Proposal No: 10-52

Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:

(2) Transformer Secondary Conductors Not over 3 m (10 ft) Long. If the length of secondary conductor does not exceed 3 m (10 ft) and complies with all of the following:

(1) The ampacity of the secondary conductors is

a. Not less than the combined calculated loads on the circuits supplied by the secondary conductors, and b. Not less than the rating of the switchboard or other equipment providing overload protection ~~device~~ supplied by the secondary conductors, or

c. not less than the rating of the overcurrent-protective device at the termination of the secondary conductors

(2) The secondary conductors do not extend beyond the switchboard, panelboard, disconnecting means, or control devices they supply.

(3) The secondary conductors are enclosed in a raceway, which shall extend from the transformer to the enclosure of an enclosed switchboard, panelboard, or control devices or to the back of an open switchboard.

(4) For field installations where the secondary conductors leave the enclosure or vault in which the supply connection is made, the rating of the overcurrent device protecting the primary of the transformer, multiplied by the primary to secondary transformer voltage ratio, shall not exceed 10 times the ampacity of the secondary conductor.

Retain the informational Note.

Substantiation: The conditions under which 10-ft transformer secondary conductors are permitted to be installed without overcurrent protection appropriate to the ampacity of the secondary conductors where the conductors originate needs to be clarified. The present word "device" must be replaced with more descriptive terms since the definition of "device in Article 100 is, "A unit of an electrical system that carries or controls electric energy as its principal function." Though not intended by 240.24(C)(2)(1)b, the broad definition of device includes wire and other conductors such as busway.

Article 408 permits switchboards to be used without overcurrent protection on their supply side. The phrase "Other equipment providing overload protection" in the Comment might include "A combination of a current transformer and overcurrent relay shall be considered equivalent to an overcurrent trip unit" as stated in 240.15(A).

Panelboards are required to have overcurrent protection on their supply side in 408.36 as are motor control centers in 430.94 and industrial control panels in 409.21. So, it does not appear this equipment can be used for termination of tap conductors unless the conductors terminate in overcurrent protection as provided in 240.21(C)(2)(1)b.

It is recommended that the list below 240.21(C)(2)(1) include a (c) to separate the items in the list.

Panel Meeting Action: Hold
Panel Statement: See panel action and statement on comment 10-19.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-21 Log #2867 NEC-P10 **Final Action: Hold**
(240.21(C)(2))

Submitter: Don Ganiere, Ottawa, IL
Comment on Proposal No: 10-52
Recommendation: This proposal should be accepted in principle by retaining the part accepted in the ROP and by revising 240.21(C)(2) as follows:
240.21(C)(2)(1)(b) should be revised as follows:
"b. Not less than the rating of the ~~device~~ switchboard, panelboard, disconnecting means, or controller supplied by the secondary conductors or not less than the rating of the overcurrent-protective device at the termination of the secondary conductors."
Substantiation: The submitter is correct that the use of the word device is not suitable for this section as a "device" can be almost anything per its Article 100 definition. The section needs clarification and the replacement of the word device with a specific list of equipment that a tap conductor is permitted to be terminated on would provide the clarity that this section requires.
Panel Meeting Action: Hold
Panel Statement: See panel action and statement on comment 10-19.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-22 Log #2554 NEC-P10 **Final Action: Reject**
(240.21(C)(3))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 10-53
Recommendation: The proposal should be accepted.
Substantiation: The panel statement is correct that the revised wording precludes other equipment than switchboards. The substantiation was clear on this point. This rule is routinely being applied improperly because past practice allowed for other arrangements. The procedure entered the NEC as 240.21 Exception No. 11 in the 1987 NEC, long before the prohibition on tapping a tap entered the NEC (1999 edition) and even longer before the individual protection rule applied to all panelboards (2008 NEC). At this time the switchboard is the only permissible application. The mention of "switchgear" in the panel statement is incorrect because this term applies to over 600 volt equipment and has no relevance to this section.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on proposal 10-53. In addition, the term "switchgear" is not restricted to greater than 600 volts.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-23 Log #2777 NEC-P10 **Final Action: Accept**
(240.21(D))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 10-54
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-24 Log #1704 NEC-P10 **Final Action: Reject**
(240.21(D) and (E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 10-55
Recommendation: Delete (D) and (E).
Substantiation: "Permitted" does not constitute a requirement per 90.5(B) and is not enforceable. Section 230.91 relates to location, not specific conductor protection. 230.90 requires service conductor overload protection, not overcurrent protection. Service conductors do not have overcurrent protection. 368.17 already applies and is mandatory. Feeder taps are covered by 240.21(B).
Panel Meeting Action: Reject
Panel Statement: The general requirement in 240.21 states that "overcurrent protection shall be provided in each ungrounded circuit conductor and shall be located at the point where the conductors receive their supply." Deleting 240.21 (D) and (E) would create a conflict with 230.91 and 368.17 by eliminating permission for the overcurrent protection to be located other than where the conductors receive their supply
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

13-1 Log #78 NEC-P13 **Final Action: Accept**
(240.21(G))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 10-57
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 13 for action in Article 445.

This action will be considered by the Code-Making Panel 13 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The Panel accepts the direction of the NEC Technical Correlating Committee to act on Proposal 10-57 and rejects Proposal 10-57.
Panel Statement: No technical substantiation was provided in the proposal to permit conductors to be sized at 100 percent of the rating of the overcurrent protective device where the conductors will be terminated. These unprotected conductors may have to carry the full value of the generator rating until protective relays or other overload sensing devices shut the generator down. At the very least, these unprotected conductors could incur insulation damage during high values of fault current on the line side of the overcurrent protective device. See the panel action on Comment 13-13.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

10-25 Log #2102 NEC-P10 **Final Action: Reject**
(240.24(F))

Submitter: Larry LeVoir, City of Irvine
Comment on Proposal No: 10-68
Recommendation: Accept the proposal.
Substantiation: While my premise regarding modern building codes overlapping could be construed as applying code wide in the NEC, I am referring to a specific case here. This also has nothing to do with maintaing the integrity of fire resistive construction. The IBC Building Codes used by much of the nation do not permit the installation of equipment foreign to the stairwell in the stairwell. Yet the NEC allows it under the right conditions. This is a conflict that could lead installers down the wrong path of installation. In single family construction this practice could be permitted by the bldg code and possibly in some office occupancies.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on proposal 10-68. Furthermore, this section of the NEC does not specifically address stairwells, it ensures equipment with overcurrent protection devices is not located over steps.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-26 Log #2555 NEC-P10 **Final Action: Reject**
(240.24(F))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 10-67
Recommendation: Accept the proposal in principle. Add the following sentence to the end of the present rule: "Where located above a landing, the landing shall have a width and depth below the overcurrent devices in accordance with 110.26(A)(2) and 110.26(A)(1) respectively."
Substantiation: The submitter appreciates the information conveyed in the panel statement, and agrees that 110.26(A)(2) is the most relevant dimension. In addition, workers should not be in danger of falling if they step backwards while working. However, there are no requirements in the NEC that addresses the width and depth of a landing used as workspace, and not all landings meet these minimum workspace requirements. We can all readily agree that an inadequately sized landing is an unsafe workspace for this equipment.
Panel Meeting Action: Reject
Panel Statement: Working space is already addressed in 110.26 and applies in general to all electrical installations. Although the committee agreed that a landing with 110.26 working space could be an acceptable location, it is not the intent of the committee to define the location further without additional substantiation that supports such clarification is necessary.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-26a Log #CC1000 NEC-P10 **Final Action: Reject**
(240.35)

TCC Action: Based on the panel action of Code-Making Panel 1 to "Accept" Comment 1-115, the Technical Correlating Committee directs that Comment 10-26a be reported as "Reject".
See the panel action on Comment 1-115 which accepted the necessary text in 110.24.
Submitter: Code-Making Panel 10,
Comment on Proposal No: 10-72
Recommendation: Revise text to read as follows:
240.35 Available Fault Current.
(A) Marking. Service equipment in other than dwelling units shall be legibly marked in the field with the maximum available fault current. The field marking(s) shall include the date the fault current calculation was performed and be of sufficient durability to withstand the environment involved.
(B) Modifications. When modifications to the electrical installation occur, that affect the maximum available fault current at the service, the maximum available fault current shall be verified or recalculated as necessary to ensure the service equipment interrupting ratings are sufficient for the maximum available fault current at the line terminals of the equipment. The required field marking(s) in (A) above shall be adjusted to reflect the new level of maximum available fault current.
Exception: The field marking requirements in (A) and (B) shall not be required in industrial installations where conditions of maintenance and supervision ensure that only qualified persons service the equipment.
Substantiation: The panel agrees with the text and the recommended placement of the requirement as developed by the task group as seen in Comment 1-115 and accepted by CMP 1 at the ROC meeting.
Panel Meeting Action: Accept
Panel Statement: The panel recognizes that the comment was accepted by CMP 1 at the ROC meeting. However, if it failed the CMP 1 letter ballot, CMP 10 places the same text in 240.35.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ELDRIDGE, C.: This proposal should be rejected based on the following rationale.
1. Some utilities publish tables of available fault current at the secondary terminals of the lowest impedance transformers they provide based on an infinite supply bus of radial distribution systems. These are usually for service voltages below 600 volts. For example, see GB7-060 in our Electric Service and Meter Manual http://apps.iplpower.com/goldbook/GB7%20Drawings.pdf. Higher voltage services, i.e. greater than 1000 volts are engineered where the utility would provide available characteristics at the time of design/installation from the supply at the service point. These two provisions can change, as the utility system is dynamic. Those described for under 600 volts have just been changed in my Company to reflect the new efficiency standards of distribution transformers.
2. With the advent of Smart Grid systems, the available fault current can change very quickly. Posting of the maximum available fault current supports the mistaken belief that that is the worst case. While it is for equipment ratings, it is not for arc hazard analysis. It can be likely that posted values on the equipment would be used for arc hazard energy calculations rather than equipment upgrades. It is better for a customer to be talking with the utility when upgrades are planned rather than assuming the posted values on the equipment can be used.
3. A customer is responsible to consult with their serving utility when working on their service connection that includes the premises service equipment. There are just too many variables that can change when making fault current calculations.
4. For equipment ratings, the maximum available fault current at any location would need to be considered and include motor and parallel generator contributions from the connections to premises wiring on the load side of the service point. This is something the premises owner will need to calculate based on their connected equipment.
5. Field marking equipment whether at the service equipment or elsewhere in the premises wiring would need to consider points 1 and 4 above.
6. Since NEC sections 90.8, 110.9, and 110.10 apply whether it is a new installation or altering of premises wiring, it should be sufficient for enforcement and examination under 90.4 and 90.7 to ensure equipment meets the capability of the maximum available fault current at any location within. Dated field marking is not necessary in this regard and its information could be misapplied in the future if values are not verified or used for other purposes than the intent of the equipment's withstand rating. Although the concept of the proposal is plausible, it appears this field marking requirement is a design and/or work practice issue that is not covered by the NEC (see 90.1(C) and 90.2(A)).

10-27 Log #606 NEC-P10 **Final Action: Reject**
(240.35)

Submitter: Donald R. Cook, Pelham, AL
Comment on Proposal No: 10-72
Recommendation: The task Group identified in the following substantiation recommends rejection of Proposal 10-72 to achieve correlation with Proposal 1-183.
Substantiation: Proposals 1-183 and 10-72 propose an available short circuit current marking requirement for electrical equipment. Both were Accepted in Principle by CMP-1 and CMP-10, respectively. The Technical Correlating Committee directed a Task Group be formed to determine if comments could be submitted to correlate the two actions. The Task Group was made up of the following members: Neil LaBrake, Michael Anthony, Mike Johnston, Vince Saporita, Alan Manche, Carl Fredericks, Jim Dollard, Gil Moniz, and Donny Cook. The task group compared the two Panel Actions and developed Public Comments for each action. The task group recommends the marking requirement be located in 110.24 rather than 240.35 based on short circuit current requirements that currently exist in 110.9 and 110.10 and marking requirements that currently exist in 110.22. Based on that consensus, the Task Group recommends Proposal 10-72 not be accepted for a new 240.35. See companion comment for Proposal 1-183 (copy provided).
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel continues to support the concept in proposal 10-72 as modified by comment 1-115. See panel action and statement on 10-26a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ELDRIDGE, C.: See my comment on 10-26a.

10-28 Log #1323 NEC-P10 **Final Action: Reject**
(240.35 (New))

Submitter: Neil F. LaBrake, Jr., National Grid USA
Comment on Proposal No: 10-72
Recommendation: Reject this proposal and delete suggested text.
Substantiation: This proposal should be rejected based on the following rationale.
1. Some utilities publish tables of available fault current at the secondary terminals of the lowest impedance transformers they provide based on an infinite supply bus of radial distribution systems. These are usually for service voltages below 600 volts. For example, see Section 9.3 of our Company's ESB 750 (http://www.nationalgridus.com/electricalspecifications). Higher voltage services, i.e. greater than 1000 volts are engineered where the utility would provide available characteristics at the time of design/installation from the supply at the service point. These two provisions can change, as the utility system is dynamic. Those described for under 600 volts are now being changed in our Company to reflect the new efficiency standards of distribution transformers.
2. With the advent of Smart Grid systems, the available fault current can change very quickly. Posting of the maximum available fault current supports the mistaken belief that that is the worst case. While it is for equipment ratings, it is not for arc hazard analysis. It can be likely that posted values on the equipment would be used for arc hazard energy calculations rather than equipment upgrades. It is better for a customer to be talking with the utility when upgrades are planned rather than assuming the posted values on the equipment can be used.

3. A customer is responsible to consult with their serving utility when working on their service connection that includes the premises service equipment. There are just too many variables that can change when making fault current calculations.

4. For equipment ratings, the maximum available fault current at any location would need to be considered and include motor and parallel generator contributions from the connections to premises wiring on the load side of the service point. This is something the premises owner will need to calculate based on their connected equipment.

5. Field marking equipment whether at the service equipment or elsewhere in the premises wiring would need to consider points 1 and 4 above.

6. Since NEC sections 90.8, 110.9, and 110.10 apply whether it is a new installation or altering of premises wiring, it should be sufficient for enforcement and examination under 90.4 and 90.7 to ensure equipment meets the capability of the maximum available fault current at any location within. Dated field marking is not necessary in this regard and its information could be misapplied in the future if values are not verified or used for other purposes than the intent of the equipment's withstand rating.

Although the concept of the proposal is plausible, it appears this field marking requirement is a design and/or work practice issue that is not covered by the NEC (see 90.1(C) and 90.2(A)).

Panel Meeting Action: Reject

Panel Statement: The marking requirement is not included for the purpose of an arc flash hazard analysis. This marking is for equipment only.

The panel continues to support the concept in proposal 10-72 as modified by comment 1-115. See panel action, substantiation and statement on comment 10-26a.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

ELDRIDGE, C.: See my comment on 10-26a.

10-29 Log #1492a NEC-P10 **Final Action: Reject**
(240.35)

Submitter: Timothy M. Croushore, Allegheny Power

Comment on Proposal No: 10-72

Recommendation: Please reconsider these two proposals and reject them.

Substantiation: I would like to commend both CMP-1 and CMP-10 for trying to resolve this issue. We agree that the issue of incident energy poses a potential hazard for electrical workers working on exposed and energized electrical components of electrical equipment. However, marking of the equipment will not resolve this issue. This is because the electrical supply system is a dynamic electrical system and source fault current will not be a constant. With the pressure on the electric utility to have dynamically reconfigurable supply systems through "smart-grid" technologies, the dynamics of the electrical supply system and the resultant changes in source fault current will be occurring. Rather than a marking, which will be wrong and will lead the qualified person into a false situation, we recommend the electrical industry develop a dynamic fault current and incident energy measuring device.

This device could be portable or permanently wired and work very similarly to a SureTest branch circuit analyzer (example Model 61-165). It can measure available short circuit current on a branch circuit without tripping a circuit breaker or operating a fuse. Rather than relying on a "marking" on the equipment, a device such as this one at the service will tell the actual available short circuit current available. Knowing the actual short circuit current available will provide the qualified electrical person the correct information about the potential hazard the individual situation poses.

A companion comment has been sent to Code-Making Panel 1 regarding the rejection of Comment 1-183 to section 110.24.

Panel Meeting Action: Reject

Panel Statement: The marking requirement is not included for the purpose of an arc flash hazard analysis. This marking is for equipment only.

The panel continues to support the concept in proposal 10-72 as modified by comment 1-115. See panel action, substantiation and statement on comment 10-26a.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

ELDRIDGE, C.: See my comment on 10-26a.

10-30 Log #1797 NEC-P10 **Final Action: Reject**
(240.35 (New))

Submitter: Michael P. Walls, American Chemistry Council

Comment on Proposal No: 10-72

Recommendation: If the new text from Proposal 10-72 is retained in Article 240, revise the Exception at the end of the text accepted by the panel to read as follows:

Exception: ~~In installations with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment, m~~Marking on the enclosure is not required if documentation of 240.35(1) and (2) is available upon request to the authority having jurisdiction.

Substantiation: ACC agrees with the Explanation of Negative provided by Mr. Fredericks. Available documentation containing the required information, but not marked on the equipment, should be accepted to meet the intent of this requirement for all facilities.

Written safety procedures are certainly valuable, but whether or not they exist for an installation is not necessarily related to whether or not separate short circuit documentation can be as effective, or more effective, than a label on the equipment.

Panel Meeting Action: Reject

Panel Statement: The Comment provides no substantiation to justify the reduced safety that would result by allowing installations without written safety procedures and qualified personnel to utilize the exception. The panel continues to support the concept in proposal 10-72 as modified by comment 1-115. See panel action, substantiation and statement on comment 10-26a.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

ELDRIDGE, C.: See my comment on 10-26a.

10-31 Log #1993 NEC-P10 **Final Action: Reject**
(240.35 (New))

Submitter: Donald A. Ganiere, Ottawa, IL

Comment on Proposal No: 10-72

Recommendation: This proposal should be rejected.

Substantiation: This proposal should be rejected per the comments of the panel members who voted against accepting.

Panel Meeting Action: Reject

Panel Statement: The panel continues to support the concept in proposal 10-72 as modified by comment 1-115. See panel action, substantiation and statement on comment 10-26a.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

ELDRIDGE, C.: See my comment on 10-26a.

10-32 Log #2267 NEC-P10 **Final Action: Accept in Principle in Part**
(240.35 (New))

Submitter: Michael J. Farrell, III, Lucas County Building Regulations

Comment on Proposal No: 10-72

Recommendation: Continue to accept the proposal as modified by the panel's "Accept in Principle in Part".

Substantiation: (1) The concept for the original proposal is critical to assure that equipment interrupting and short-circuit current ratings are adequate, as was evidenced by acceptance of similar proposals by both CMP-1 and CMP-10.

(2) A Task Group, consisting of CMP-1 and CMP-10 members, met at the direction of the TCC. It decided to correlate the requirements between the panels and place the requirements in Article 110.

(3) The proposal, as modified by CMP-10, should continue to be accepted by CMP-10, just in case CMP-1 does not continue to pass a similar proposal.

(4) If Panel 10 passes this comment and if CMP-1 continues to accept their original proposal (or passes the comment developed by the task group), the TCC is requested take action to nullify the action taken on this comment by CMP-10.

(5) Passage of this comment will assure that this much needed requirement will be found somewhere in the NEC, either in Article 110 or in Article 240. The TCC is requested to assure that it is not in both.

Panel Meeting Action: Accept in Principle in Part

The panel rejects the submitters recommendation to continue to accept in principal in part proposal 10-72.

Panel Statement: The panel continues to support the concept in proposal 10-72 as modified by comment 1-115. See panel action, substantiation and statement on comment 10-26a. The panel concludes that it has met the goals of the submitters substantiation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

ELDRIDGE, C.: See my comment on 10-26a.

10-33 Log #2556 NEC-P10 **Final Action: Reject**
(240.35 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 10-72
Recommendation: The proposal should be rejected.
Substantiation: This wording is unenforceable because the labeling that it will require may or may not become obsolete after it is applied, through no fault of any party to the process. The most frequent source of increased available fault currents is utility activities on their networks. If the day after the final inspection the utility upgrades its transformers and primary distribution outside the facility, the labeling will be obsolete from that day forward.

In this case, the obsolescence of the labeling creates a direct hazard, because those servicing the equipment will tend to believe the label; they will have entered a fool's paradise. There does not appear to be any way to make this proposal practicable, unfortunately. There is no substitute for contemporaneous application of 110.9 and 110.10, which in turn requires communication with the utility.
Panel Meeting Action: Reject
Panel Statement: The panel continues to support the concept in proposal 10-72 as modified by comment 1-115. See panel action, substantiation and statement on comment 10-26a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ELDRIDGE, C.: See my comment on 10-26a.

10-34 Log #2886 NEC-P10 **Final Action: Reject**
(240.35 (New))

Submitter: Timothy D. Curry, Curry Electric, Inc.
Comment on Proposal No: 10-72
Recommendation: PLEASE REJECT THIS PROPOSAL.
Substantiation: I KNOW MR. FARRELL PERSONALLY AND WHILE I APPLAUD HIS EFFORTS OTHERS WHO FOLLOW US WILL USE THIS AS THE INFORMATION THEY NEED FOR ARC FLASH PROTECTION. THAT CAN BE A DEADLY MISTAKE, AND IT MIGHT EVEN BE SUCH THAT NO ONE IN THE BUILDING IS INVOLVED. IF THE UTILTY OVERBUILDS THE PRIMARY DISTRIBUTION SYSTEM, OR CHANGES THE TRANSFORMER, OR THE SERVICE DROP CONDUCTORS GET CHANGED DURING REPAIRS AFTER A STORM, ANY OF THESE CAN AFFECT THE AVAILABLE FAULT CURRENT. IN TURN, A LOWER FAULT CURRENT CAN ACTUALLY INCREASE THE ARC FLASH HAZARD DUE TO THE LONGER CLEARING TIME ON THE UPSTREAM DEVICE. PLUS, I BELIEVE THIS WOULD BE WAY TOO COSTLY TO IMPLEMENT, ESPECIALLY ON A SIMPLE ADDED CIRCUIT OR MINOR MODIFICATION TO THE WIRING SYSTEM. PLUS, WHETHER WE LIKE IT OR NOT.
Panel Meeting Action: Reject
Panel Statement: The panel continues to support the concept in proposal 10-72 as modified by comment 1-115. See panel action, substantiation and statement on comment 10-26a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
ELDRIDGE, C.: See my comment on 10-26a.

10-35 Log #1420 NEC-P10 **Final Action: Reject**
(240.76 (New))

Submitter: Thomas F. Mueller, Southern Company Services
Comment on Proposal No: 10-82
Recommendation: This paragraph/proposal should be completely rewritten as follows and the fine print note deleted:

240.87 Non-Instantaneous Trip. When design and construction of a facility involves non-instantaneous trip style breakers, a fault current study shall be completed and made available to the authority having jurisdiction that details the design enhancements included which can be used to limit arc flash energy in the event energized work must be performed anywhere on the system.
Substantiation: The problem of assessing available arc flash energy cannot be simplified by the addition of maintenance switches or zone selective interlocking. In other words, it is ludicrous to assume that energized work can be undertaken while wearing rubber gloves, a cotton shirt and jeans, as long as the maintenance switch is thrown. There are many options available to limit arc flash energy. The proposal as currently accepted will tend to limit those options to the three listed and compliance will provide the appearance of safety in design while not actually mandating a system that can be worked safely. When an electrical system is large enough to require the use of short time breakers, it is also capable of delivering deadly arc flash blasts. Such systems are complicated and beyond the scope of cookbook design. Perhaps coordination can be adjusted such that available arc flash energy is reduced. Perhaps upstream or downstream relaying can be installed specifically to limit arc flash energy when energized work is to be done. These are but two options that provide meaningful protection from hazardous arc flash blasts, but are not on the proposed list.

And even if there are only instantaneous trip breakers involved in a complex system, an arc flash study should still be completed. An arc flash by its very nature has some amount of resistance to current flow. The reduced current flow while high enough to cause great damage, may not be high enough for an instantaneous trip of a thermal magnetic or electronic circuit breaker. An arc flash study would determine that the instantaneous trip setting of such breakers would need to be lowered in order for energized work to proceed.

The company I work for has designed, built, and operated many, many industrial style plants where the electrical design includes short-time delay breakers. Our company has an exemplary safety record so we are well aware of the arc flash hazards that are present when and if work involves energized electrical equipment. We have used all of the protection options listed in the proposal but not necessarily for arc flash mitigation. We have a robust arc flash protection program in place that involves both system design and an informed work force. That design has been effective but in almost all cases, did not include protection mandated by Proposal 10-82 as accepted. Without change, the proposal as accepted will require the addition of expensive components to the electrical system under the guise of safety, while not addressing the problem. That is, can a piece of equipment be worked on safely while energized, and if so, what precautions should be taken to limit the arc flash energy and what PPE should that employee be wearing?
Panel Meeting Action: Reject
Panel Statement: The proposed new requirement does not require the use of power circuit breakers without an instantaneous, but rather will require the use of one of the three list items (or approved equivalent means) whenever a power circuit breaker without an instantaneous trip is used. The new requirement does not encourage energized electrical work, but rather provides reduced energies if an arc-flash should occur during required work on energized equipment. A fault current study is always required in order to determine equipment interrupting ratings and short-circuit current ratings, to meet 110.9 and 110.10 respectively. See panel action on Comment 10-41.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ELDRIDGE, C.: See my comment on 10-38.
FREDERICKS, C.: I'm voting against this panel action to reject.

The submitter here made several excellent points including reference to experience that will be typical of Supervised Industrial Installations, that I don't believe the Panel statement well addressed. The intent should be to protect the worker and to allow knowledgeable parties latitude as to how that will be accomplished. Please see also my voting explanations on comments 10-44 and 10-38.

10-36 Log #1611 NEC-P10 **Final Action: Hold**
(240.87 (New))

Submitter: Christopher G. Walker, Eaton Corp.
Comment on Proposal No: 10-82
Recommendation: Modify the Panel's accepted text to read as follows:

240.87 ~~Non-instantaneous Trip~~ Arc Energy Reduction: Where a circuit breaker ~~without an instantaneous trip~~ rated for, or can be adjusted to, 1,000 Amperes or more is utilized, one of the following or approved equivalent means shall be provided:

(1) Zone-selective interlocking
(2) Differential relaying
(3) Energy-reducing maintenance switching with a local status indicator

FPN: An energy-reducing maintenance switch allows a worker to set a circuit breaker trip unit to operate faster while the worker is working within an arc flash boundary as defined in NFPA 70E, and then to set the circuit breaker back to normal setting after the potentially hazardous work is complete.
Substantiation: The Panel Action recognizes the importance of having electrical circuits open without delay in order to minimize arc flash hazards. This comment is focused on requiring the use of either currently available or future devices, technologies or design approaches that may be incorporated to further minimize arc flash hazards, regardless of the circuit breaker's Instantaneous or Short-Delay capabilities. The Panel's action focuses on only Non-Instantaneous circuit breakers may exclude certain circuit breakers that have an instantaneous trip, yet may have a higher amount of let-through energy. This comment also addresses Mr. Cook's Comment on the Affirmative: *"As an enforcement representative I have some concern about the difficulty of identifying non-instantaneous trip circuit breakers in the field."* These devices and technologies would be used to further enhance existing design and operational safety options such as the use of PPE and other arc resistant equipment per NFPA 70E. This comment is focused on requiring the use of these devices and technologies of circuit breakers rated for, or can be adjusted to, 1,000 Amperes or more. This aligns with the rating established for Ground-Fault Protection of Equipment per NEC 230.95.

Panel Meeting Action: Hold
Panel Statement: The panel does not accept the proposed new title or the inclusion of all circuit breakers rated for or adjustable to 1,000 amperes or more. The proposed revision was not suggested or addressed in the proposal stage. In accordance with the Regulations Governing Committee Projects 4.4.6.2.2, this comment is held for process in the next cycle where it will receive the necessary public review.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-37 Log #1880 NEC-P10 **Final Action: Reject**
(240.87 (New))

Submitter: Jason D'Antona, Partners HealthCare System Inc.
Comment on Proposal No: 10-82
Recommendation: Delete 240.87 in its entirety.
Substantiation: Mandated inclusion of these prescribed methods to reduce arc-flash hazards, poses a serious conflict with the requirements of Articles 620.62 (selective coordination of elevator driving machines), 695.3(C)(3) (selective coordination of fire pump over current protection devices), 700.27(selective coordination of Emergency Systems), 701.18 (selective coordination of Legally Required Stand-By Systems) and 708.54 (selective coordination of Critical Operations Power Systems). If implemented, the allowed use of energy-reducing maintenance switches will allow over-current protection devices (OCPD) to remain in an uncoordinated state while the switch is activated. Allowing this uncoordinated state on systems defined in Articles 620.62, 695.3(C)(3), 700.27, 701.18 and 708.54 leaves those electrical systems vulnerable to extended electrical outages-thus exposing building occupants to hazards.

In cases where instantaneous trip functions are not used on feeder circuit breakers in order to achieve selective coordination, zone selective interlock and bus-differential relaying may not be possible or practical, especially if down stream devices are located in remote locations.
Panel Meeting Action: Reject
Panel Statement: The proposed new requirement does not require that power circuit breakers without instantaneous trip be used, but that when they are utilized, one of the three arc-flash energy reducing methods (or approved equivalent means) also be utilized. These methods do not interfere with selective coordination of critical systems, but rather support the ability of the systems to selectively coordinate. See panel action on Comment 10-41.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ELDRIDGE, C.: See my comment on 10-38.
FREDERICKS, C.: I'm voting against this panel action to reject.
Please see my voting explanations on comments 10-35, 10-44 and 10-38.

10-38 Log #1911 NEC-P10 **Final Action: Reject**
(240.87 (New))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 10-82
Recommendation: Reject this proposal.
Substantiation: This proposal is a significant departure from the purpose of the NEC. The panel appears to be attempting to write a system design requirement that purports to accomplish some level of improved worker safety. However, it should be fully recognized that this is outside the purpose of the NEC. As stated in NEC 90.1, the purpose of the NEC is "practical safeguarding of persons and property from hazards arising from the use of electricity". A circuit breaker with a non-instantaneous function can be fully and safely utilized within the electrical system. In other words, the installation of a non-instantaneous trip circuit breaker does the job of protecting persons and property from hazards arising from the use of electricity. There is absolutely no basis to limit the use of the product as related to the electrical system installation requirements. The use of a non-instantaneous trip circuit breaker may result in low energy levels or in high energy levels depending on the system parameters. In either case, there are worker procedures and practices contained in NFPA 70E and OSHA requirements to handle the level of incident energy. Article 240 covers overcurrent protection requirements – not worker safety or incident energy.

Furthermore, this proposal will place an unnecessary burden on facility owners, operators and maintainers and should be rejected for a number of additional reasons.

1. Many companies strictly prohibit working on energized equipment, making this requirement totally unnecessary for them.

2. Others require their electrical maintenance workers to wear a minimum level of PPE. If the equipment will have an HRC equal to or lower than that, providing a means to reduce the hazard still further should not be required for them.

3. Many power systems are now being designed from the start with a low incident energy level by reducing the size of transformers or other design techniques that do not require the introduction of add-on systems like energy reducing maintenance switches or ZSI.

4. This proposal says nothing about reducing the Hazard Risk Category in fusible systems. It is a well documented fact that the use of Class L fuses can result in significantly higher incident energy levels that do equivalently sized circuit breakers, even without employing energy reducing maintenance switches or ZSI. The panel action requires a higher level of performance for systems protected by circuit breakers as compared to systems protected by fuses without any data or performance documentation to support such a difference.

5. This proposal does not address the need to provide multiple levels of energy reduction so as to minimize the impairment of selective coordination in the system.

6. The use of energy reducing maintenance switches can lead to the need for confusing labeling and operating instructions, thereby increasing the possibility that a worker will be inadequately protected when they think the equipment they are about to work on has been placed into a "safer" mode, but actually hasn't.

Panel Meeting Action: Reject
Panel Statement: The intent of this new requirement is to provide a reduced clearing time when and where justified energized work may be necessarily performed on equipment supplied by circuit breakers without an instantaneous trip capability. This requirement is indeed within the scope of the NEC as it is practical to provide a means to reduce the clearing time of circuit breakers without an instantaneous trip setting when and where justified energized work may be necessarily performed on equipment supplied by circuit breakers without an instantaneous trip capability.
This requirement does not limit in any manner the use of a circuit breaker without an instantaneous trip capability. Article 240 addresses overcurrent protection and is the appropriate location for a general requirement of this type. This requirement does not place a burden on any facility owner. Even companies that may prohibit energized work as a basic principle will be required to troubleshoot problems which will include voltage testing which is an energized task. Providing a means to reduce the clearing time when where justified energized work may be necessarily performed on equipment supplied by circuit breakers without an instantaneous trip capability is prudent and well within the scope of the NEC. This requirement does not impair in any way a selectively coordinated system. When an electrical worker enters equipment that is energized, regardless of whether it is selectively coordinated or not, the reliability of the system has been compromised. The use of energy reduction maintenance switches as well as all other methods will reduce the clearing time in the event of a fault.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ELDRIDGE, C.: When reducing the energy based on calculations to show the energy is reduced to an acceptable level, use of this switch for instantaneous tripping can create several problems:

1) The altered design to reduce the energy can compromise the effectiveness of the normal day-to-day protection scheme. It is undesirable to reduce the effectiveness of the system's protection if the instantaneous really is not part of the scheme, which could end up with tripping of other devices that could have unintended consequences.

2) The operating personnel using this proposed solution could greatly impact the devices that the switch is protecting if it was inadvertently left on, this condition would not allow the system to operate properly.

This is a work practice issue that is not covered by the NEC. The proposal will create a generic cookbook method of providing protection for workers without doing the proper analysis of the system to determine the proper PPE. Unknowingly, a false sense of security can be in place and possibly could result in an injury or fatality of a worker.

FREDERICKS, C.: I'm voting against this panel action to reject.

The panel statement either did not address or did not well address several good points that were made by the submitter. Re: the submitter's points:

1. Some companies do in fact prohibit all energized work on certain types of equipment, in addition to strongly restricting energized work on all equipment. Yes, voltage testing to confirm de-energization is still required, but with appropriate equipment, procedures and training, this is and should be recognized as a low-risk activity.

2. Adequate PPE has an excellent operational record of preventing arc flash injuries, and a requirement particularly at low voltage to reduce potential incident energies further below the ratings of the PPE does not seem valuable. I have never seen a documented case below 1000 volts where a worker that was protected by adequate PPE received any direct injuries from an arc flash, and I would be interested to hear if anyone could document such an incident.

3. As commented by the submitter, there are design options and in some cases the inherent nature of a system will be such that the addition of quick-trip maintenance switches or ZSI adds no additional safety benefit.

4. The submitter is correct that the proposal is unbalanced in not requiring similar measures for fusible systems protected by Class L fuses that will not be current-limiting for arcing currents, or for systems protected by breakers with an instantaneous trip that will not be activated by an arcing fault current.

5. The panel statement was correct that coordination with downstream devices is less relevant if a fault occurs within equipment, but potential loss of coordination by improper setting of a maintenance switch can still be a significant issue.

6. I agree with the thought that provision of quick-trip maintenance switches can result in a false sense of security that could lead a less-knowledgeable worker to take local action and make spot decisions to do energized work, based on a belief that they are protected by these devices. There could also be a false sense of security from assuming that all equipment on site has provisions that would now be required by code. There is not a substitute for adequate training, procedures, and PPE.

See also my voting explanation on comment 10-44.

10-39 Log #2011 NEC-P10 **Final Action: Reject**
(240.87 (New))

Submitter: Dennis M. Darling, Stantec
Comment on Proposal No: 10-82
Recommendation: Reject the proposal.
Substantiation: Primary direction of NFPA 70E is to De-Energize electrical equipment for worker safety. The proposed features will reduce but will not eliminate the electric hazards which can only be eliminated by removing all energy sources.

If any work needs to be performed on energized equipment a hazard risk analysis must be conducted justifying why the system can not be de-energized. A similar requirement for first de-energizing electrical equipment unless it is infeasible to do so exists in OSHA subpart S.

The IEEE/NFPA Arc-Flash Collaborative Research and Testing Project is presently working on quantifying the general arc-flash hazard. Until results of the results of the research and testing by the collaborative committee are complete both groups have agreed to not introduce codes or standards that may not be consistent with the findings of this investigation.

Other technologies exist to limit arc-flash incident energy.

This is a design issue and depends on safety and operational considerations.

The code should not provide a disincentive to the development of new technologies by providing a limited list of acceptable technologies and approaches.

Panel Meeting Action: Reject
Panel Statement: CMP 10 solidly supports the concept of de-energizing equipment whenever possible/feasible, according to principles in OSHA and NFPA 70E. However, as both OSHA and NFPA 70E detail, there are cases where energized work is justified. Under these cases, the requirements offered by this new Section will increase worker safety. This new requirement in no way encourages work on energized equipment. It does increase safety when energized work is required.

See the panel action and statement on comment 10-38.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

ELDRIDGE, C.: See my comment on 10-38.

FREDERICKS, C.: I'm voting against this panel action to reject.

Please see my voting explanations on comments 10-35, 10-44 and 10-38.

10-40 Log #2384 NEC-P10 **Final Action: Reject**
(240.87 (New))

Submitter: Michael A. Anthony, University of Michigan
Comment on Proposal No: 10-82
Recommendation: Accept the Proposal in Principle, but with the addition of another conditional phrase, as follows:

240.87 Non-instantaneous Trip. Where a circuit breaker without an instantaneous trip is utilized, **and where there are written, administrative procedures that permit working on energized equipment,** one of the following or approved equivalent means shall be provided:

(1) Zone-selective interlocking
(2) Differential relaying
(3) Energy-reducing maintenance switching with a local status indicator

Substantiation: Safety proposals of this nature have been conceptually cleared with our industry electrical professionals but some concern remains:

A- Does this proposal discourage de-energization of equipment; especially in motor control centers, where a fair amount of live work is undertaken? We want to *en*courage de-energization of equipment. This concern is captured in Mr. Darling's statement. We would like to work a little harder getting equipment simply turned off and a work a little slower on backing ourselves into specific equipment classes or technologies (though technological solutions are an important part of our work).

B - Does this proposal render some overcurrent protective schemes unspecifiable - especially those that do not have electronic trip units? Is ZSI available in, say, a substation main breaker with only Long-Short and Ground Fault protection? If it costs significantly more to add ZSI to the main breaker (which may or may not have adjacent breakers with which to communicate anyway) then we want to have the option of telling the Owner that the cost of not paying for ZSI is that the substation must be de-energized during servicing. Twenty-five years down the road, we want inspectors to be recognize no-time-delay schemes. We want our designers to have choices that span the entire safety-versus-economy continuum. If any of those breakers have their instantaneous functions effectively disabled, then the switchgear must be de-energized in order for work to proceed.

I think the industry under-estimates the degree to which Owners and occupants are willing to accommodate short 1-4 hour power outages so that electricians may work on equipment safely. We should start building enough redundancy into our building premises power systems so that electricians only need to work on de-energized equipment.

Panel Meeting Action: Reject
Panel Statement: As written, the comment would limit the new requirement to facilities that have written, administrative procedures that permit working on energized equipment. No substantiation is provided to reduce this safety requirement for facilities that do not have written administrative procedures.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-41 Log #2399 NEC-P10 **Final Action: Accept in Principle**
(240.87 (New))

TCC Action: The Technical Correlating Committee understands that the panel action on Comment 10-43 modifies the panel action on the Informational Note in Comment 10-41.
Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 10-82
Recommendation: Revise text from the Panel Action to read as follows:
240.87 Non-instantaneous Trip. Where a power circuit breaker is utilized without an instantaneous trip, or the instantaneous trip can be turned off, one of the following or approved equivalent means shall be provided:

(A) Zone-selective interlocking
(B) Differential relaying
(C) Energy-reducing maintenance switching with local status indicator

Where power circuit breakers are utilized, documentation shall be available to those authorized to design, install, inspect, or operate the device notifying field personnel the breaker does not or may not include an instantaneous trip function.

FPN: An energy-reducing maintenance switch allows a worker to set a circuit breaker trip unit to instantaneous while the worker is working within an arc-flash boundary as defined in NFPA 70E, and then to set the trip unit back to a normal setting after the potentially hazardous work is complete.

Substantiation: As stated in my comment on affirmative ballot during the ROP, I am supportive of proposed actions to protect installers that are required in some situations to perform work on energized equipment. Identifying the devices that are available and of concern has been difficult. While many breakers include an "Off" position for the instantaneous setting, they also include positions where the instantaneous protection is on. Those devices are not WITHOUT an instantaneous trip. That will make the enforcement of the requirement problematic. Revisions in the proposed text attempt to address the concerns raised by Mr. Cook and Mr. Ockuly in the affirmative ballots.
Panel Meeting Action: Accept in Principle

Revise text to read as follows:

240.87 Non-instantaneous Trip. Where a circuit breaker is utilized without an instantaneous trip, documentation shall be available to those authorized to design, install, operate or inspect the installation as to the location of the circuit breaker(s).

Where a circuit breaker is utilized without an instantaneous trip one of the following or approved equivalent means shall be provided:

(A) Zone-selective interlocking
(B) Differential relaying
(C) Energy-reducing maintenance switching with local status indicator

FPN: An energy-reducing maintenance switch allows a worker to set a circuit breaker trip unit to instantaneous to reduce the clearing time while the worker is working within an arc-flash boundary as defined in NFPA 70E, and then to set the trip unit back to a normal setting after the potentially hazardous work is complete.

Panel Statement: The panel has revised the proposed text for clarity. The panel deleted the text "instantaneous trip can be turned off" because the requirement addresses circuit breakers utilized without an instantaneous trip.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

DARLING, D.: Primary direction of NFPA 70E is to De-Energize electrical equipment for worker safety. The proposed features will reduce but will not eliminate the electric hazards which can only be eliminated by removing all energy sources. If any work needs to be performed on energized equipment a hazard risk analysis must be conducted justifying why the system can not be de-energized. A similar requirement for first de-energizing electrical equipment unless it is infeasible to do so exists in OSHA subpart S. Research and testing of the IEEE/NFPA Collaborative Effort on the Arc-Flash Hazard issue is presently working on quantifying the general arc-flash hazard. Other technologies exist to limit arc-flash incident energy. This is a design issue and depends on safety and operational considerations. The code should not provide a disincentive to the development of new technologies by providing a limited list of acceptable technologies and approaches.

ELDRIDGE, C.: See my comment on 10-38.

FREDERICKS, C.: I'm voting against this panel action to accept in principle.

Please see my voting explanations on comments 10-35, 10-44 and 10-38.

10-42 Log #2452 NEC-P10 **Final Action: Reject**
(240.87 (New))

Submitter: Paul Konz, RG Vanderweil Engineers
Comment on Proposal No: 10-82
Recommendation: Delete proposed 240.87.
Substantiation: Mandating these fixed methods as a prescribed means to prevent injury to workers has the potential to conflict and/or cause confusion with the employee safety requirements of NFPA 70E. In addition, the issue of equipment damage is addressed in 110.10.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on comment 10-39.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ELDRIDGE, C.: See my comment on 10-38.
FREDERICKS, C.: I'm voting against this panel action to reject.
Please see my voting explanations on comments 10-35, 10-44 and 10-38.

10-43 Log #1768 NEC-P10 **Final Action: Accept**
(240.87, FPN (New))

Submitter: Chad Kennedy, Schneider Electric/Square D
Comment on Proposal No: 10-82
Recommendation: Revise text as follows:
FPN: An energy-reducing maintenance switch allows a worker to set a circuit breaker trip unit to ~~instantaneous~~ no intentional delay while the worker is working within an arcflash boundary as defined in NFPA 70E, and then to set the trip unit back to a normal setting after the potentially hazardous work is complete.
Substantiation: Although this proposed language change will have limited value to new installations since current production circuit breakers have an instantaneous function included, the FPN is inaccurate in that in advising that a maintenance switch turns on a instantaneous function, it actually would more accurately move the breaker to a "no intentional delay" mode.
Panel Meeting Action: Accept
Panel Statement: The statement in the substantiation that all "current production circuit breakers have an instantaneous function" applies only to molded case circuit breakers, not to power circuit breakers.
The panel understands that the FPN as written in the panel action on comment 10-41 is modified by this action.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ELDRIDGE, C.: See my comment on 10-38.
FREDERICKS, C.: I'm voting against this panel action to accept.
Please see my voting explanations on comments 10-35, 10-44 and 10-38.

10-44 Log #1798 NEC-P10 **Final Action: Reject**
(240.87, FPN 2 (New))

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 10-82
Recommendation: Add an additional FPN at the end of the text approved by the panel to read as follows:
FPN 2: Approved equivalent means may consist of one or more of the following: current limitation, available fault current reduction, arc resistant equipment, application of procedures that ensure PPE is rated to meet the available arc flash hazard energy, and procedures that ensure de-energized maintenance.
Substantiation: ACC agrees with the Explanation of Negative Vote provided by Mr. Fredericks. The proposed addition is in accordance with that Explanation of Negative Vote; equally-safe design and operational options should not be restricted. This is a technically-challenging addition to the code, so it is all the more important to ensure that Code users are fully aware of the panel's intent.
Panel Meeting Action: Reject
Panel Statement: The methods proposed in the comment do not address the accepted requirement in comment 10-41.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ELDRIDGE, C.: See my comment on 10-38.
FREDERICKS, C.: I'm voting against this panel action to reject.
This new requirement in 240.87 is well-intentioned and seeks to make a code requirement of practices that are usually valuable and usually a practical cost to apply. However, the new requirement is disproportionate in the equipment addressed and too prescriptive and too restrictive in the new requirements it adds.
Necessary guidance towards flexibility in the application of this new requirement, as proposed by this comment, here is specifically rejected by the panel, I believe without reasonable cause.
The panel statement claims that the alternate methods proposed in the comment do not address the accepted requirement, but they specifically do. Each of the alternate methods listed has a proven operational record in reducing arc flash hazards and injuries. For example, adequate PPE has a long and successful operational history in preventing arc flash injuries, particularly at the lower voltages addressed by this new requirement. It is important to understand that even with adoption of this new requirement, adequate PPE and in some cases a full flash suit, will still be required.
See also my voting explanation on Comment 10-38.

10-45 Log #1610 NEC-P10 **Final Action: Reject**
(240.91)

Submitter: Kevin J. Lippert, Eaton Corporation
Comment on Proposal No: 10-83
Recommendation: Do not accept this Proposal.
Substantiation: Acceptance of this Proposal will allow conductors to be sized beyond their tested conditions as evaluated for connection to end-use equipment. No data has been submitted to justify the subsequent increased temperature rise that will affect all of the connected equipment.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on comment 10-49.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MANCHE, A.: See the NEMA voting comment on Comment 10-49.

10-46 Log #1654 NEC-P10 **Final Action: Reject**
(240.91 (New))

Submitter: John W. Young, Siemens Industry
Comment on Proposal No: 10-83
Recommendation: Reject the Proposal.
Substantiation: Protection of the conductor is a standards issue. The standard requires that the circuit breaker be evaluated with rated wire and compliance is demonstrated by test. Putting a statement in the Code that smaller wire can be used does not mean that the wire is protected. The substantiation states that the conductors are protected against overloads by load calculations and monitoring. Protection is provided by the circuit breaker. If protection could be provided by load calculations there would be no need to have the circuit breaker (or fuse).
The substantiation also states that protection is provided by monitoring but there is no requirement for monitoring in the proposal.
The substantiation notes that short circuit protection is accomplished by a short circuit study but a short circuit study does not prove that the conductor is protected. This is demonstrated by test as required by the Standard.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on comment 10-49.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MANCHE, A.: See the NEMA voting comment on Comment 10-49.

10-47 Log #1769 NEC-P10 **Final Action: Reject**
(240.91 (New))

Submitter: Chad Kennedy, Schneider Electric/Square D
Comment on Proposal No: 10-83
Recommendation: This proposal should be rejected.
Substantiation: It is important to recognize that the panel has written a rule that tells the users of the NEC to misapply listed electrical products. Not a shred of evidence has been presented to the panel that shows that the products in question can be applied safely in the manner outlined in the code text. It is the responsibility of the submitter to produce credible and substantial evidence to show that the products can be safely used in the manner proposed. Under almost all other circumstances code panels have required fact finding reports, studies, etc. from third parties to show that a particular application can be safe. This proposal seeks to push the thermal performance of equipment well beyond any thermal values evaluated as part of the listing of the equipment.
The panel needs to give serious reconsideration to this proposal and consider the following:
What do we know:
1) No data has been provided by the submitter to support this relaxation of the conductor ampacity rules.
2) Thermal operating temperatures of the equipment will increase – this is simple physics – if you decrease the ability of the conductor to sink away heat by making the conductor smaller, the temperature within the equipment will increase.
3) An increase in thermal operating temperatures will impact equipment resulting in reduction in its life cycle and possible premature failure or equipment operation issues.

4) If conductor size is reduced, thermal operating temperatures will increase, in most cases, beyond those permitted by the standard resulting in negative performance concerns (we know this through limited testing that we have performed).

5) The thermal coordination of materials and components within the equipment is lost

6) At least a 10% rise in heat rise temperatures on components has been seen in the lab in non comprehensive testing

What is unknown, due to no data being provided by the submitter:

1) The higher temperature impact on the performance and useful life of insulation systems, device lubricants, springs, bus and cable terminations, enclosure gasket material, and plating as well as components used in the equipment.

2) If the equipment can operate safely at higher temperatures than permitted by UL why has the UL standard not been revised to reflect those higher permitted operating temperatures?

Further review of industry inspection and maintenance standards such as NEMA PB1.1, PB2.1, AB4, and BU1.1 demonstrate the importance of equipment temperature restrictions within the design and product standard ratings. For this proposal, compliance with the original design and appropriate industry product standard is no longer assured. The code panel must reject this proposal until a fact finding study, which would provide data, can demonstrate that the numerous known issues and unknown impact have been reviewed and addressed.

How can the code panel adopt a provision that in plain and simple terms applies the product in a manner not intended by the manufacturer or the product standard?

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on comment 10-49.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

MANCHE, A.: See the NEMA voting comment on Comment 10-49.

10-48 Log #1922 NEC-P10 **Final Action: Reject**
(240.91 (New))

Submitter: Travis Lindsey, Travis Lindsey Consulting Services

Comment on Proposal No: 10-83

Recommendation: This proposal should be rejected.

Substantiation: The committee has not considered all of the variables associated with the temperature performance of conductors. the insulation performance of conductors and the
intricate relationship of conductor temperature to the equipment temperature limitations and ultimately system wide safety and performance.

Recent research shows that the effect of temperature on conductors is a much closer relationship than previously expected. In research of elevated ambient temperatures above rooftops by TLCS laboratory. a number of situations were tested. Many samples and experiments resulted in temperature rises exceeding the
allowable in NEC 310.16 for the associated conductors. The thermal performance of equipment attached to conductors increased by this change is not likely to be
suitable for the resulting temperature increases. The conductor and conductor insulation are likely to be impacted dramatically by the increase in temperature. The committee should not accept a significant change without substantial background investigation including literature research, fact finding, laboratory and field
testing. Even if this code panel determines the conductor can be appropriately protected with the proposed reduction in conductor ampacity. this long standing rule
must not be changed without an effort to coordinate with code panels 6, 7. 9 and others. The lack of coordination will create a situation where conductor ampacities
are increased without proper consensus of the technical committees charges with ensuring the proper use of conductors and equipment.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on comment 10-49.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

MANCHE, A.: See the NEMA voting comment on Comment 10-49.

10-49 Log #2010 NEC-P10 **Final Action: Accept in Principle**
(240.91 (New))

Submitter: Dennis M. Darling, Stantec

Comment on Proposal No: 10-83

Recommendation: 240.91 Protection of Conductors. Conductors shall be protected in accordance with 240.91(A) or (B).

(A) General. Conductors shall be protected in accordance with 240.4.

(B) Devices Rated over 800 Amperes. Where the overcurrent device is rated over 800 amperes, the ampacity of the conductors it protects shall be equal to or greater than 95% of the rating of the overcurrent device defined in 240.6, where the conductor is protected within recognized time vs. current limits for ~~all~~ short circuit currents ~~of up to 1000 seconds duration~~.

Substantiation: The proposed action should have been Accept in Part:

The phrase "*all*" and "*up to 1,000 seconds duration*" should be deleted.

No published data is currently available to warrant the 1,000 second duration for cable damage curves.

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

240.91 Protection of Conductors. Conductors shall be protected in accordance with 240.91(A) or (B).

(A) General. Conductors shall be protected in accordance with 240.4.

(B) Devices Rated over 800 Amperes. Where the overcurrent device is rated over 800 amperes, the ampacity of the conductors it protects shall be equal to or greater than 95% of the rating of the overcurrent device defined in 240.6 where:

1) the conductors are ~~is~~ protected within recognized time vs. current limits for ~~all~~ short circuit currents ~~of up to 1000 seconds duration~~. and
2) where all equipment in which the conductors terminate is listed and marked for the application.

Panel Statement: The panel added the equipment listing requirement to address the concerns in the balloting of proposal 10-83 as well as those expressed in other comments.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

DARLING, D.: The following phrase was added by CMP-10, "where all equipment in which the conductors terminate is listed and marked for the application." **This is new material and has not had public review.**

MANCHE, A.: It is noted that the code panel has recognized the unresolved concerns voiced in the number of negative comments with regard to reducing conductors in equipment by attempting to put language in the NEC that would require the equipment to be evaluated through Listing and Marking the equipment for such application. Unfortunately there has been not data presented to the code panel that supports this application. NEMA has historically taken positions against the introduction of a product application where product standards requirements are voided. An example of the introduction of a product for use in an unintended application was found in 250.122 for a number of cycles where ground fault protection of equipment would permit the equipment grounding conductor to be reduced in size. An application that was granted by CMP-5 which required the ground fault protection to be "listed for the purpose." It was introduced into the 1999 NEC and removed in the 2008 NEC because no product standard was ever drafted or developed.

No data has been presented that supports a safe application of product beyond its UL Listing today. The code panel is attempting to support an application that has no documented safety record.

Comment on Affirmative:

DOLLARD, JR., J.: We are voting affirmative on the panel action to Accept in Principle Comment 10-49. Our comments are as follows:

In the Explanation of Negative Vote by Mr. D. Darling, it is stated that the panel action to include the phrase "where all equipment in which the conductors terminate is listed and marked for the application" constitutes new material and has not received public review.
This is incorrect.

The submitter of Comment 10-49 sought to modify the panel action to Accept Proposal
10-83. It is imperative to review Proposal 10-83 in the ROP.

See page 234 of the ROP. In the second and third paragraphs of the Explanation of Negative Vote on Proposal 10-83 by Mr. A. Manche, there is significant comment on the need for overcurrent devices used in this manner to be listed for the application.

The panel action to include this text is in direct response to the concerns expressed by Mr. A. Manche in the ROP.

There is no conflict, this is not new material. This concept had adequate public review in the ROP.

10-50 Log #2557 NEC-P10 **Final Action: Reject**
(240.91)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 10-83
Recommendation: The proposal should be rejected.
Substantiation: Why 95%, and not 94% or 96%? Is it just a coincidence that 95% of 400 amperes is 380 amperes, the 75° temperature column ampacity for 500 kcmil copper conductors? Have we seen this before? This is just another attempt to substitute 500 kcmil conductors in applications that would normally require 600 kcmil conductors. There has been no technical substantiation to support the impact of the change on the performance of the equipment to which the smaller sized conductors will be connected, either in terms of the termination performance or of the equipment itself. Remember, manufacturers have historically been secure in basing their equipment designs around UL and NEC temperature limitations at terminations. The wire and the equipment are evaluated as a system, and often the wires are a heat sink for the equipment. A 20% additional cross-sectional area for a connected conductor (500 kcmil vs. 600 kcmil) can obviously make a significant difference in how the equipment dissipates internal heat. If the proposal is accepted, UL will presumably be forced, quite correctly, to initiate a file review protocol for large equipment, resulting in substantial upheaval in equipment designs that will end up as a lose-lose proposition for both users and manufacturers alike.

It can be conceded that this proposal does address the performance of the conductors over the length of the run. However, every wire has both a middle and two ends. Any proposed approach to this subject must address both aspects; preferably on separate pieces of paper to there is no confusion between these differing problems. When we require separate conductor derating calculations for mutual conductor heating [310.15(B)(2)(a)] and for termination limitations [110.14(C)], and then selecting for the worst case, we are applying this principle. The substantiation for this proposal omits any mention of the latter, and as such must not be accepted.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on comment 10-49.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MANCHE, A.: See the NEMA voting comment on Comment 10-49.

10-51 Log #2739 NEC-P10 **Final Action: Reject**
(240.91 (New))

Submitter: Christel K. Hunter, Alcan Cable
Comment on Proposal No: 10-83
Recommendation: Delete new language in 240.91.
Substantiation: There has been no substantiation that the reduced conductor size is adequate for the anticipated installations. While it is unlikely that reducing the conductor size will damage the conductors, it is unclear what the impact on connection longevity and equipment reliability will be.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on comment 10-49.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MANCHE, A.: See the NEMA voting comment on Comment 10-49.

10-52 Log #1312 NEC-P10 **Final Action: Reject**
(Table 240.92(B))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 10-84
Recommendation: The Proposal should be Accepted.
Substantiation: The Panel Statement chose the 3 rd definition in the dictionary and ignored the first two definitions of formula.

A formula can be an expression of a chemical composition or even a baby's formula and usually does not include an "=" sign. The Webster's Collegiate Dictionary, Eleventh Edition, first definition for equation is "the act or process of equating". An equation indicates that the variable on the left of the "=" sign equals the combination of variables on the right side of the "=" sign as stated in 2a of the definition of equation: "formal statement of the equality or equivalence of mathematical or logical expressions".
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms their rejection of this proposal. The proposed revisions do not add clarity or improve usability.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 250 — GROUNDING

5-35 Log #2084 NEC-P05 **Final Action: Reject**
(250, Part II)

Submitter: Jim Davis, Electrical Education Services, LLC
Comment on Proposal No: 5-81
Recommendation: Change the current heading for Part II of Article 250 to include the words "and System Bonding" as follows:
II. System Grounding and System Bonding.
Substantiation: The code panel is respectfully requested to reconsider the submitter's substantiation provided with the original proposal along with the explanation of negative provided by Mr. Brett, Jr. in the ROP for the 2011 NEC. By accepting this proposal, code users are presented with the clear distinction between "system" bonding (which is critical to overcurrent device operation) and all other bonding, which is critical to providing an effective path back to the system bonding connection. This would improve code clarity and actually agree with the current layout of the code text.
Panel Meeting Action: Reject
Panel Statement: See the panel statement for Proposal 5-81. Article 250 Part II is about grounding of electrical systems. Sometimes that is achieved via a main or system bonding conductor and therefore those requirements are properly located in Part II. Bonding in general was purposefully separated into Part V in the 1999 NEC process to assist users in understanding the difference in "grounding" and in "bonding". The diagram in 250.1 provides guidance that elements of bonding apply into multiple parts of Article 250, yet the parts do not have to each have the title changed to reflect that relationship.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-36 Log #79 NEC-P05 **Final Action: Accept**
(Figure 250.1, Title of Part X, 250.180, 250.182 250.188)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-51a
Recommendation: The Technical Correlating Committee directs the panel to clarify the panel action on this proposal with respect to retaining the term "high-voltage" in the first sentence of the revised 250.188(A) and anywhere else in this Article.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel recognizes that the text is correct in the ROP draft. The term "high-voltage" was deleted.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-37 Log #579 NEC-P05 **Final Action: Accept in Principle**
(250.2)

Submitter: Charles R. Miller, Lebanon, TN
Comment on Proposal No: 5-52
Recommendation: Move existing definition of "System Bonding Jumper" from Article 250 to Article 100.
Substantiation: This term is used in more than one article. Besides Article 250, System Bonding Jumper is in 708.20(C) Exception.
Panel Meeting Action: Accept in Principle
Revise ROP draft text to read as follows:

Bonding Jumper, System. The connection between the grounded circuit conductor and the supply-side bonding jumper, or the equipment grounding conductor, or both, at a separately derived system.
Panel Statement: The panel accepts the definition as stated and relocates the definition to Article 100.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-38 Log #2558 NEC-P05 **Final Action: Accept**
(250.2)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-55
Recommendation: Continue to reject the proposal.
Substantiation: The term is used throughout the NEC and does belong in Article 100. It would be an entirely appropriate addition to that article. An electrical component is "likely to become energized" if the failure of a single insulating element, such as the insulation on an ungrounded conductor, could result in the component becoming energized. This definition should be resubmitted in the 2014 NEC cycle to CMP 1 for action in Article 100.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-39 Log #1491 NEC-P05 **Final Action: Accept**
(250.2.Ground Fault)

Submitter: Timothy M. Croushore, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Please reconsider this proposal. Please revise the definition of ground fault in 250.2 to read as follows:
Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment or earth.
Substantiation: I would like to commend CMP-5 and the TCC for trying to resolve this issue. It turns out to be a rather complicated issue to resolve. If possible and not technically incorrect, this definition for "ground fault" should probably be moved from 250.2 to Article 100 definitions. Once in Article 100, it can be properly used in the other places in the Code that discuss the term "ground fault".

Please allow me to make the following points with regard to the grounded conductor and the definition of the term "ground fault".

1. The definition of ground fault should be acceptable to conductors of both service supplied and separately derived electrical systems.
2. The grounded conductor is by definition a normally current carrying conductor. Therefore, the definition as proposed by the TCC's suggested wording in the response to CMP-5's panel action will not be appropriate.
3. In a service supplied electrical system, the grounded conductor, the equipment grounding conductors, the grounding electrode conductors and the metallic enclosures are connected together at the main disconnecting means. This connection at the main disconnecting means is not a ground fault.
4. Further, either the proper (250.32 (B) Exception) or errant re-grounding of the grounded conductor somewhere on the circuit other than the main disconnecting means is also not a ground fault.
5. At the main disconnecting means of a service supplied electrical system, if an ungrounded conductor comes in "accidental" contact with a wire connected to the grounded bus, it is a ground fault no matter if the insulation on the wire is bare, or colored/marked white or green.
6. Last point. Please think about fault current in terms of the source of the current. All fault current starts at one terminal of the source and returns to another terminal of the same source. The ac source could be either a transformer, generator or power electronic inverter/converter. It doesn't matter who owns the ac electrical source such as electric utility or building/facility owner. If the fault current only involves the phase or line terminals/conductors (ungrounded terminals/conductors) it is a short circuit. However, if the fault current involves any path back to the grounded neutral point or intentionally grounded terminal of a corner grounded delta source, it should be called a ground fault.

I know from the panel statement on proposal 5-54 that the panel wishes to call an unintentional connection with high fault current between an ungrounded conductor and a grounded conductor a "short circuit". However, in reality, it is actually not a short circuit when referenced back to the ac source. So, while not completely correct either, lets use the above definition in this comment because it is, at least, not incorrect.
Panel Meeting Action: Accept
Panel Statement: The recommendation in the comment does not revise the text of the 2008 NEC. Note that the definition of "ground fault" was moved to Article 100 by CMP 5's action on Proposal 5-10. CMP 5 does not necessarily agree with the substantiation for this comment.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:

MOHLA, D.: The proposed wording is identical to the present wording in the 2008 NEC. The Proposal
5-54 definition included the neutral conductor which is a grounded conductor and not included in the present definition. A fault from a neutral to a ground can result in damage to property and personnel if not detected and cleared.

5-40 Log #2282 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Adam Baker, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Revise as follows:
Ground Fault: An unintentional, electrically conducting connection between an undergrounded conductor of an electrical circuit and ~~the normally non-current carrying conductors,~~ (earth), metallic enclosures, metallic raceways, (and) metallic equipment (that are sufficiently grounded and provide a well conductive path to the ground).
Substantiation: I believe that the current definition of ground fault is misleading. The connection between an ungrounded conductor of an electrical circuit and the normally non current carrying conductor should fall under the definition of short circuit. The current carrying conductor and non-current carrying conductor are part of a circuit. Therefore, if the non current carrying conductor were to come in contact with the current carrying conductor of the same circuit or if the non current carrying conductor and the current carrying conductor of another circuit where to come into contact then the circuit(s) would short out.

However, if the current carrying conductor of a circuit were to come in contact with a conductive object (metal pole, metallic enclosure) and that object was well grounded, then the current would now have a direct path to the ground. In return, this would cause a ground fault on the electrical circuit.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-41 Log #2283 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Jennifer Robinson, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Revise to read as follows:
Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the grounded conductor or normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment or earth.
Substantiation: I agree with the definition provided in Proposal 5-57. The wording, "normally non-current-carrying conductor" found in the current NEC definition can be unclear. A "grounded conductor" can also be a normally current-carrying conductor making the statement in the original definition of a ground fault provided in the 2008 NEC incorrect. The definition only refers to "ungrounded" conductors making contact with "normally non-current-carrying" conductors, which doesn't necessarily include "ungrounded" conductors that make contact with "grounded" conductors that can be "normally current-carrying" conductors. The definition proposed in Proposal 5-57 just clearly states "grounded conductor or normally non-current-carrying conductors…" eliminating any confusion concerning which conductors are in question.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-42 Log #2284 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Brandon W. Gibellino, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: I agree with the recommendation of Mr. Timothy M. Croushore, Allegheny Power/Rep. Edition Electric Light and Power Group. Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the grounded conductor or normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment or earth.
Substantiation: It is more effective to clearly specify that the line component of a line-to-ground fault is "an ungrounded conductor" rather than "a normally current carrying conductor"; and the ground component of a line-to-ground fault can be "a grounded conductor" as well as "normally non-current-carrying conductors". This eliminates any confusion when considering the neutral wire, which can provide a return path for current or which can also be tied to ground. The recommendation above clearly states the definition of a line-to-ground fault.

Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-43 Log #2285 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Andrew Bilitski, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: I strongly concur with the proposed recommendation and its substantiation that discusses Soares' two distinctions between a short circuit and a ground fault, but it is important to modify or add to these terms for today's current practices and the ever-changing future.
Substantiation: Due to the current scenarios used in modern day facilities and equipment, a new distinct term should be developed to describe an intentional inappropriate fault that behaves in the same fashion as a ground fault. The term "fault" carries the connotation of "undesired" with it, and in many situations current on a normally non-current-carrying line is preferred. A new term should clarify this discrepancy.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-44 Log #2286 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Zachary Nyce, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: I believe that this is the correct definition for Ground Fault:
Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the grounded conductor or normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment or earth.
Substantiation: Since most of the time a grounded conductor is a non-current-carrying conductor, saying a grounded conductor makes more sense, since it is called a "Ground Fault".
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-45 Log #2287 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Christopher M. Pilch, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Revise to read as follows:
An unintentional, electrically conducting connection between an ungrounded conductor of electrical circuit and grounded conductor or normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment, or earth.
Substantiation: I am in support of Mr. Croushore's definition. The current definition does not properly define a neutral conductor. A neutral conductor can carry current. Also, grounded fault is a type of short circuit.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-46 Log #2288 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Raymond Arnold, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: I propose that the definition be revised as follows:
"Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and a grounded conductor ~~normally non-current-carrying conductors~~, metallic enclosures, metallic raceways, metallic equipment, or earth."
Substantiation: A fault between an ungrounded conductor to any other conductor, non-current-carrying or otherwise, may not provide a path to ground. Should an ungrounded current-carrying conductor come in contact electrically with another ungrounded conductor, this may qualify as a fault; however, it may not provide a path to ground. Furthermore, the current definition provides that a ground fault is an electrical connection between an ungrounded conductor and earth, but not that a connection between a grounded conductor and an ungrounded conductor. Depending on the resistance of the grounded conductor, the loss may be negligible, and, thereby, provide a solid ground.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-47 Log #2289 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Bridget Meadows, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: I agree with the proposed definition provided by Mr. Croushore.
Substantiation: It is agreed that the unintended, electrically conducting connection of the ungrounded conductor to ground is a ground fault. However, the unintentional, electrically conducting connection of the ungrounded conductor to the grounded conductor is also a ground fault; electrical current is still flowing from the ungrounded conductor through an unintended, direct connection to ground. This can be seen through symmetrical component study. In symmetrical components, a single line to ground and a line to line to ground connection are both considered ground faults. As seen in Figure A,That I have provided electrically, the only difference between Fault A and Fault B would be the impedance of the grounded conductor; in both causes, an unintended electrical connection has been made from the ungrounded conductor to ground.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-48 Log #2290 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Morgan Cooper, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Revise to read as follows:
Ground Fault. An unintentional, electrically conducting connection between a normally current carrying conductor of an electrical circuit, and the normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment (or any other objects with a conductive path to) earth.
Substantiation: In the report on proposals A2010 Comment No. 5-54 Log #56 NEC-P05, the proposed definition of ground fault was rejected because the panel states that proposed definition is a short-circuit, not a ground-fault. To my knowledge, there is currently no definition for short circuits in the NEC. As in the recommendation submitted by Timothy M. Croushore, I agree with the proposed definition for a short circuit as "an unintentional, electrically conducting connection between two or three ungrounded conductors of an electrical circuit". If this is not the proper definition of a short circuit, then a more accurate description should be added to the NEC. I believe a ground fault is a connection between an electrically carrying conductor and any object with a relationship or link to ground. A ground fault can include many different sources such as a structure, vegetation, the neutral conductor, and others. This is why I added the comment "(or any other objects with a conductive path to) earth."
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-49 Log #2291 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Pedram Vaziri, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Change the definition to read as follows:
Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the ground conductor, metallic enclosures, metallic raceways, metallic equipment or earth.
Substantiation: A grounded conductor is a return path of the electricity to its original source. The phrase "the normally non-current-carrying conductor" should not be interchanged with grounded conductor. Otherwise, one interpretation of the definition can count the connection between neutral and earth as a ground fault; earth does not carry current, but a neutral conductor does.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-50 Log #2292 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Logan Hughes, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Revise to read as follows:
An unintentional electrically conducting connection between ~~an ungrounded or grounded~~ a normally current carrying conductor of an electrical circuit, and the normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment, or earth.
Substantiation: I agree with the definition above. Specifying that the conductor is current carrying. A normal current carrying conductor is usually ungrounded, but they also consider it to be grounded or neutral.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-51 Log #2293 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Nathan J. Bard, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: I agree with Proposal 5-57's definition for Ground Fault.
Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the grounded conductor or normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment or earth.
Substantiation: The definition of Ground Fault as it currently reads is misleading since the neutral of a circuit can be a normally current carrying conductor. This implies that a connection between the neutral of a circuit and a normally non-current-carrying conductor, metallic enclosure, metallic raceway, metallic equipment or earth would be considered a Ground Fault. Using the Symmetrical Component method for calculating fault currents, we see that a connection between the neutral and any grounded component would only change the zero sequence impedance slightly since the neutral can already be grounded and this would not cause a higher level of current to flow during operation, although there could be current flow in normally non-current conducting equipment.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-52 Log #2294 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Michael Kalata, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Revise to read as follows:
Ground Fault. An unintentional, electrically conducting connection between an ungrounded normally current carrying conductor of an electrical circuit, and the normally non-current-carrying conductor, grounded neutral conductor, metallic enclosures, metallic raceways, metallic equipment, or earth.
Substantiation: This definition adds the case of a phase to neutral connection, which normally is a current-carrying conductor, but can cause a ground fault if connected with another normally current carrying conductor.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-53 Log #2296 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Corey L. Edge, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: I agree with the proposal made by Tim Croushore of Allegheny Power.
Substantiation: If an ungrounded conductor contains a normally non-conducting conductor and creates a fault sending current into the ground, then the fault would be considered a ground fault, not a short circuit fault. If your return path is ground, but a fault sends current into ground, it is still a ground fault.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-54 Log #2297 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Mark Zucca, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Revise to read as follows:
Ground Faul. : An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the grounded conductor or normally non-current carrying conductors, metallic enclosures, metallic raceways, metallic equipment or earth.
Substantiation: The issue is with the use of the term "a normally current carrying conductor" is Proposal 5-57, since a grounded conductor or neutral conductor is also a "normally current carrying conductor", a connection between this grounded conductor and the equipment-grounding conductor path would be considered a ground fault according to Proposal 5-57, while this is a grounding error, this term "ground fault" is not the correct term for this occurrence.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-55 Log #2298 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: David Purkey, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Revise to read as follows:
Ground Fault. The accidental or unintentional electrically conducting connection between an ungrounded normally current carrying conductor of an electrical circuit and the grounded conductor and/or related grounded appurtenances, (enclosures, metallic equipment, etc.), normally non current carrying.
Substantiation: Generally, I agree with Mr.Croushore, suggest revised wordage to clarify conditions for a ground fault. 110.10 specifies phase to phase as well as phase to ground faults in the definition of a "fault." The use of the word "accidental" further emphasizes this condition not to be in the design criteria, while the addition of "current carrying" distinguishes further that the conductor is typically energized and this condition is an occurrence between an energized conductor and a ground conductor appurtenances only.

Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-56 Log #2301 NEC-P05 **Final Action: Reject**
(250.2.Ground Fault)

Submitter: Bryan Selestak, Allegheny Power
Comment on Proposal No: 5-54
Recommendation: Accept in Principle the proposal. Change the definition to read as follows:
Ground Fault. An ~~unintentional~~ unwarranted, electrically conducting connection between an ungrounded conductor of an electrical circuit and the normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment, or earth.
Substantiation: The word "unintentional" in the original definition applies the possibility of intent. In reality, no one "intends" to cause a ground fault. The word "unwarranted" implies that the ground fault was a complete accident and no intent was involved.
Panel Meeting Action: Reject
Panel Statement: The definition of "ground fault" as it appears in the 2008 Edition of the NEC is appropriate for the application of the requirements of the NEC. See panel actions and statements on Proposal 5-10 and Comment 5-39.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-57 Log #1051 NEC-P05 **Final Action: Reject**
(250.6(A), FPN (New))

Submitter: Gregory P. Bierals, Samaritan's Purse World Medical Mission
Comment on Proposal No: 5-63
Recommendation: Accept this proposal to add text as follows:
Capcitive charging current normally present in equipment grounding conductors is not the objectionable current addressed in this section.
Substantiation: Most people are unaware that some current is normally present in equipment grounding conductors due to capacitive coupling between these conductors and adjacent conductors that are carrying current. This is a normal and not objectionable condition.
Panel Meeting Action: Reject
Panel Statement: There is no evidence indicating that the lack of this note has caused any problems with the use of this section. There may be cases where the level of capacitive charging current imposed on equipment grounding conductors, metallic raceways or enclosure could be objectionable for proper operations.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-58 Log #479 NEC-P05 **Final Action: Reject**
(250.8(A)(5) and (6))

Submitter: Thomas Lawshe, Bagby & Russell Electric Co., Inc. / Rep. IBEW Local 505, Mobile, AL
Comment on Proposal No: 5-73
Recommendation: Revise text to read as follows:
250.8(A)(5) Machine screw–type fasteners that ~~engage not less than two threads or~~ are secured with a nut. ~~(6) Thread–forming machine screws that engage not less than two threads in the enclosure.~~
Substantiation: Reference: NEC Article 422 Appliances.
In addition, over the past 10 years in the electrical industry with the introduction of non-linear loads, vibration and noise currents, is a problem with grounds becoming "loose." Manufacturers today are making appliances with extremely thin metal causing thread-forming machine screws to "loosen" due to vibration and "noise currents."
Panel Meeting Action: Reject
Panel Statement: The substantiation is based on manufacturers that used very thin sheet metal. The engagement of two full threads would require a sufficient sheet metal thickness, or a punch to provide adequate thread engagement to mitigate the problems observed. A 32 thread per inch would require 1/16" sheet metal which approximately is 16 gage galvanized or 15 gage mild steel sheet metal. The UL standards have used the two full thread engagement criteria in a number of standards without reported incidents. There was no technical substantiation for imposing a requirement to always use a nut without regard to metal thickness.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-59 Log #80 NEC-P05 **Final Action: Accept**
(250.20(D))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-83
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 5-101 that has deleted 250.20(D).
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: Section 250.20(D) in the 2008 NEC is deleted by the action on Proposal 5-101. The opening paragraph of 250.20 in the 2011 NEC ROP Draft appears to be correct.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-60 Log #1291 NEC-P05 **Final Action: Accept in Principle**
(250.21(C) (New))

Submitter: David E. Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education
Comment on Proposal No: 5-86a
Recommendation: Revise text to read as follows:
~~If systems are ungrounded, they~~ Any system that is ungrounded...".
Substantiation: Grammatical correction; original construction was non-parallel.
Panel Meeting Action: Accept in Principle
Revise the text of 250.21(C) from the 2011 NEC Draft to read as follows:
(C) Marking. Ungrounded systems shall be legibly marked "Ungrounded System" at the source or first disconnecting means of the system. The marking shall be of sufficient durability to withstand the environment involved.
Panel Statement: The revised text clarifies the requirements further and meets the intent of the submitted. The revised text is consistent with the text in 250.21(B).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-61 Log #2760 NEC-P05 **Final Action: Accept**
(250.24(A))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-88
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Panel Statement:
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-62 Log #2761 NEC-P05 **Final Action: Accept**
(250.24(A)(1))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-89
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-63 Log #2762 NEC-P05 **Final Action: Accept**
(250.24(A)(2))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-90
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-64 Log #2559 NEC-P05 **Final Action: Reject**
(250.24(C))

TCC Notes: The Technical Correlating Committee directs that the text of 250.24(C) be revised to read as follows:
"Where an ac system operating at less than 1000 volts...".
In addition, the Technical Correlating Committee directs that the Exception to 250.24(C) be revised to read as follows:
"Where two or more service disconnecting means...".
The remainder of Proposal 5-95 remains unchanged.
In this instance, the Technical Correlating Committee determined that the revised wording is more appropriate.
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-95
Recommendation: Accept the proposal in part. Do not change "where" to "if" in the three places indicated in the proposal.
Substantiation: This comment is intended as a vehicle to raise a generic objection to the plethora of accepted ROP actions on the part of CMP 5 throughout its articles that replace "where" with "if." The changes were substantiated on the basis of the content of Section 3.3.4 in the NEC Style Manual, which states: "*Where* (in the sense of *when* or *if*) — Use *when* or *if* instead." I believe that this provision is being misinterpreted by the proposal submitter and CMP 5.

The word "if" is a generic conjunction that in usual code applications means "in the event that." In this sense, virtually any usage of "where" can be replaced by "if", as is equally the case of "when". The reason that these other words, particularly "where" have been generally applied throughout the NEC is that they more precisely define the event. The word "where" has been (and continues to be) used because it is limited to being a condition of place, and "when" has been (and continues to be) used in instances describing a condition of time.

The NEC is an installation document, and most of its provisions provide direction regarding installation practice in concrete locations, that being the nature of the trade. The subject of this proposal leads off with "Where an ac system operating at less than 1000 volts …" Although it is not grammatically incorrect to begin the sentence with "if", the word "where" is preferred because this rule describes a condition of place. Over the past decade, the word "where" has become the usual term for such usage throughout the NEC.

If this is to now change, it should be only following express direction from the TCC, preferably through a clarification in the NEC Style Manual. Literally thousands of changes will be required throughout the NEC to accomplish this change. As of now, we will have a few articles using an inconsistent style, which is to be avoided. This comment is directed to the TCC, and requests formal direction with respect to the usage of the word "where" and how Section 3.3.4 of the NEC Style Manual is to be applied going forward. If CMP 5 is indeed misapplying 3.3.4, then the CMP 5 actions (and many based on similar proposals from the same proposal submitter in other articles as well) should be set aside.
Panel Meeting Action: Reject
Panel Statement: The panel actions are in compliance with the Section 3.3.4 of the NEC Style Manual, Word Clarity. That section contains the following requirement, "Words and terms used in the NEC shall be specific and clear in meaning, and shall avoid jargon, trade terminology, industry-specific terms, or colloquial language that is difficult to understand. NEC language shall be brief, clear, and emphatic. The following are examples of old-fashioned expressions and word uses that shall not be permitted: Where (in the sense of when or if) — Use when or if instead." The Style Manual goes on to indicate in Annex B Standard Terms, "if (indicates condition - can usually be used instead of provided, provided that, or where)" and "where (location or situation)."
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-65 Log #1832 NEC-P05 **Final Action: Accept**
(250.24(C)(1) and (2))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-95
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(1) Sizing for a Single Raceway. The grounded conductor shall not be smaller than the required grounding electrode conductor specified in Table 250.66 but shall not be required to be larger than the largest ungrounded service-entrance ~~phase~~ conductor(s). In addition, for sets of ungrounded service-entrance ~~phase~~ conductors larger than 1100 kcmil copper or 1750 kcmil aluminum, the grounded conductor shall not be smaller than 12-1/2 percent of the circular mil area of the largest set of service-entrance ungrounded ~~phase~~ conductor(s).

(2) Parallel Conductors in Two or More Raceways. If the ungrounded service-entrance ~~phase~~ conductors are installed in parallel in two or more raceways, the grounded conductor shall also be installed in parallel. The size of the grounded conductor in each raceway shall be based on the total circular mil area of the parallel ungrounded conductors in the raceway as indicated in (C)(1) but not smaller than 1/0 AWG.
Substantiation: CMP-5 has correctly changed "phase conductor(s)" to "ungrounded conductor" or "grounded conductor" to more accurately describe the conductor the rule is intended to apply. This Comment intends to correct these sections.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-66 Log #2763 NEC-P05 **Final Action: Accept**
(250.24(D))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-98
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-67 Log #2764 NEC-P05 **Final Action: Accept**
(250.24(E))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-99
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-68 Log #81 NEC-P05 **Final Action: Accept**
(250.30)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-102
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal in accordance with 3.2.3 of the NEC Style Manual related to the use of acronyms.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the use of the term and the acronym and determined that the term "Supply-Side Bonding Jumper" is to be used without the acronym (SSBJ) at each location where the term is used. See panel action on Comment 5-69.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-69 Log #1836 NEC-P05 **Final Action: Accept in Principle**
(250.30)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-102
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
250.30 Grounding Separately Derived Alternating-Current Systems. In addition to complying with 250.30(A) for grounded systems or as provided in 250.30(B) for ungrounded systems, separately derived systems shall comply with 250.20, 250.21, 250.22, ~~250.24(A)(2)~~ and 250.26.
Substantiation: The reference to 250.24(A)(2) is not needed as the requirements for establishing an earth connection at the source of an outdoor separately derived system has been included in 250.30(C).
Panel Meeting Action: Accept in Principle
Revise Section 250.30 in the ROP draft to read as follows:

250.30 Grounding Separately Derived Alternating-Current Systems. In addition to complying with 250.30(A) for grounded systems or as provided in 250.30(B) for ungrounded systems, separately derived systems shall comply with 250.20, 250.21, 250.22, and 250.26.

Informational Note No. 1: An alternate ac power source such as an on-site generator is not a separately derived system if the grounded conductor is solidly interconnected to a service-supplied system grounded conductor. An example of such situations is where alternate source transfer equipment does not include a switching action in the grounded conductor and allows it to remain solidly connected to the service-supplied grounded conductor when the alternate source is operational and supplying the load served.
Informational Note No. 2: See 445.13 for the minimum size of conductors that carry fault current.

(A) Grounded Systems. A separately derived ac system that is grounded shall comply with 250.30(A)(1) through (A)(8). Except as otherwise permitted in this article, a grounded conductor shall not be connected to normally non–current-carrying metal parts of equipment, to equipment grounding conductors, or be reconnected to ground on the load side of the system bonding jumper.
Informational Note: See 250.32 for connections at separate buildings or structures, and 250.142 for use of the grounded circuit conductor for grounding equipment.
Exception: Impedance grounded neutral system grounding connections shall be made as specified in 250.36 or 250.186, as applicable.
(1) System Bonding Jumper. An unspliced system bonding jumper shall comply with 250.28(A) through (D). This connection shall be made at any single point on the separately derived system from the source to the first system disconnecting means or overcurrent device, or it shall be made at the source of a separately derived system that has no disconnecting means or overcurrent devices, in accordance with (a) or (b). The system bonding jumper shall remain within the enclosure where it originates. If the source is located outside the building or structure supplied, a system bonding jumper shall be installed at the grounding electrode connection in compliance with (C).
Exception No. 1: For systems installed in accordance with 450.6, a single system bonding jumper connection to the tie point of the grounded circuit conductors from each power source shall be permitted.
Exception No. 2: A system bonding jumper at both the source and the first disconnecting means shall be permitted if doing so does not establish a parallel path for the grounded conductor. If a grounded conductor is used in this manner, it shall not be smaller than the size specified for the system bonding jumper but shall not be required to be larger than the ungrounded conductor(s). For the purposes of this exception, connection through the earth shall not be considered as providing a parallel path.
Exception No. 3: The size of the system bonding jumper for a system that supplies a Class 1, Class 2, or Class 3 circuit, and is derived from a transformer rated not more than 1000 volt-amperes, shall not be smaller than the derived ungrounded conductors and shall not be smaller than 14 AWG copper or 12 AWG aluminum.
(a) *Installed at the Source.* The system bonding jumper shall connect the grounded conductor to the supply-side bonding jumper and the normally non–current-carrying metal enclosure.
(b) *Installed at the First Disconnecting Means.* The system bonding jumper shall connect the grounded conductor to the supply-side bonding jumper, the disconnecting means enclosure, and the equipment grounding conductor(s).

(2) Supply-Side Bonding Jumper. If the source of a separately derived system and the first disconnecting means are located in separate enclosures, a supply-side bonding jumper shall be installed with the circuit conductors from the source enclosure to the first disconnecting means. A supply-side bonding jumper shall not be required to be larger than the derived ungrounded conductors. The supply-side bonding jumper shall be permitted to be of nonflexible metal raceway type or of the wire or bus type as follows:
(a) A supply-side bonding jumper of the wire type shall comply with 250.102(C), based on the size of the derived ungrounded conductors.
(b) A supply-side bonding jumper of the bus type shall have a cross-sectional area not smaller than a supply-side bonding jumper of the wire type as determined in 250.102(C).

(3) Grounded Conductor. If a grounded conductor is installed and the system bonding jumper connection is not located at the source, 250.30(A)(3)(a) through (A)(3)(d) shall apply.
(a) *Sizing for a Single Raceway.* The grounded conductor shall not be smaller than the required grounding electrode conductor specified in Table 250.66 but shall not be required to be larger than the largest derived ungrounded conductor(s). In addition, for sets of derived ungrounded conductors larger than 1100 kcmil copper or 1750 kcmil aluminum, the grounded conductor shall not be smaller than 12-1/2 percent of the circular mil area of the largest set of derived ungrounded conductors.
(b) *Parallel Conductors in Two or More Raceways.* If the ungrounded conductors are installed in parallel in two or more raceways, the grounded conductor shall also be installed in parallel. The size of the grounded conductor in each raceway shall be based on the total circular mil area of the parallel derived ungrounded conductors in the raceway as indicated in (a) but not smaller than 1/0 AWG.
Informational Note: See 310.10(H) for grounded conductors connected in parallel.
(c) *Delta Connected System.* The grounded conductor of a 3-phase, 3-wire delta system shall have an ampacity not less than that of the ungrounded conductors.
(d) *Impedance Grounded System.* The grounded conductor of an impedance grounded neutral system shall be installed in accordance with 250.36 or 250.186 as applicable.
(4) Grounding Electrode. The grounding electrode shall be as near as practicable to and preferably in the same area as the grounding electrode conductor connection to the system. The grounding electrode shall be the nearest one of the following:
(1) Metal water pipe grounding electrode as specified in 250.52(A)(1)
(2) Structural metal grounding electrode as specified in 250.52(A)(2)
Exception No. 1: Any of the other electrodes identified in 250.52(A) shall be used if the electrodes specified by 250.30(A)(4) are not available.
Exception No. 2 to (1) and (2): If a separately derived system originates in listed equipment suitable for use as service equipment, the grounding electrode used for the service or feeder equipment shall be permitted as the grounding electrode for the separately derived system.
Informational Note No. 1: See 250.104(D) for bonding requirements for interior metal water piping in the area served by separately derived systems.
Informational Note No. 2: See 250.50 and 250.58 for requirements for bonding all electrodes together if located at the same building or structure.

(5) Grounding Electrode Conductor, Single Separately Derived System. A grounding electrode conductor for a single separately derived system shall be sized in accordance with 250.66 for the derived ungrounded conductors. It shall be used to connect the grounded conductor of the derived system to the grounding electrode as specified in 250.30(A)(4). This connection shall be made at the same point on the separately derived system where the system bonding jumper is connected.
Exception No. 1: If the system bonding jumper specified in 250.30(A)(1) is a wire or busbar, it shall be permitted to connect the grounding electrode conductor to the equipment grounding terminal, bar, or bus, provided the equipment grounding terminal, bar, or bus is of sufficient size for the separately derived system.
Exception No. 2: If a separately derived system originates in listed equipment suitable as service equipment, the grounding electrode conductor from the service or feeder equipment to the grounding electrode shall be permitted as the grounding electrode conductor for the separately derived system, provided the grounding electrode conductor is of sufficient size for the separately derived system. If the equipment grounding bus internal to the equipment is not smaller than the required grounding electrode conductor for the separately derived system, the grounding electrode connection for the separately derived system shall be permitted to be made to the bus.
Exception No. 3: A grounding electrode conductor shall not be required for a system that supplies a Class 1, Class 2, or Class 3 circuit and is derived from a transformer rated not more than 1000 volt-amperes, provided the grounded conductor is bonded to the transformer frame or enclosure by a jumper sized in accordance with 250.30(A)(1), Exception No. 3, and the transformer frame or enclosure is grounded by one of the means specified in 250.134.
(6) Grounding Electrode Conductor, Multiple Separately Derived Systems. A common grounding electrode conductor for multiple separately derived systems shall be permitted. If installed, the common grounding electrode conductor shall be used to connect the grounded conductor of the separately derived systems to the grounding electrode as specified in 250.30(A)(4). A grounding electrode conductor tap shall then be installed from each separately derived system to the common grounding electrode conductor. Each tap conductor shall connect the grounded conductor of the separately derived system to the common grounding electrode conductor. This connection shall be made at the same point on the separately derived system where the system bonding jumper is connected.
Exception No. 1: If the system bonding jumper specified in 250.30(A)(1) is a wire or busbar, it shall be permitted to connect the grounding electrode conductor tap to the equipment grounding terminal, bar, or bus, provided the equipment grounding terminal, bar, or bus is of sufficient size for the separately derived system.
Exception No. 2: A grounding electrode conductor shall not be required for a system that supplies a Class 1, Class 2, or Class 3 circuit and is derived from a transformer rated not more than 1000 volt-amperes, provided the system grounded conductor is bonded to the transformer frame or enclosure by a jumper sized in accordance with 250.30(A)(1), Exception No. 3 and the transformer frame or enclosure is grounded by one of the means specified in 250.134.

(a) *Common Grounding Electrode Conductor.* The common grounding electrode conductor shall be permitted to be one of the following:
(1) A conductor of the wire-type shall not be smaller than 3/0 AWG copper or 250 kcmil aluminum.
(2) The metal frame of the building or structure that complies with 250.52(A)
(2) or is connected to the grounding electrode system by a conductor not smaller than 3/0 AWG copper or 250 kcmil aluminum.
(b) *Tap Conductor Size.* Each tap conductor shall be sized in accordance with 250.66 based on the derived ungrounded conductors of the separately derived system it serves.
Exception: If a separately derived system originates in listed equipment suitable as service equipment, the grounding electrode conductor from the service or feeder equipment to the grounding electrode shall be permitted as the grounding electrode conductor for the separately derived system, provided the grounding electrode conductor is of sufficient size for the separately derived system. If the equipment ground bus internal to the equipment is not smaller than the required grounding electrode conductor for the separately derived system, the grounding electrode connection for the separately derived system shall be permitted to be made to the bus.
(c) *Connections.* All tap connections to the common grounding electrode conductor shall be made at an accessible location by one of the following methods:
(1) A connector listed as grounding and bonding equipment.
(2) Listed connections to aluminum or copper busbars not smaller than 6 mm × 50 mm (1/4 in. × 2 in.). If aluminum busbars are used, the installation shall comply with 250.64(A).
(3) The exothermic welding process.
Tap conductors shall be connected to the common grounding electrode conductor in such a manner that the common grounding electrode conductor remains without a splice or joint.
(7) Installation. The installation of all grounding electrode conductors shall comply with 250.64(A), (B), (C), and (E).
(8) Bonding. Structural steel and metal piping shall be connected to the grounded conductor of a separately derived system in accordance with 250.104(D).
(B) Ungrounded Systems. The equipment of an ungrounded separately derivedsystem shall be grounded and bonded as specified in 250.30(B)(1) through (B)(3).
(1) Grounding Electrode Conductor. A grounding electrode conductor, sized in accordance with 250.66 for the largest derived ungrounded conductor(s) or set of derived ungrounded conductors, shall be used to connect the metal enclosures of the derived system to the grounding electrode as specified in 250.30(A)(5) or (6), as applicable. This connection shall be made at any point on the separately derived system from the source to the first system disconnecting means. If the source is located outside the building or structure supplied, a grounding electrode connection shall be made in compliance with (C).
(2) Grounding Electrode. Except as permitted by 250.34 for portable and vehicle-mounted generators, the grounding electrode shall comply with 250.30(A)(4).
(3) Bonding Path and Conductor. A supply-side bonding jumper shall be installed from the source of a separately derived system to the first disconnecting means in compliance with 250.30(A)(2).
(C) Outdoors Source. If the source of the separately derived system is located outside the building or structure supplied, a grounding electrode connection shall be made at the source location to one or more grounding electrodes in compliance with 250.50. In addition, the installation shall comply with 250.30(A) for grounded systems or with 250.30(B) for ungrounded systems.
Exception: The grounding electrode conductor connection for impedance grounded neutral systems shall comply with 250.36 or 250.186, as applicable.
Panel Statement: The panel made editorial and organizational changes to improve clarity and that meet the submitter's intent. The action on this comment incorporates recommendations or concepts from the following comments: 5-69, 5-70, 5-71, 5-72, 5-73, 5-76, 5-79, 5-80, 5-81, 5-82, 5-83, 5-84, 5-85, and 5-87.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:
WILLIAMS, D.: The rewrite of section 250.30 is a huge improvement and is in part from a great proposal to organize how we deal with separately derived systems. There was also an extensive amount of work by a CMP-5 Task Group that spent a lot of time prior to the NEC ROP Meetings and work that occurred during the meeting by the Task Group and by the full code panel. This change reflects how we design, install, and inspect separately derived systems.

5-70 Log #2092 NEC-P05 **Final Action: Accept in Principle**
(250.30)

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 5-102
Recommendation: Continue to Accept this proposal.
Substantiation: The changes made in this section is mainly used to reorganize Section 250.30. The reorganization helps installers and inspectors setting up the requirements in an order that they are used in the field.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-71 Log #2560 NEC-P05 **Final Action: Accept in Principle**
(250.30)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-102
Recommendation: Accept the proposal in principle, making three changes as follows:
I. In 250.30(A)(3)(c) change "service" to "system" in both the title and the rule.
II. In 250.30(A)(4) Informational Notes Nos. 1 and 2, change "bonding requirements of" and "requirements of bonding" to "bonding requirements for" and "requirements for bonding" respectively.
III. In 250.30(B)(3), change "A bonding jumper or conductor …" to "A supply-side bonding jumper …"
Substantiation: I. This application is within Section 250.30 covering separately derived systems and cannot be addressing services.
II. A requirement of bonding would be some requirement that is imposed by the act of (possessive) bonding. These requirements are imposed by the NEC for safety, and are therefore requirements for bonding. This comment corrects this usage in both places.
III. The conductor cited in this provision meets all the characteristics described in the new definition of supply-side bonding jumpers, and this terminology should be used here. Failing to make this change will create confusion as code users will think there is a difference when none is intended.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-72 Log #439 NEC-P05 **Final Action: Accept in Principle in Part**
(250.30(A)(1))

Submitter: J. Kevin Vogel, Crescent Electrical Supply
Comment on Proposal No: 5-102
Recommendation: Revise text to read as follows:
(1) System Bonding Jumper. An unspliced system bonding jumper shall be sized and installed~~. It shall be sized~~ in compliance with 250.28(A) through (D). "~~This connection~~ Attachment shall be made at any single point on the separately derived system from...".
Substantiation: 1. The proposed text removes ambiguity and makes it clear that all requirements contained in 250.28(A) through (D), not merely those having to do with "sizing" the SSBJ, need to be adhered to.
2. "Attachment" [see 250.28(C)] is more accurate than "This connection".
Panel Meeting Action: Accept in Principle in Part
The recommendation for the first sentence is accepted in principle. The recommendation for the second sentence is not accepted as it would not add clarity.
Panel Statement: See panel action on Comment 5-69. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-73 Log #1833 NEC-P05 **Final Action: Accept in Principle**
(250.30(A)(1))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-102
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(1) System Bonding Jumper. An unspliced system bonding jumper shall be installed~~. It shall be sized~~ in compliance with 250.28(A) through (D). This connection shall be made at any single point on the separately derived system from the source to the first system disconnecting means or overcurrent device, or it shall be made at the source of a separately derived system that has no disconnecting means or overcurrent devices, in accordance with (a) or (b). The system bonding jumper shall remain within the enclosure where it originates. If the source is located outside the building or structure supplied, a system bonding jumper shall be installed at the grounding electrode connection in compliance with (C).

The 3 exceptions and 250.30(A)(1)(a) are unchanged by this Comment.
(b) *Installed at the First Disconnecting Means.* The system bonding jumper shall connect the grounded conductor to the supply-side bonding jumper, the disconnecting means enclosure, and the equipment grounding conductor(s). ~~The system bonding jumper shall remain within the enclosure where it originates.~~
Substantiation: Changes to the opening paragraph are to simplify the two sentences and to recognize that 250.28 contains requirements on the material, construction, attachment as well as the size of the system bonding jumper. All of these requirements are applicable to system bonding jumpers as the bold faced title of 250.28 identifies.
The last sentence of 250.30(A)(1)(b) is proposed to be located in the opening paragraph as the requirement relates to installations where the system bonding jumper is located at the source as well as at the first disconnecting means.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-74 Log #649 NEC-P05 **Final Action: Reject**
(250.30(A)(1)(a))

Submitter: Edward G. Kroth, Verona, WI
Comment on Proposal No: 5-102
Recommendation: Revise text to read as follows:
The system bonding jumper shall connect the grounded conductor to the ~~supply~~ derived side bonding jumper and the normally non current carrying metal enclosure.
Substantiation: This is a companion comment to 250.30(A)(2). This comment should be accepted only if the comment to 250.30(A)(2) is accepted.
Panel Meeting Action: Reject
Panel Statement: The suggested revision to the title "Supply Side Bonding Jumper" in Comment 5-77 was not accepted so this comment, as directed by the substantiation, is also rejected.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-75 Log #650 NEC-P05 **Final Action: Reject**
(250.30(A)(1)(b))

Submitter: Edward G. Kroth, Verona, WI
Comment on Proposal No: 5-102
Recommendation: Revise text to read as follows:
The system bonding jumper shall connect the grounded conductor to the ~~supply~~ derived side bonding jumper, the disconnecting means enclosure, and the equipment grounding conductor(s). The system bonding jumper shall remain within the enclosure where it originates.
Substantiation: This is a companion comment to 250.30(A)(2). It should only be accepted if the comment to 250.30(A)(2) is accepted.
Panel Meeting Action: Reject
Panel Statement: The suggested revision to the title "Supply Side Bonding Jumper" in Comment 5-77 was not accepted so this comment, as directed by the substantiation, is also rejected.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-76 Log #476 NEC-P05 **Final Action: Accept in Principle**
(250.30(A)(2))

Submitter: J. Kevin Vogel, Crescent Electrical Supply
Comment on Proposal No: 5-102
Recommendation: Revise text to read as follows:
(2) Supply Side Bonding Jumper. If the source of a separately derived system and the first disconnecting means are located in separate enclosures, ~~a~~ an SSBJ ~~or conductor~~ shall be installed with the circuit conductors from the source enclosure to the first disconnecting means. The ~~bonding jumper~~ SSBJ shall be of the wire, bus, or nonflexible metal raceway type. If ~~a~~ the SSBJ is of the wire type ~~is installed~~, it shall be sized and installed in accordance with 250.102(C), ~~based on the size of the derived phase conductors~~. If a bus is installed as the SSBJ, it shall have a circular mil area not less than the bonding jumper of the wire type as determined in 250.102(C). ~~This conductor~~ The SSBJ shall not be required to be larger than the derived circuit conductors. [ROP 5-102].
Substantiation: 1. Consistent use of the acronym "SSBJ" improves usability and clarifies the intent of the rules presented here.
2. The unedited text only requires the SSBJ to be "sized" per 250.102(C), but does not require the "installation", i.e., of parallel SSBJ's, also to comply. The proposed revisions attempt to correct that oversight.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel accepts the concepts contained in the recommendation but makes minor editorial revisions for clarity or consistency. See the panel action on Comment 5-69. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-77 Log #651 NEC-P05 **Final Action: Reject**
(250.30(A)(2))

Submitter: Edward G. Kroth, Verona, WI
Comment on Proposal No: 5-102
Recommendation: Revise text to read as follows:
~~Supply~~ Derived Side Bonding Jumper. If the source of a separately derived system and the first disconnecting means are located in separate enclosures, a ~~SSBJ~~ DSBJ or conductor shall be installed with the circuit conductors from the source enclosure to the first disconnecting means. The bonding jumper shall be of the wire, bus, or nonflexible metal raceway type. If a ~~SSBJ~~ DSBJ of the wire type is installed it shall be sized in accordance with 250.102(C), based on the size of the derived conductors. If a bus is installed as the ~~SSBJ~~ DSBJ, it shall...(the rest of the section is to remain.)
Substantiation: The title and subsequent abbreviations should be changed to eliminate confusion in the case of transformer and battery type separately derived systems. The primary side of a transformer or the circuit feeding the charging unit of a battery could be viewed as the supply side of these two items. In the case of a generator separately derived system the use of derived side bonding jumper would still be accurate. If this comment is accepted, the companion comments on 250.30(A)(1)(a) and (b) should also be accepted to provide uniformity. In general, I applaud the reorganization of 250.30. It flows better and will hopefully be more user friendly.
Panel Meeting Action: Reject
Panel Statement: The proposed change is not acceptable as the supply side bonding jumper is used at a service as well as at separately derived systems.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-78 Log #1834 NEC-P05 **Final Action: Reject**
(250.30(A)(3))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-102
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(3) Grounded Conductor. If a grounded conductor is installed and the system bonding jumper connection is not located at the source, the grounded conductor shall be in compliance with 250.24(C) (1) through (C)(4). ~~250.30(A)(3)(a) through (A)(3)(d) shall apply.~~
~~(a) *Sizing for a Single Raceway.* The grounded conductor shall not be smaller than the required grounding electrode conductor specified in Table 250.66 but shall not be required to be larger than the largest ungrounded service-entrance phase conductor(s). In addition, for sets of ungrounded conductors larger than 1100 kcmil copper or 1750 kcmil aluminum, the grounded conductor shall not be smaller than 121/2 percent of the circular mil area of the largest set of ungrounded conductors.~~
~~(b) *Parallel Conductors in Two or More Raceways.* If the ungrounded conductors are installed in parallel in two or more raceways, the grounded conductor shall also be installed in parallel. The size of the grounded conductor in each raceway shall be based on the total circular mil area of the parallel ungrounded conductors in the raceway as indicated in (a) but not smaller than 1/0 AWG.~~
~~Informational Note: See 310.10(H) for grounded conductors connected in parallel.~~
~~(c) *Delta Connected Service.* The grounded conductor of a 3-phase, 3-wire delta service shall have an ampacity not less than that of the ungrounded conductors.~~
~~(d) *Impedance Grounded System.* The grounded conductor of an impedance grounded neutral system shall be installed in accordance with 250.36 or 250.186.~~
Substantiation: The issue of concern with this section is that the grounded conductor if installed so it will be called upon to carry fault current back to the source, is large enough to safely carry the current that can be supplied by the system. This is the same issue and concern addressed for service-supplied systems in 250.24(C)(1) through (C)(4) Those sections have been revised for the 2011 NEC and there does not seem to be an advantage to repeating all the information in this section.
Panel Meeting Action: Reject
Panel Statement: Though similar to the sizing rules in 250.24(C) in concept, the panel prefers to keep the requirements for sizing the grounded conductor in 250.30(A) for completeness.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-79 Log #477 NEC-P05 **Final Action: Accept in Principle**
(250.30(A)(3)(a))

Submitter: J. Kevin Vogel, Crescent Electrical Supply
Comment on Proposal No: 5-102
Recommendation: Revise text to read as follows:
(a) Sizing for a Single Raceway. The grounded conductor shall not be smaller than the required grounding electrode conductor specified in Table 250.66, but shall not be required to be larger than the largest ungrounded ~~service entrance~~ phase conductor(s). In addition, for sets of ungrounded conductors larger than 1100 kcmil copper or 1750 kcmil aluminum, the grounded conductor shall not be smaller than 12 1/2 percent of the circular mil area of the largest set of ungrounded conductors. [ROP 5-102]
Substantiation: The words "service entrance" are not appropriate since we are dealing with the conductors for separately derived systems.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-80 Log #652 NEC-P05 **Final Action: Accept in Principle**
(250.30(A)(3)(a))

Submitter: Edward G. Kroth, Verona, WI
Comment on Proposal No: 5-102
Recommendation: Revise text to read as follows:
...larger than the largest ungrounded ~~service-entrance~~ derived phase conductor(s). (The remainder of the section should stay as is.)
Substantiation: The title of 250.30 is Grounding Separately Derived Alternating-Current Systems. In article 100, "Service" is defined as being supplied by a utility. Separately derived systems are defined as having no direct electrical connection to the service supplied by the utility. Neither version of the definition of service entrance conductors applies to separately derived systems.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-81 Log #1260 NEC-P05 **Final Action: Accept in Principle**
(250.30(A)(3)(a))

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 5-102
Recommendation: Continue to accept the proposal. Revise the text in 250.30(A)(3)(a) as follows:
(a) *Sizing for a Single Raceway*. The grounded conductor shall not be smaller than the required grounding electrode conductor specified in Table 250.66 but shall not be required to be larger than the largest ungrounded derived ~~service entrance~~ phase conductor(s). In addition, for sets of ungrounded conductors larger than 1100 kcmil copper or 1750 kcmil aluminum, the grounded conductor shall not be smaller than 12 1/2 percent of the circular mil area of the largest set of ungrounded derived phase conductors.
Substantiation: 250.30(A) covers grounding requirements for separately derived systems. The reference to "service-entrance conductors" is not technically accurate. For consistency, the correct term should be derived phase conductors.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-82 Log #1066 NEC-P05 **Final Action: Accept in Principle**
(250.30(A)(3)(c) (New))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 5-102
Recommendation: Revise the heading and text of 250.30(A)(3)(c) as accepted to eliminate the incorrect term "service" from this section. The revised text would be: "(c) Delta Connected ~~Service~~ System. The grounded conductor of a 3-phase, 3-wire delta ~~service~~ system shall have an ampacity not less than the ungrounded conductors."
Substantiation: This is an obvious misuse of the defined term "service." The section is about separately derived systems, not services.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-83 Log #1261 NEC-P05 **Final Action: Accept in Principle**
(250.30(A)(3)(c))

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 5-102
Recommendation: Continue to accept the proposal.
Revise 250.30(A)(3)(c) as follows:
(c) *Delta Connected System ~~Service~~*. The grounded conductor of a 3-phase, 3-wire delta-connected separately derived system ~~service~~ shall have an ampacity not less than that of the ungrounded conductors.
Substantiation: 250.30(A) covers grounding of separately derived systems. This revision to Proposal 5-102 replaces the term "service" with the term "system" and the term "delta-connected separately derived system" to maintain consistency and accuracy within this section.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-84 Log #2342 NEC-P05 **Final Action: Accept in Principle**
(250.30(A)(3)(c))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-102
Recommendation: Revise 250.30(A)(3)(c) as follows:
(c) *Delta Connected System ~~Service~~*. The grounded conductor of a 3-phase, 3-wire delta ~~service~~ system shall have an ampacity not less than that of the ungrounded conductors.
Substantiation: Because this rule is in 250.30, it is referring to separately derived systems, not services.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-85 Log #1826 NEC-P05 **Final Action: Accept in Principle**
(250.30(B)(1))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-102
Recommendation: Revise the text of the 2001 NEC ROP Draft as follows:
(1) Grounding Electrode Conductor. A grounding electrode conductor, sized in accordance with 250.66 for the largest derived ungrounded conductor(s) or set of ungrounded conductors ~~phase conductors~~, shall be used to connect the metal enclosures of the derived system to the grounding electrode as specified in 250.30(A)(5) ~~250.30(B)(5)~~ or (6), as applicable. This connection shall be made at any point on the separately derived system from the source to the first system disconnecting means. If the source is located outside the building or structure supplied, a grounding electrode connection shall be made in compliance with (C).
Substantiation: It appears the reference to 250.30(B)(5) or (6) is incorrect as these sections do not exist. It seems the correct reference should be to 250.30(A)(5) or (6) in the ROP Draft where the installation of a grounding electrode conductor for separately derived systems is covered.
CMP-5 has revised the term "phase conductor" to "ungrounded conductor" to be more descriptive. The addition of the phrase "ungrounded conductor(s) or set of ungrounded conductors" is intended to be editorial to clarify the application of the rule to installations with a single or parallel set of ungrounded conductors.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-86 Log #1056 NEC-P05 **Final Action: Reject**
(250.30(C) Exception)

Submitter: David Bredhold, Eaton Corporation
Comment on Proposal No: 5-102
Recommendation: Delete text as follows:
~~*Exception: The grounding electrode conductor connection shall not be made at the outdoor source for high-impedance grounded neutral systems. The system shall meet the requirements of 250.36.*~~
Substantiation: The exception could prove tenable if all secondary conductors from a transformer supplying only one building. The connection to the grounding electrode conductor could be made inside the building, even though the transformer and impedance are located some distance remote from the building.

In a campus system, however, where a transformer's secondary conductors supply more than one building (ref. 240.21(C)(4), termination of the ground-side of the impedance at a single building would prove impossible, the only possible termination point could be at the transformer where the impedance is located.
Panel Meeting Action: Reject
Panel Statement: The panel concludes the exception provides valuable information but revises it in Comment 5-69.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-87 Log #1835 NEC-P05 **Final Action: Accept in Principle**
(250.30(C) Exception)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-102
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
Exception: The grounding electrode conductor connection for an ~~shall not be made at the~~ outdoor source for high-impedance grounded neutral systems. ~~The system~~ shall comply with ~~meet the requirements of~~ 250.36.
Substantiation: The source of high-impedance grounded neutral systems is often located in a unit substation that is outside a building or structure. The consulting engineer needs the flexibility and option to locate the impedance device at the unit substation and also have the grounding electrode connection at that location.
The text of the revised exception is intended to offer suitable options to the design engineer or installer.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69. The panel concludes this action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-88 Log #2693 NEC-P05 **Final Action: Reject**
(250.32(A) Exception)

Submitter: Frederic P. Hartwell, Rep. Massachusetts Electrical Code Advisory Committee
Comment on Proposal No: 5-124
Recommendation: The proposal should be accepted.
Substantiation: In the panel statement, CMP 5 challenges the assertion in the proposal substantiation that what is requested in the proposal was a former requirement of this part of the Code. The relevant text in the 1993 NEC is 250-24(a) Exception No. 2. The second sentence of this exception reads as follows: "Where there are no existing electrodes, a grounding electrode meeting the requirements of Part H shall be installed *where the building or structure supplies more than one branch circuit* [emphasis supplied]. In the 1996 edition, this was changed, courtesy of the Dan Leaf proposal #5-37 to read, "*where the building or structure is supplied by more than one branch circuit"* [emphasis supplied]. The result changed the point of supply criterion from the second building to the first building, and therefore changed the supply characteristic from a feeder to multiple branch circuits. The change was not substantiated by either the proposal submitter or the panel, and we still live with this concept today.
The wording of the proposal returns to the original concept. It is quite true that more than one branch circuit could arrive at an outbuilding, but they would be no larger individually than a single branch circuit could be under the present wording. The more important point is that a feeder will arrive at an enclosure where completely appropriate terminations are available to connect the (usually) 6 AWG or larger grounding electrode conductors that will be required to comply with these rules.
Panel Meeting Action: Reject
Panel Statement: The text in the 1993 NEC 250-24(a) Exception No. 2, referred to in the substantiation, is an exception to a rule that no longer exists in the NEC. The relevant text in the 1993 NEC is 250-24(a) Exception No. 1, which supports the action and statement on Proposal 5-124.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-89 Log #82 NEC-P05 **Final Action: Accept**
(250.32(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-126
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal in accordance with 3.2.3 of the NEC Style Manual related to the use of acronyms.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the use of the term and the acronym and determined that the term "Supply-Side Bonding Jumper" is to be used without the acronym (SSBJ) at each location where the term is used.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-90 Log #2093 NEC-P05 **Final Action: Reject**
(250.32(B))

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 5-127
Recommendation: This proposal should be accepted.
Substantiation: The exception was put into the code for the initial cycle to inform users of the change and that existing installations are allowed to remain. There is no need to have this exception to continue in the code for the 2011 code cycle. All installations that fall under this exception were approved at that time and the current code would not require them to make a change.
Panel Meeting Action: Reject
Panel Statement: In many situations a branch circuit is added to an existing installation that was made using the grounded conductor as a fault current path for a building being supplied. This exception makes it clear that the installation can remain and be used or even an additional circuit installed without changing the feeder, similar to what is permitted for ranges and dryers in 250.140 and 250.142.
See panel action on Comment 5-91.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-91 Log #1837 NEC-P05 **Final Action: Accept**
(250.32(B)(1) Exception)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-127
Recommendation: Revise text of the 2011 NEC ROP Draft as follows:
Exception: For installations made in compliance with previous editions of this Code that permitted such connection, ~~existing premises wiring systems only~~, the grounded conductor run with the supply to the building or structure shall be permitted to serve as the ground-fault return path ~~be connected to the building or structure disconnecting means and to the grounding electrode(s) and shall be used for grounding or bonding of equipment, structures, or frames required to be grounded or bonded~~ if all the requirements of (1), (2), and (3) continue to be ~~are~~ met:
The remainder of the Exception is unchanged by this Comment.
Substantiation: These changes are recommended to improve the application of the exception to only installations that were previously made in full compliance with the requirements in previous editions of the Code that permitted the grounded conductor (often a neutral) to be re-grounded at a building or structure and serve as the ground-fault return path. Installations made in compliance with more recent editions of the NEC are required have the neutral isolated from the equipment grounding means at the building or structure supplied by a feeder.
Since these are existing installations, the language on what the grounded conductor is connected to is no longer needed. Those rules were provided in the text that applied when the installation was made.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-92 Log #481 NEC-P05 **Final Action: Reject**
(250.32(B)(2)(a) and (b))

Submitter: J. Kevin Vogel, Crescent Electrical Supply
Comment on Proposal No: 5-126
Recommendation: Revise text to read as follows:
(a) Having Overcurrent Protection. If overcurrent protection is provided where the conductors originate, the installation shall comply with (B)(1)~~.~~ and 250.30.
(b) Without Overcurrent Protection. If overcurrent protection is not provided where the conductors originate, the installation shall comply with 250.30~~(A)~~...".
Substantiation: 250.30 Grounding Separately Derived Alternating-Current Systems, if accepted, will require: "In addition to complying with 250.30(A) for grounded systems or as provided in 250.30(B) for ungrounded systems, separately derived systems shall comply with 250.20, 250.21, 250.22, 250.24(A)(2) and 250.26". It is important that 250.32(B)(2)(a) and (b) both be subjected to all of the installation requirements contained in 250.30, especially those of 250.24(A)(2) regarding the connection of the grounded conductor of an outdoor transformer to a grounding electrode "either at the transformer or elsewhere outside the building."
Panel Meeting Action: Reject

Panel Statement: Section 250.32 deals with the equipment grounding conductor installation with feeder or branch circuits serving outbuildings or structures. If served by a separately derived system, the requirements of 250.30 still apply and do not need to be cross referenced again.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-93 Log #2561 NEC-P05 **Final Action: Accept in Principle**
(250.32(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-129
Recommendation: Accept the proposal as modified in principle. Add the following sentence as a second paragraph:

"If overcurrent protection is not provided where the conductors originate, the installation shall comply with 250.30(B), and if installed, the supply side bonding jumper shall be connected to the building or structure disconnecting means and to the grounding electrode(s). If overcurrent protection is not provided where the conductors originate, a supply-side bonding jumper shall be installed in accordance with 250.30(B)(3)."
Substantiation: This provision needs comparable language for ungrounded systems as CMP 5 inserted into the final version of Proposal 5-126. Note that the reference to the supply-side bonding jumper correlates with this submitter's comment on Proposal 5-102.
Panel Meeting Action: Accept in Principle
Revise the text of 250.32(C) from the 2011 NEC Draft to read as follows:

(C) Ungrounded Systems.

(1) Supplied by a Feeder or Branch Circuit. An equipment grounding conductor as described in 250.118 shall be installed with the supply conductors and be connected to the building or structure disconnecting means and to the grounding electrode(s). The grounding electrode(s) shall also be connected to the building or structure disconnecting means.
(2) Supplied by a Separately Derived System.
(a) Having Overcurrent Protection. If overcurrent protection is provided where the conductors originate, the installation shall comply with (C)(1).
(b) Without Overcurrent Protection. If overcurrent protection is not provided where the conductors originate, the installation shall comply with 250.30(B). If installed, the supply-side bonding jumper shall be connected to the building or structure disconnecting means and to the grounding electrode(s)."
Panel Statement: The revised text brings these requirements into parallel with the like requirements for grounded systems in 250.32(B) where supplied by a separately derived system outside the building or structure. The panel concludes the revisions meet the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-94 Log #14 NEC-P05 **Final Action: Reject**
(250.34)

Submitter: Rick Wittmer, WEXECC
Comment on Proposal No: 5-130
Recommendation: My proposed change is to require all vehicle mounted generators have a retractable cord reel mounted on the vehicle with the green wires attached to the reel, with sufficient cord of proper size to reach earth where a "TEE" ground rod be inserted into the earth and the cord with a clamp attached to it.

Unless I'm reading the code wrong, this code change should be retroactive to all generators mounted on vehicles. This is an accident waiting to happen. Please respond if I'm missing some part of the code that would make this a safe condition not to ground the truck chassis (generator housing) to earth.
Substantiation: I have been an electrical engineer in a power plant for 34 years, now retired. I have also been a volunteer fire fighter for 40 years. Recently, we purchased a new pumper with a 15 KW generator 110/220 volt. Over the years, the generators have increased in size and power output. These generators are large enough to power a home. When we took delivery of the truck the vendor representative stated a ground reel for the generator was an option, and not mandatory. I reviewed the requirements for grounding on page 70-103, section 250.34, Portable and Vehicle-Mounted Generators of the 2008 code book. There is no requirement for grounding the generator to earth ground only to the truck frame. We have 100 ft AWG #10 cord reels which can extend into a burning structure. These reels carry 220v/120v power for fans and portable lights. My safety concern is with a 20 or 30 amp breaker and a fireighter standing in water holding onto a portable light, could be electrocuted if the equipment were to ground out. Since the code requires the ground wire (green) be bonded to the truck frame. The truck frame is isolated from earth ground. I considered a GFIC breaker, but in the fire service conditions this would not be practical. We would be tripping breakers constantly.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided proposed text for this comment including the wording to be added, revised (and how revised), or deleted in accordance with 4.4.5(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-95 Log #1838 NEC-P05 **Final Action: Accept in Principle**
(250.35)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-134
Recommendation: Revise the existing text of the 2008 NEC as follows:
250.35 Permanently Installed Generators.
A conductor that provides an effective ground-fault current path shall be installed with the supply conductors from a permanently installed generator(s) to the first disconnecting mean(s) in accordance with (A) or (B).
(A) Separately Derived System. If ~~Where~~ the generator is installed as a separately derived system, the requirements in 250.30 shall apply.
(B) Nonseparately Derived System. If ~~Where~~ the generator is ~~not~~ installed as a nonseparately derived system, and overcurrent protection is not integral with the generator assembly, a SSBJ ~~an equipment bonding jumper~~ shall be installed between the generator equipment grounding terminal and the equipment grounding terminal, bar or bus of the ~~enclosure of supplied~~ disconnecting mean(s) ~~in accordance with (B)(1) or (B)(2).~~ It shall be sized in accordance with 250.102(C) based on the size of the conductors supplied by the generator
~~(1) Supply Side of Generator Overcurrent Device. The equipment bonding jumper on the supply side of each generator overcurrent device shall be sized in accordance with 250.102(C) based on the size of the conductors supplied by the generator.~~
~~(2) Load Side of Generator Overcurrent Device. The equipment grounding conductor on the load side of each generator overcurrent device shall be sized in accordance with 250.102(D) based on the rating of the overcurrent device supplied.~~
Substantiation: The recommendation was to Accept Proposal 5-134 in Principle with the following action. This was accepted by CMP-5 at the Panel meeting in Hilton Head, SC on January 12-16, 2009. For some reason, this action was reported as "Reject" in the Report on Proposals. The changes to 250.35 as shown above was accepted by CMP-5 yet the revision does not appear in the 2011 NEC ROP Draft.

Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if." This Comment intends to use the word "if" where appropriate.
Panel Meeting Action: Accept in Principle
Revise the existing text of the 2008 NEC to read as follows:
250.35 Permanently Installed Generators.
A conductor that provides an effective ground-fault current path shall be installed with the supply conductors from a permanently installed generator(s) to the first disconnecting mean(s) in accordance with (A) or (B).
(A) Separately Derived System. If the generator is installed as a separately derived system, the requirements in 250.30 shall apply.
(B) Nonseparately Derived System. If the generator is installed as a nonseparately derived system, and overcurrent protection is not integral with the generator assembly, a supply-side bonding jumper shall be installed between the generator equipment grounding terminal and the equipment grounding terminal, bar, or bus of the disconnecting mean(s). It shall be sized in accordance with 250.102(C) based on the size of the conductors supplied by the generator.
Panel Statement: The panel has considered the use of the term and the acronym and determined that the term "Supply-Side Bonding Jumper" is to be used without the acronym (SSBJ) at each location where the term is used.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-96 Log #83 NEC-P05 **Final Action: Accept**
(250.35(B)(1) and (2))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-134
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

It was the further action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 5-95. The acceptance of this comment restores the panel action at the ROP meeting that was inadvertently reported as reject instead of accept in principle.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-97 Log #84 NEC-P05 **Final Action: Accept**
(250.36(C), FPN 2 (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-135
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

It was the further action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise 250.36 to read as follows:

250.36 High-Impedance Grounded Neutral Systems.

High-impedance grounded neutral systems in which a grounding impedance, usually a resistor, limits the ground-fault current to a low value shall be permitted for 3-phase ac systems of 480 volts to 1000 volts if all the following conditions are met:

(1) The conditions of maintenance and supervision ensure that only qualified persons service the installation.

(2) Ground detectors are installed on the system.

(3) Line-to-neutral loads are not served. High-impedance grounded neutral systems shall comply with the provisions of 250.36(A) through (G).

(A) Grounding Impedance Location. The grounding impedance shall be installed between the grounding electrode conductor and the system neutral point. If a neutral point is not available, the grounding impedance shall be installed between the grounding electrode conductor and the neutral point derived from a grounding transformer.

(B) Grounded System Conductor. The grounded system conductor from the neutral point of the transformer or generator to its connection point to the grounding impedance shall be fully insulated. The grounded system conductor shall have an ampacity of not less than the maximum current rating of the grounding impedance but in no case shall the grounded system conductor be smaller than 8 AWG copper or 6 AWG aluminum or copper-clad aluminum.

(C) System Grounding Connection. The system shall not be connected to ground except through the grounding impedance.

FPN: The impedance is normally selected to limit the ground-fault current to a value slightly greater than or equal to the capacitive charging current of the system. This value of impedance will also limit transient overvoltages to safe values. For guidance, refer to criteria for limiting transient overvoltages in ANSI/IEEE 142-1991, Recommended Practice for Grounding of Industrial and Commercial Power Systems."

(D) Neutral Point to Grounding Impedance Conductor Routing. The conductor connecting the neutral point of the transformer or generator to the grounding impedance shall be permitted to be installed in a separate raceway from the ungrounded conductors. It shall not be required to run this conductor with the phase conductors to the first system disconnecting means or overcurrent device.

(E) Equipment Bonding Jumper. The equipment bonding jumper (the connection between the equipment grounding conductors and the grounding impedance) shall be an unspliced conductor run from the first system disconnecting means or overcurrent device to the grounded side of the grounding impedance.

(F) Grounding Electrode Conductor Location. The grounding electrode conductor shall be connected at any point from the grounded side of the grounding impedance to the equipment grounding connection at the service equipment or first system disconnecting means.

(G) Equipment Bonding Jumper Size. The equipment bonding jumper shall be sized in accordance with (1) or (2) as follows:

(1) If the grounding electrode conductor connection is made at the grounding impedance, the equipment bonding jumper shall be sized in accordance with 250.66, based on the size of the service entrance conductors for a service or the derived phase conductors for a separately derived system.

(2) If the grounding electrode conductor is connected at the first system disconnecting means or overcurrent device, the equipment bonding jumper shall be sized the same as the neutral conductor in 250.36(B).

Panel Statement: The revised text was accepted by the panel and as stated in several negative votes was not processed into the ROP. The panel concludes that the work of the TG making the proposal was correct. The panel also concludes the reject of Proposal 5-135 was also correct and the technical substantiation in support of that reject was correct.

The panel corrects the previous use of the term "equipment bonding jumper" as the bonding jumper does not complete the equipment grounding conductor path as defined in Article 100. Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-98 Log #1078 NEC-P05 **Final Action: Reject**
(250.50)

Submitter: Charles J. Palmieri, Town of Norwell
Comment on Proposal No: 5-137
Recommendation: Revise the text of 250.50, as indicated:

All grounding electrodes as described in 250.52(A)(1) through (A)~~(7)~~(8) that are present at each building or structure served shall be bonded together to form the grounding electrode system. Where none of these grounding electrodes exist, one or more of the grounding electrodes specified in 250.52(A)(4) through (A)~~(8)~~(9) shall be installed and used.
Substantiation: This proposal should be reconsidered. I have submitted comments on Proposals 5-142 Log #2567, and 5-143 Log #2570. It is not the intent of the submitter to group acceptable electrodes by trade. The reality that compelled the original proposal is that inspectors are requiring electricians to install the 20 ft of No. 4 copper when construction does not dictate the installation of No 4 Re-Rebar. The argument most often given, is "The #4 Cu is listed in 250.52(A)(3) so it must be installed". In contrast there is nothing in 250.52(A)(1) or (2) which would provoke such a response if a metal water pipe or building steel were not present. My original thought was if the 20 ft of No. 4 Cu. was located to the list of installed electrodes Items 4-7 (see Proposals 5-137 Log #2569, 5-142 Log #2567, and 5-143 Log #2570), then hopefully local authorities would not be so insistent on installing 20 ft of No. 4 copper. If the panel continues to reject these proposals then I would suggest a FPN indicating that the No. 4 Cu is not mandated in the absence of reinforcement steel in the foundations or footings.
Panel Meeting Action: Reject
Panel Statement: The requirement for establishing a grounding electrode system is in 250.50, including using all the electrodes that are present. Section 250.52 the qualifications for electrodes that are permitted to be used. If a concrete encased electrode doesn't exist, either rebar or wire, - they are not present and it is not required to install one. At least one of the electrodes in 250.52 shall be used.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-99 Log #686 NEC-P05 **Final Action: Reject**
(250.50, FPN (New))

Submitter: Paul Guidry, Fluor Enterprises, Inc.
Comment on Proposal No: 5-140
Recommendation: Add FPN to read:
FPN: Bonding of dissimilar metals will result in corrosion of one of the metals. Cathodic protection systems may need to be installed to mitigate the corrosion.
Substantiation: The panel statement was given as follows:
"The corrosion concern between concrete encased rebar and copper wire has been specifically addressed in the Institute of Electrical and Electronic Engineers standard 142, IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems (Green Book). It clearly mentions " It should be noted that steel rebar, when encased in concrete, has approximately the same potential as copper and thus will not corrode." Industry has been using concrete encased reinforcing bar grounding systems with and without connecting to the copper wires without any reported concerns."

The information in Std. 142 is correct as long as copper isn't connected to steel. I am currently on the IEEE Green Book Working Committee for the revision of Std. 142 and this information is being corrected.

Unfortunately, I do not have actual pieces of corroded rebar to show the panel. When concrete fails, it is usually blamed on "bad concrete", not realizing that the problems may have been caused by current flowing between different metals. But, I do have empirical data which I intend to demonstrate for the panel which proves that the connection of copper and steel creates a battery (or a corrosion cell).

Being employed by a large engineering firm, I have ready access to corrosion engineer's technical advice. Most people using the Code do not have this benefit. It can be argued that the Code isn't an instruction manual and that people using the Code should be aware of the cathodic current flowing and resulting corrosion. I agree that the Code is not an instruction manual. It is a highly technical document that shouldn't be used by untrained persons. However, most electrical engineers, designers, electricians and inspectors are not trained in cathodic protection principles and techniques. When following Code requirements, if there is a potential problem, I believe it is the ethical thing to do to at least add a FPN alerting users to the fact that there may be an issue. This is done throughout the Code today, much like the FPNs for voltage drop, conduit expansion, etc.
Panel Meeting Action: Reject
Panel Statement: The technical substantiation does not support the need for an Informational Note. Steel encased in concrete is at the same potential as copper.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-100 Log #1839 NEC-P05 **Final Action: Reject**
(250.52(A))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-144
Recommendation: Revise the existing text of the 2008 NEC by inserting an opening paragraph as follows:
250.52 Grounding Electrodes.
(A) General. Only the portion of grounding electrode(s) installed below the soil frost level shall be considered in determining compliance with (B)(1) through (B)(8) and the installation requirements of 250.53.
Renumber existing 250.52(A) to (B) and existing (B) to (C).
Substantiation: Several authoritative sources show the conductivity of the earth is reduced sharply if the earth is frozen. See Table 2-10 of the *Military Handbook, Grounding, Bonding, and Shielding for Electronic Equipments and Facilities Volume II of 2 Volumes Applications.* (Copy attached) This standard gives the resistance of sandy loam having 15.2 percent moisture. A direct, nearly lineal and opposite relationship exists. As the temperature decreases, the resistance of the earth increases. The changes are most significant as the temperature falls below freezing.
Additional documentation, though not so specific as that found in the Military Handbook, is found in the British Standard, Code of practice for Earthing. The fourth paragraph of section 8.1 gives guidance on installation of earthing electrodes below the frost level and recommends that portions of the earth electrode within 3 ft of the surface be disregarded.
Frozen earth severely reduces the opportunity of the grounding electrode to make a connection to the earth.
Building codes typically require that footings for building foundations be installed below the frost line to avoid structural damage from earth movement. As a result, grounding electrodes that are installed at or below the excavation level will automatically comply with the proposed rule. Underground metal water pipes are typically required to be buried below the frost level for obvious reasons.
This clarification needs to be added to the Code since CMP-5 made a change to 250.52(A)(4) for the 2008 NEC that permits concrete-encased electrodes to be installed vertically. Only the portion of the grounding electrode that is below the frost level should be considered when determining whether a qualifying grounding electrode is present.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: There was no evidence provided that indicates that the existing methods have created a problem or have adversely affected the safety of the system.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
BRENDER, D.: Earth conductivity is reduced sharply if the earth is frozen. Frozen earth severely reduces the ability of an electrode to make contact with the earth. Only that portion of an electrode below the frost line should be considered when determining whether an electrode is effective.

5-101 Log #1371 NEC-P05 **Final Action: Reject**
(250.52(A)(1) Exception)

Submitter: Charles M. Trout, Maron Electric Company
Comment on Proposal No: 5-148
Recommendation: Delete 250.52(A)(1) Exception in its' entirety.
Substantiation: The panel statement refers to a condition of distance for the use of this exception, a condition which is not a part of the exception. The panel statement does not justify this exception with technical substantiation regarding permitting a lesser degree of safety because of an undefined distance and the lack of prescriptive requirements to enable the AHJ to enforce the requirement.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no evidence of a problem or for it providing a lesser degree of safety. In some situations, such as for large buildings, connecting to the water pipe and using it as an extension to the electrode can result in a lower impedance path. A facility that has a process to ensure the water pipe continuity is not interrupted can use the exception. The AHJ can verify that such a process or method exists.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-102 Log #1079 NEC-P05 **Final Action: Reject**
(250.52(A)(3))

Submitter: Charles J. Palmieri, Town of Norwell
Comment on Proposal No: 5-142
Recommendation: Delete the text as indicated.
(3) Concrete-Encased Electrode. An electrode encased by at least 50 mm (2 in.) of concrete, located horizontally near the bottom or vertically, and within that portion of a concrete foundation or footing that is in direct contact with the earth, consisting of at least 6.0 m (20 ft) of one or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than 13 mm (1/2 in.) in diameter, ~~or consisting of at least 6.0 m (20 ft) of bare copper conductor not smaller than 4 AWG.~~ Reinforcing bars shall be permitted to be bonded together by the usual steel tie wires or other effective means. Where multiple concrete-encased electrodes are present at a building or structure, it shall be permissible to bond only one into the grounding electrode system.
Substantiation: This proposal should be reconsidered as Accept in Principal. It is not the intent of the submitter to group acceptable electrodes by trade. The reality that compelled the original proposal is that inspectors are requiring electricians to install the 20 ft of No. 4 copper when construction does not dictate the installation of No. 4 Re-Rebar. "The #4 Cu is listed in 250.52(A)(3) so it must be installed" this is the argument that is most often given. In contrast, there is nothing in 250.52(A)(1) or (2) which would provoke such a response if a metal water pipe or building steel were not present. My original thought was if the 20 ft of No. 4 Cu. was located to the list of installed electrodes Items 4-7 (see Proposals 5-137 Log #2569, 5-142 Log #2567, and 5-143 Log #2570), then, hopefully, local authorities would not be so insistent on installing 20 ft of No. 4 copper. If the panel continues to reject these proposals then I would suggest a FPN indicating that the No. 4 Cu. is not mandated in the absence of reinforcement steel in the foundations or footings.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comments 5-98 and 5-103.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-103 Log #1840 NEC-P05 **Final Action: Accept in Principle**
(250.52(A)(3))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-158
Recommendation: Revise the existing text of the 2008 NEC as follows:
(3) Concrete-Encased Electrode. A conductive element ~~An electrode~~ encased by at least 50 mm (2 in.) of concrete, ~~located horizontally near the bottom or vertically, and within that portion of a concrete foundation or footing that is in direct contact with the earth,~~ consisting of at least 6.0 m (20 ft) of one or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than 13 mm (½ in.) in diameter, or consisting of at least 6.0 m (20 ft) of bare copper conductor not smaller than 4 AWG. Reinforcing bars for use as a concrete-encased electrode shall be in one continuous 6.0-m (20-ft) length or, if in multiple pieces of reinforcing bars, shall ~~permitted to~~ be connected ~~bonded~~ together by the usual steel tie wires, exothermic welding, welding, or other effective means to create one or more 6.0-m (20-ft) length(s). If ~~Where~~ multiple concrete-encased electrodes are present at a building or structure, it shall be permissible to bond only one into the grounding electrode system.
(**a) Location.** Metallic components shall be located horizontally within that portion of a concrete foundation or footing that is in direct contact with the earth or within vertical foundations or structural components or members that are in direct contact with the earth.
Substantiation: A new subsection is proposed to cover the location requirements of concrete-encased electrodes. This will make the requirements more user-friendly. Changes are proposed to add requirements on how to create the minimum 20-ft length of concrete-encased electrode. CMP-5 accepted adding connection of hold-down bolts for structural steel grounding electrodes as "welding, exothermic welding, the usual steel tie wires.." so those three methods are recognized here.
CMP-5 added the permission to use concrete-encased electrodes in a "vertical" orientation in the 2008 NEC but now needs to "fill in the blanks" on how this style of electrode is to be installed or recognized. Some members of CMP-5 have stated it is their opinion the vertical grounding electrode must be in one 20-ft length. Others have opined that 4, 5-ft lengths should suffice. This proposal intends to require not less than one 20-ft length as that is the documentation that accompanied the original proposal to add the "Ufer ground" to Article 250 (so far as I can determine). Four, 5-ft lengths may perform adequately but documentation to support that premise has not been supplied to CMP-5. A concrete-encased grounding electrode installed in a vertical orientation needs to have direct earth contact to ensure the concrete-encased grounding electrode will maintain essential moisture level so as to remain conducive.
Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if." This proposal intends to use the word "if" where appropriate.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle

Revise the existing text of the 2008 NEC to read as follows:

250.52(A)(3) Concrete Encased Electrode. At least 6.0 m (20 ft) of either (1) or (2):

(1) One or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than 13 mm (1/2 in.) in diameter, installed in one continuous 6.0-m (20-ft) length, or if in multiple pieces connected together by the usual steel tie wires, exothermic welding, welding, or other effective means to create a 6.0-m (20-ft) or greater length; or

(2) Bare copper conductor not smaller than 4 AWG

Metallic components shall be encased by at least 50 mm (2 in.) of concrete and shall be located horizontally within that portion of a concrete foundation or footing that is in direct contact with the earth or within vertical foundations or structural components or members that are in direct contact with the earth. If multiple concrete-encased electrodes are present at a building or structure, it shall be permissible to bond only one into the grounding electrode system.

Informational Note. Concrete installed with insulation, vapor barriers, films or similar items separating the concrete from the earth is not considered to be in "direct contact" with the earth.

Panel Statement: The panel made editorial and organizational changes to improve clarity.

An Informational note was added to provide clarification on direct contact with the earth.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-104 Log #1841 NEC-P05 **Final Action: Accept in Principle**
(250.52(A)(3))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-158
Recommendation: Revise the existing text of the 2008 NEC as follows:
(3) Concrete-Encased Electrode. An electrode encased by at least 50 mm (2 in.) of concrete, ~~located horizontally near the bottom or vertically, and within that portion of a concrete foundation or footing that is in direct contact with the earth,~~ consisting of at least 6.0 m (20 ft) of one or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than 13 mm (½ in.) in diameter, or consisting of at least 6.0 m (20 ft) of bare copper conductor not smaller than 4 AWG. Reinforcing bars shall be ~~permitted to~~ be connected ~~bonded~~ together by the usual steel tie wires, welding, or other effective means. If ~~Where~~ multiple concrete-encased electrodes are present at a building or structure, it shall be permissible to bond only one into the grounding electrode system.
(a) Location. Metallic components of the electrode shall be located horizontally near the bottom and within that portion of a concrete foundation or footing that is in direct contact with the earth or within vertical foundations or structural components or members that are in direct contact with the earth.
Substantiation: The Panel action and statement in rejecting the Proposal are not responsive to the proposal or substantiation. The Panel Statement is inconsistent with the text it accepted in Proposal 5-150 where the Panel crafted the language, "The hold-down bolts shall be connected to the concrete-encased electrode by welding, exothermic welding, the usual tie wires, or other approved means." The Panel states in its statement on Proposal 5-150 that proposed text and substantiation for Proposals 5-149, 150, 151 and 152 are included in its action on Proposal 5-150. A review of those proposals does not indicate any language about connection by welding or exothermic welding. Why is the language acceptable in Proposal 5-150 without substantiation and yet was rejected in Proposal 5-158?

It is not uncommon for reinforcing steel to be welded. The American Welding Society produces *D1.4:2005, Structural Welding Code - Reinforcing Steel*. Section 1.4 of the standard reads as follows:

"1.4 Welding Processes

1.4.1 Welding shall be performed with shielded metal arc welding (SMAW), gas metal arc welding (GMAW), or flux cored arc welding (FCAW).
1.4.2 Other welding processes may be used when approved by the Engineer, provided that any special qualification test requirements not covered here are met to ensure that welds satisfactory for the intended application will be obtained."

A new subsection is proposed to cover the location requirements of concrete-encased electrodes. This will make the requirements more user-friendly.

CMP-5 added the permission to use concrete-encased electrodes in a "vertical" orientation but now needs to "fill in the blanks" on how this style of electrode is to be installed or recognized. Some members of CMP-5 have stated it is their opinion the vertical grounding electrode must be in one 20-ft length. Others have opined that 4, 5-ft lengths should suffice. This proposal intends to require not less than one 20-ft length as that is the documentation that accompanied the original proposal to add the "Ufer ground" to Article 250 (so far as I can determine). Four, 5-ft lengths may perform adequately but documentation to support that premise has not been supplied to CMP-5. A concrete-encased grounding electrode installed in a vertical orientation needs to have direct earth contact to ensure the concrete-encased grounding electrode will maintain essential moisture level so as to remain conducive.

Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if." This proposal intends to use the word "if" where appropriate.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-103.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-105 Log #2562 NEC-P05 **Final Action: Reject**
(250.52(A)(3))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-164
Recommendation: Accept the proposal.
Substantiation: The proposal only allows what the panel statement said, in effect, was acceptable. It allows multiple pieces of steel that are bonded together. The only difference is that the bonding is not accomplished by a steel-to-steel bond, but through bonds to the grounding electrode conductor. It is hard to imagine that the grounding impedance of four steel reinforcing rods connected in a common location using the usual tie wires would be less than the same four rods in separate locations all bonded together with copper. In fact, the latter scenario would presumably be lower in impedance because each rod would access differing sections of earth, and therefore receive the benefits of paralleled electrodes.
Panel Meeting Action: Reject
Panel Statement: No test data has been provided to support the recommendation of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-106 Log #1988 NEC-P05 **Final Action: Reject**
(250.52(A)(4))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 5-165
Recommendation: This proposal should be accepted
Substantiation: The only technical substantiation that is required to support this proposal is logic. It should be very clear that a 20' radial will provide a better grounding electrode than that same 20' of copper run around the structure would be. With the 20' run around a structure there will be overlapping spheres of influence that will reduce the effectiveness of the grounding electrode, just like the case where ground rods are installed too close to each other. If a grounding electrode must encircle the structure to be a functional grounding electrode, the why are ground rods, metal underground water pipes or building steel suitable for use as grounding electrodes?
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its view that the technical substantiation submitted is insufficient to justify a change. There was no empirical test data or field evidence provided to indicate a radial performs as well as a ring.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-107 Log #2396 NEC-P05 **Final Action: Reject**
(250.52(A)(5))

Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 5-166
Recommendation: The submitter's request that CMP-5 reconsider action on the Proposal 5-166 and accept as submitted.
Substantiation: As stated in the substantiation submitted with the proposal, enforcement has no means to evaluate an unlisted ground rod installed on a job site. Listing of the rods would require the rod to be evaluated prior to installation and permit the listing mark to be used as confirmation the NEC requirements have been met.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-108.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:

BRENDER, D.: Panel should have accepted this Comment. The substantiation is persuasive and for the most part, seems to have been ignored by the Panel in its statement.

5-108 Log #2872 NEC-P05 **Final Action: Reject**
(250.52(A)(5))

Submitter: Gary Jones, Ft. Worth, TX
Comment on Proposal No: 5-166
Recommendation: The original proposal should be accepted and the panel may consider the ideal of the proposed language as follows:
Revise 250.52(A)(5) to read as follows:
(5) Rod and Pipe Electrodes. Rod and pipe electrodes shall not be less than 2.44 m (8 ft) in length and shall consist of the following materials.
(a) Pipe Electrodes. ~~Grounding~~ electrodes of pipe or conduit shall not be smaller than metric designator 21 (trade size ¾) and, where of steel, shall have the outer surface galvanized or otherwise metal-coated for corrosion protection.
(b) Rod Electrodes.Rod type electrodes shall comply with the following:
(1) Shall be constructed of solid copper, steel or ~~Grounding electrodes of~~ stainless steel
(2) Where of steel, rods shall be coated by ~~and~~ copper or zinc ~~steel~~
(3) Shall be listed as grounding and bonding equipment ~~at least 15.87 mm (5/8 in.) in diameter, unless listed and not less than 12.70 mm (½ in.) in diameter.~~
Substantiation: After many discussions with inspectors both locally and throughout the country, we have concerns about being unable to determine if the ground rod installed meets the requirements of the NEC.

The proposed modified wording would provide further reassurance of appropriately constructed ground rods and proper coatings while still meet the intent of proposal 5-166 plus it removes the minimum size requirement. This will allow the listing process and product standard to determine what is adequate. Additionally, by having a listing mark it would help us (the AHJ) to make sure the ground rod meets valid standards. With the idea that listings requirements exist, the NEC does not need to establish minimum manufacturing requirements.

Concerning the panel statement, "the NEC cannot control the manufacture of non-compliant products". The National Electrical directs that compliant products are used by requiring them to be listed. This includes many listing provisions found in the NEC, particularly grounding and bonding as found in NEC section 250.8(A), all to guarantee that conforming equipment and components may be acceptable to the AHJ.
Panel Meeting Action: Reject
Panel Statement: There is no technical substantiation provided that indicates that unlisted rods are not suitable.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
BRENDER, D.: Panel should have accepted this Comment. The substantiation is persuasive and for the most part, seems to have been ignored by the Panel in its statement.

5-109 Log #2889 NEC-P05 **Final Action: Reject**
(250.52(A)(5))

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-166
Recommendation: Revise text as follows:

The panel should reconsider and accept the concept of the proposed language as follows:

Revise 250.52(A)(5) to read as follows:

(5) Rod and Pipe Electrodes. Rod and pipe electrodes shall not be less than 2.44 m (8 ft) in length and shall consist of the following materials.

(a) Pipe Electrodes. ~~Grounding~~ electrodes of pipe or conduit shall not be smaller than metric designator 21 (trade size ¾) and, where of steel, shall have the outer surface galvanized or otherwise metal-coated for corrosion protection.

(b) Rod Electrodes.Rod type electrodes shall comply with the following:
(1) Shall be constructed of solid copper, steel or ~~Grounding electrodes of~~ stainless steel
(2) Where of steel, rods shall have a coating of ~~and~~ copper or zinc ~~steel~~
(3) Shall be listed as grounding and bonding equipment ~~at least 15.87 mm (5/8 in.) in diameter, unless listed and not less than 12.70 mm (½ in.) in diameter.~~
Substantiation: The revised language incorporates the provisions of Proposal 5-168 and the two negative ballots that were provided on that proposal to eliminate the minimum size and let that be covered by the present Listing process and product standard. The premise that where listings requirements exist, the NEC does not need to establish minimum manufacturing requirements is correct.

The basic issue for inspectors is very clearly brought out by one of the major manufacturers of ground rods in a recent broadcast statement:

"Ground Rod Markings. A fully marked ground rod gives you inspectability and traceability. An unmarked, no-name ground rod gives you liability. It's your choice. Choosing expediency or a few pennies cost difference over safety is potentially very dangerous for electrical inspectors, wholesalers, contractors and their customers."

When ground rods are installed and there is no indication of compliance with the UL standard for grounding and bonding equipment, the suitability of the rod cannot be readily determined by the inspector. The length, the core material used, the coating thickness are all in question no matter what the diameter.

The panel statement is incorrect in stating, "the NEC cannot control the manufacture of non-compliant products". The NEC can very much control that compliant products are used by requiring them to be listed, as evidenced by the numerous listing requirements placed in the NEC for conduit, wire, conduit fittings, specific grounding and bonding connectors, signs, and luminaires, etc., all to ensure that compliant products are provided, and can be readily inspected by the AHJ, for the installation.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-108.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
BRENDER, D.: Panel should have accepted this Comment. The substantiation is persuasive and for the most part, seems to have been ignored by the Panel in its statement.

5-110 Log #1230 NEC-P05 **Final Action: Accept**
(250.52(A)(5)(b))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 5-168
Recommendation: Grounding electrodes of stainless steel and copper or zinc coated steel shall be at least 15.87 mm (5/8 in.) in diameter, unless listed ~~and not less than 12.70 mm (1/2 in.) in diameter.~~
Substantiation: This proposal should have been accepted. The UL467 Standard requires the minimum size of a listed rod to be the identical size as presently described in the NEC, 12.7 mm (1/2 in.). The NEC is intended to be an installation code and not a product design standard. Change the wording to a very simple statement.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
BRENDER, D.: The Panel should have rejected this Comment. The NEC appropriately contains many, many construction requirements. The present UL Product Safety Standard contains identical requirements to that of the NEC for the minimum diameter of ground rods. Nothing is to be gained by removing the minimum diameter.

5-111 Log #1080 NEC-P05 **Final Action: Reject**
(250.52(A)(8) (New))

Submitter: Charles J. Palmieri, Town of Norwell
Comment on Proposal No: 5-143
Recommendation: Add a new subsection number (8) to section 250.52(A) to read as follows and renumber existing subsections (8) as (9).

(8) Other Concrete Encased Electrodes. At least 6.0 m (20 ft) of bare copper conductor not smaller than 4 AWG, encased by at least 50 mm (2 in.) of concrete, located horizontally near the bottom or vertically, and within that portion of a concrete foundation or footing that is in direct contact with the earth.

Substantiation: This proposal should be reconsidered as Accept in Principal. It is not the intent of the submitter to group acceptable electrodes by trade. The reality that compelled the original proposal is that inspectors are requiring electricians to install the 20 ft of No. 4 copper when construction does not dictate the installation of No. 4 Re-Rebar. "The #4 Cu is listed in 250.52(A)(3) so it must be installed" this is the argument that is most often given. In contrast, there is nothing in 250.52(A)(1) or (2) which would provoke such a response if a metal water pipe or building steel were not present. My original thought was if the 20 ft of No. 4 Cu. was located to the list of installed electrodes Items 4-7 (see Proposals 5-137 Log #2569, 5-142 Log #2567, and 5-143 Log #2570), then, hopefully, local authorities would not be so insistent on installing 20 ft of No. 4 copper. If the panel continues to reject these proposals then I would suggest a FPN indicating that the No. 4 Cu. is not mandated in the absence of reinforcement steel in the foundations or footings.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-98.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-112 Log #496 NEC-P05 **Final Action: Accept**
(250.53(A)(2))

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 5-169a
Recommendation: Continue to accept the proposal and add the word "single" in list item (2) as follows:
(2) Supplemental Electrode Required. A single rod, pipe or plate electrode shall be supplemented by an additional electrode of a type specified in 250.52(A)(2) through (A)(8).
Remainder as suggested in Proposal 5-169a.
Substantiation: The driving text in former 250.56 included the word "single." This word was lost in the proposal stage of the process. The new requirement to install a supplemental electrode is driven by the choice to install one rod, pipe, or plate electrode.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-113 Log #2232 NEC-P05 **Final Action: Reject**
(250.53(A)(2))

Submitter: Charles E. Beck, Affiliated Engineers NW, Inc.
Comment on Proposal No: 5-169a
Recommendation: Revise text to read as follows:
"Supplemental Electrode Required: A rod, pipe or plate electrode shall not by itself comprise an entire grounding electrode system, but rather shall be supplemented..."
Substantiation: The CMP is incorrectly interpreting its own words, in believing that the wording of this proposal does not presently require a rod to be supplemented, even if the rod is but one electrode in a system comprising many other types of electrodes. The wording, both as originally written in 250.56 and as proposed in 250.53, says that if there is a rod, then it gets supplemented. It says nothing about checking for the presence of other types of electrodes before deciding that a supplemental electrode is required.
Panel Meeting Action: Reject
Panel Statement: A single rod, pipe, or plate can be the entire "grounding electrode system" in cases where it meets the Code requirements in the exception to 250.53(A)(2). If a rod is connected to another electrode as defined in 250.52(A)(2) to (8), then no additional electrode is required either for the 2008 NEC in 250.56 or the proposed 2011 NEC.
See panel action and statement Comment 5-112.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-114 Log #2531 NEC-P05 **Final Action: Reject**
(250.53(A)(2))

Submitter: George M. Stolz, II, Western Sky Electric, LLC
Comment on Proposal No: 5-176a
Recommendation: The panel should reconsider and accept the proposal. Delete proposed 250.53(A)(2) and exception 2, and delete the existing 250.56.
Substantiation: There was no technical substantiation in the panel's comment to support how a second ground rod improves an electrical grounding system. Moving the text around the code does not distract this section's legion of critics from the fact that 30 ohms of resistance to earth is likely better than two paths of 3,000,000 ohms. If you move it around, we'll simply see you next cycle. The proposed changes make absolutely no difference in the interpretation or application of the text, add no additional safety to the NEC, and nothing substantive has been changed. I salute the panel's tenacity in their defense of this relic, hopefully in time it will fade along with the bygone 3-ohm water pipe requirement. I'm younger than most of you, chances are I'll outlive you, and perhaps the next generation will be able to demonstrate an enhanced ability to add.
Panel Meeting Action: Reject
Panel Statement: It is standard practice in some areas to install two ground rods because other types of electrodes are not present, instead of testing the resistance of a single rod. Depending on geographical location and conditions, installing more than two ground rods will not achieve a resistance of 25 ohms. In other locations a single rod can achieve a resistance of much less than 25 ohms.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-115 Log #1842 NEC-P05 **Final Action: Accept in Principle**
(250.53(A)(3))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-169a
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
Informational Note: ~~The paralleling efficiency of rods longer than 2.5 m (8 ft) is improved by spacing greater than 1.8 m (6 ft).~~ The paralleling efficiency of rods is increased by spacing adjacent rods by a distance equal to twice the length of a single rod. If the rods are not of the same length, the spacing of the paralleled rods is best determined by spacing not less than twice the length of the longer rod.
Substantiation: Note the Substantiation for Proposal 5-177. It states "The sphere of influence or relative earth cylinder or earth shell of a single rod is determined by the driven depth of the rod. No other rod should occupy this shell. Therefore, where it is possible to provide this spacing, the overall resistance to ground of the paralleled rods would be approximately half that of a single rod. I have seen certain local authorities require a 6-foot spacing between rods and this is certainly a misinterpretation of this concept."
The submitter of the proposal is correct. Manufacturers of listed ground rods recommend the rods be spaced not less than twice the length of the rod. This issue then becomes one of compliance with 110.3(B). The Informational Note brings valuable attention to this listing requirement.
This spacing to avoid overlapping "sphere-of-influence" by adjacent ground rods is also described in instructional manuals from manufacturers of earth-resistance testers.
Panel Meeting Action: Accept in Principle
Revise the recommended informational note text as follows:
Informational Note: The paralleling efficiency of rods is increased by spacing them twice the length of the longest rod.
Panel Statement: The proposed revised language is more concise and meets the submitter's intent.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-116 Log #1869 NEC-P05 **Final Action: Accept**
(250.53(D)(2))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-170
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(2) Supplemental Electrode Required. A metal underground water pipe shall be supplemented by an additional electrode of a type specified in 250.52(A)(2) through (A)(8). If the supplemental electrode is of the rod, pipe, or plate type, it shall comply with 250.52(A) ~~250.56~~. The supplemental electrode shall be bonded to one of the following:
(1) The grounding electrode conductor
(2) The grounded service-entrance conductor
(3) A nonflexible grounded service raceway
(4) Any grounded service enclosure
(5) As provided by 250.32(B)
Substantiation: This Comment is to correct the reference to the appropriate section in the 2011 NEC ROP Draft.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-117 Log #85 NEC-P05 **Final Action: Accept**
(250.56)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-174
Recommendation: The Technical Correlating Committee directs the panel to reconsider and clarify whether or not it was their intent to delete 250.56.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 5-119.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-118 Log #86 NEC-P05 **Final Action: Accept**
(250.56)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-176a
Recommendation: The Technical Correlating Committee directs the panel to reconsider and clarify whether or not it was their intent to delete 250.56.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 5-119.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-119 Log #1843 NEC-P05 **Final Action: Accept**
(250.56)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-174
Recommendation: Delete Section 250.56 and the FPN in the 2008 NEC.
Substantiation: Code Panel 5 moved the requirements and the Fine Print Note from 250.56 to 250.53(A)(2) in their ROP meeting actions. It appears it was the intent of CMP-5 to delete this section.
This action may not accomplish the intent of the submitter as CMP-5 has relocated the 25-ohm requirements to 250.52(A) and had "turned the rule on its head."
Panel Meeting Action: Accept
Panel Statement: It was the panel's intent to delete section 250.56 and related FPN from the 2008 NEC in its entirety.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-120 Log #1220 NEC-P05 **Final Action: Accept in Principle**
(250.56, FPN)

Submitter: Gregory P. Bierals, Samaritan's Purse World Medical Mission
Comment on Proposal No: 5-177
Recommendation: Revise text to read as follows:
The paralleling efficiency of rods is increased by spacing adjacent rods by a distance equal to twice the length of a single rod, where the rods are not of the same length, the spacing of the paralleled rods may be based on twice the length of the longer rod.
Substantiation: This concept is not clearly understood, and while not worded in a mandatory format, proper spacing between parallel rods may have a significant effect on resistance to ground, as opposed to virtually wasting additional eletrodes.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-115.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-121 Log #87 NEC-P05 **Final Action: Accept**
(250.64(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-194
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action with respect to the provisions of this proposal that are included in the panel action on Proposal 5-195.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 5-123.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-122 Log #88 NEC-P05 **Final Action: Accept**
(250.64(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-195
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal with respect to the provisions of Proposal 5-194 that have been included.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 5-123. The panel action text includes both Proposal 5-194 and Proposal 5-195 combined.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-123 Log #1844 NEC-P05 **Final Action: Accept**
(250.64(B))

TCC Action: The Technical Correlating Committee directs that in the text of 250.64(B) the word "if" be changed to the word "where".
In this instance, the Technical Correlating Committee had determined that the revised wording is more appropriate.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-194
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(B) Securing and Protection Against Physical Damage. If ~~Where~~ exposed, a grounding electrode conductor or its enclosure shall be securely fastened to the surface on which it is carried. Grounding electrode conductors shall be permitted to be installed on or through framing members. A 4 AWG or larger copper or aluminum grounding electrode conductor shall be protected if ~~where~~ exposed to physical damage. A 6 AWG grounding electrode conductor that is free from exposure to physical damage shall be permitted to be run along the surface of the building construction without metal covering or protection if ~~where~~ it is securely fastened to the construction; otherwise, it shall be protected in rigid metal conduit (RMC), intermediate metal conduit (IMC), rigid polyvinyl chloride conduit (PVC), reinforced thermosetting resin conduit (RTRC), electrical metallic tubing (EMT), or cable armor. Grounding electrode conductors smaller than 6 AWG shall be protected in RMC ~~rigid metal conduit~~, IMC ~~intermediate metal conduit~~, PVC ~~rigid polyvinyl chloride conduit (PVC)~~, RTRC ~~reinforced thermosetting resin conduit (RTRC)~~, EMT ~~electrical metallic tubing~~, or cable armor.
Substantiation: Please see the substantiation for Proposal 5-194. It appears, based upon CMP-5's statement on Proposal 5-195, that the Panel intended to incorporate the proposed changes in Proposal 5-194 into its action on Proposal 5-195. For some reason, it does not appear that happened.
This Comment incorporates the accepted language in the 2011 NEC ROP Draft so the work of CMP-5 on this section is preserved and to bring the use of acronyms into compliance with the NEC Style Manual.
Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if." This Comment intends to use the word "if" where appropriate.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-124 Log #1451 NEC-P05 **Final Action: Reject**
(250.64(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-197
Recommendation: Accept the proposal.
Substantiation: Raceways are not always used primarily for the purpose of protection, but as a support or a route for installation of conductors. Raceway conductor fill requirements do not specify that an equipment grounding conductor or bonding conductor is not be counted. Heating is not a factor where such conductors are the only ones installed, but they are not prohibited from installation with other conductors, where those other conductors can be affected. Installation with other conductors affects the area fill requirements for those conductors. Table 1 in Chapter 9 has a fill percentage for one conductor whether or not a circuit conductor. Proposed "provisions" include fishing of raceways and support of conduit bodies, which are not "requirements".
Panel Meeting Action: Reject
Panel Statement: If a grounding electrode conductor or grounding electrode bonding conductor were installed with circuit conductors, the raceway article requirements would already be in place when considering the overall circuit conductor conduit fill. The revised text does not add clarity. No additional technical substantiation was provided to delete the word "requirements" and add the terms "applicable provisions" as indicated in the panel statement for Proposal 5-197. Each raceway article, typically in the.22 section, references Chapter 9, Table 1 for raceway fill. Heat is not the only reason for limiting raceway fill, see 300.17.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-125 Log #1616 NEC-P05 **Final Action: Reject**
(250.64(E), FPN)

Submitter: Peter D. Noval, Jr., Philadelphia, PA
Comment on Proposal No: 5-200
Recommendation: Add new text to read as follows:
Ferrous metal enclosures for grounding electrode conductors shall be electrically continuous from the point of attachment to cabinets or equipment to the grounding electrode and shall be securely fastened to the ground clamp or fitting. Nonferrous metal enclosures shall not be required to be electrically continuous. Ferrous metal enclosures that are not physically continuous from cabinets or equipment to the grounding electrode shall be made electrically continuous by bonding each end of the raceway or enclosure to the grounding electrode conductor. Bonding shall apply at each end and to all intervening ferrous metal raceways, boxes, and enclosures between the cabinets or equipment and the grounding electrode. The bonding jumper for a grounding electrode conductor raceway or cable armor shall be the same size as, or larger than, the enclosed grounding electrode conductor. Where a raceway is used as protection for a grounding electrode conductor, the installation shall comply with the requirements of the appropriate raceway article.
FPN: NFPA 780-2008, Standard for the Installation of Lightning Protection Systems makes no distinction between ferrous and nonferrous and requires all metal conduit containing grounding electrode conductors to be bonded in the manner described by 250.64(E) for ferrous conduit.
Substantiation: The addition of the fine print note points out that the requirements for bonding grounding electrode conductor enclosures for lightning protection systems differ from those for other types of installations. Hopefully, this clarification will assist designers, installers and inspectors alike by eliminating the potential for confusion.
Panel Meeting Action: Reject
Panel Statement: The NEC is not the installation code for lightning protection systems. If these requirements are considered necessary, the proper installation code is NFPA 780.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-126 Log #338 NEC-P05 **Final Action: Accept**
(250.64(F)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-202
Recommendation: The proposal should be accepted in principle. Revise the ends text to read: "… bonding jumpers that are installed in accordance with 250.53(C).
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly. The final sentence does, however, need the additional words "that are installed" in order for the rule to make sense grammatically. The NEC is an installation code and inanimate objects cannot comply with a rule requiring a certain installation protocol unless they have been so installed. The wording presented in this comment is more readable.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-127 Log #1221 NEC-P05 **Final Action: Reject**
(250.64(G))

Submitter: Gregory P. Bierals, Samaritan's Purse World Medical Mission
Comment on Proposal No: 5-204
Recommendation: New text to read as follows:
Grounding electrode conductors shall be run as short and straight as practicable in order to limit conductor inpedance.
Substantiation: This revised statement is brief and to the point. The length of this conductor and the method of installation is very important and cannot be overlooked.
Panel Meeting Action: Reject
Panel Statement: The phrase "as short and straight as practicable" is subjective and difficult to enforce. The amount of acceptable conductor impedance is also left open to interpretation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-128 Log #1052 NEC-P05 **Final Action: Reject**
(250.66(B))

Submitter: Gregory P. Bierals, Samaritan's Purse World Medical Mission
Comment on Proposal No: 5-210
Recommendation: Accept this proposal to add text as follows:
Where the grounding electrode conductor is connected to a concrete encased electrode as permitted in 250.52(A)(3), that portion of the conductor that is the sole connection to the grounding electrode shall not be required to be larger than 4 AWG copper wire. This conductor shall be extended from this connection to an additional electrode(s) to protect the concrete from damage associated with ground-seeking current.
FPN: See IEEE F77-115-9.
Substantiation: It has been known for quite some time (at least 1960) that concrete footings can be damaged by ground-seeking current which causes the rapid expansion of the absorbed moisture in the concrete. Some code enforcing authorities are requiring the use of this type of electrode without the knowledge of potential damage.
Panel Meeting Action: Reject
Panel Statement: No documented evidence or direct technical substantiation has been provided to support adding the proposed requirement or the informational note.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-129 Log #2343 NEC-P05 **Final Action: Reject**
(250.68(C))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-212
Recommendation: Reject this proposal.
Substantiation: While this proposal does seem to address a real world concern, it also creates as many concerns as it solves. For example, with this new rule, no longer can an installer use the concrete encased electrode (CEE) as a GEC. It is quite common to connect from the service equipment to the CEE, then from the CEE to the underground water pipe. This is a very common practice, especially in wood framed structures. This change also eliminates connecting the GEC to a ground rod, then connecting a bonding jumper from the rod to another rod, as this proposed text states that only the water pipe or structural metal can have bonding jumpers.
Perhaps instead of rejecting the proposal, the CMP could include a "where used, bonding jumpers to water pipes or structural metal shall comply with the following…" type of statement. As currently accepted, however, room for confusion certainly exists.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-131. The panel action on Comment 5-131 resolved the issues with the submitter. Section 250.64(F) provides other locations for grounding electrode conductor and bonding jumper terminations. Section 250.50 requires all electrodes present to be bonded together.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-130 Log #2563 NEC-P05 **Final Action: Accept in Principle**
(250.68(C) (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-212
Recommendation: Accept the proposal in principle. In item (2)(a), change "reinforcing bars" to "conductive elements".
Substantiation: Concrete-encased electrodes are permitted to use bare copper wire as their conductive element, as well as steel reinforcing bars. The panel action, apparently inadvertently and certainly without substantiation does not accommodate an electrode made with bare copper wire.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-131.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-131 Log #1845 NEC-P05 **Final Action: Accept in Principle**
(250.68(C)(2) and 250.64(C))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-212
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
The opening paragraph of 250.68(C) and (C)(1) are not addressed by this Comment.
250.68(c)(2) The structural frame of a building that qualifies as a grounding electrode in accordance with 250.52(A)(2) and can be shown to provide a continuous path from the point of connection to the grounding electrode ~~as follows:~~.

~~a. By connecting the structural metal frame to the reinforcing bars of a concrete-encased electrode as provided in 250.52(A)(3) or ground ring as provided in 250.52(A)(4)~~
~~b. By bonding the structural metal frame to one or more of the grounding electrodes as defined in 250.52(A)(5) or (A)(7) that comply with 250.56~~
~~c. By other approved means of establishing a connection to earth~~
250.64(C) Continuous. Except as provided in 250.30(A)(5), (A)(6), 250.30(B)(1) and 250.68(C), grounding electrode conductor(s) shall be installed in one continuous length without a splice or joint. If required, splices or connections shall be made ~~except~~ as permitted in (1) through (4) ~~and (2)~~:
(1) Splicing of the wire-type grounding electrode conductor shall be permitted only by irreversible compression-type connectors listed as grounding and bonding equipment or by the exothermic welding process.
(2) Sections of busbars shall be permitted to be connected together to form a grounding electrode conductor.
(3) Bolted, riveted, or welded connections of structural metal frames of buildings or structures
(4) Threaded, welded, brazed, soldered or bolted-flange connections of metal water piping
Substantiation: The purpose of this new 250.68(C) as stated in the new opening paragraph is to recognize the use of above-ground portions of metal water pipe and structural metal portions of a building as a grounding electrode conductor. As such, 250.68(C)(2) needs to be corrected to refer to the portion of structural metal that is recognized as a grounding electrode and not restate the conditions for determining the requirements for establishing the grounding electrode. In addition, the text on proving that the path from the connection of a wire-type grounding electrode conductor to structural metal that serves as a grounding electrode conductor may be obvious to some but ensuring the structural metal path is continuous is essential to its use as such.
It seems a coordinating change to 250.64(C) needs to be made so connections from a grounding electrode conductor through normal bolted, riveted or welded connections of structural steel and threaded, soldered, or bolted connections of metal water pipes are not considered a violation of the "without a splice" rules of that section. Separately derived systems commonly use continuous metal water piping systems and continuous structural steel as a grounding electrode conductor between the connection and the grounding electrode. Since these connection or splicing methods have been recognized by installers and inspectors for many years, it is hoped this information will not be considered a new concept for the NEC.
Panel Meeting Action: Accept in Principle
Revise 250.68(C) in ROP draft to read as follows:
"(C) Metallic Water Pipe and Structural Metal. Grounding electrode conductors and bonding jumpers shall be permitted to be connected at the following locations and be used to extend the connection to an electrode(s):
(1) Interior metal water piping located not more than 1.52 m (5 ft) from the point of entrance to the building shall be permitted to be used as a conductor to interconnect electrodes that are part of the grounding electrode system.
Exception: In industrial, commercial, and institutional buildings or structures if conditions of maintenance and supervision ensure that only qualified persons service the installation, interior metal water piping located more than 1.52 m (5 ft) from the point of entrance to the building shall be permitted as a bonding conductor to interconnect electrodes that are part of the grounding electrode system, or as a grounding electrode conductor, provided that the entire length, other than short sections passing perpendicularly through walls, floors, or ceilings, of the interior metal water pipe that is being used for the conductor is exposed.
(2) The structural metal frame of a building that is directly connected to a grounding electrode as specified in 250.52(A)(2) or 250.68(C)(2)(a), (b) or (c) shall be permitted as a bonding conductor to interconnect electrodes that are part of the grounding electrode system, or as a grounding electrode conductor.
a. By connecting the structural metal frame to the reinforcing bars of a concrete-encased electrode as provided in 250.52(A)(3) or ground ring as provided in 250.52(A)(4)
b. By bonding the structural metal frame to one or more of the grounding electrodes as defined in 250.52(A)(5) or (A)(7) that comply with 250.53(A)(2)
c. By other approved means of establishing a connection to earth"
Revise recommended text for 250.64(C) from this comment to read as follows:
"**250.64(C) Continuous.** Except as provided in 250.30(A)(5), (A)(6), 250.30(B)(1) and 250.68(C), grounding electrode conductor(s) shall be installed in one continuous length without a splice or joint. If necessary, splices or connections shall be made as permitted in (1) through (4):
(1) Splicing of the wire-type grounding electrode conductor shall be permitted only by irreversible compression-type connectors listed as grounding and bonding equipment or by the exothermic welding process.
(2) Sections of busbars shall be permitted to be connected together to form a grounding electrode conductor.
(3) Bolted, riveted, or welded connections of structural metal frames of buildings or structures.
(4) Threaded, welded, brazed, soldered or bolted-flange connections of metal water piping."
Panel Statement: The revised text for 250.68(C) incorporates Comments 5-130 and 5-131 with editorial revisions made for clarity. The recommended text for 250.64(C) was accepted with changing the term "required" to necessary".
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-132 Log #1450 NEC-P05 **Final Action: Reject**
(250.71 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-215
Recommendation: Accept the proposal.
Substantiation: Where insulated or covered grounding electrode conductors are installed as indicated in the proposal, identification should be provided to distinguish them. An EGC appears to comply with the definition of grounded conductor and grounding conductor since it is part of a system and it connect equipment and a system to a grounding electrode; therefore, if insulated or covered, it should be identified. If covering is white, it can be deemed as a circuit conductor.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any evidence of a problem as previously indicated in the ROP panel statement.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-133 Log #2765 NEC-P05 **Final Action: Accept**
(250.80)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-216
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-134 Log #2344 NEC-P05 **Final Action: Accept**
(250.80 Exception)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-217
Recommendation: Revise the text as follows:
Exception: A metal elbow that is installed in an underground ~~installation of rigid nonmetallic polyvinyl chloride conduit (PVC) or reinforced thermosetting resin conduit (RTRC)~~ nonmetallic raceway and is isolated from possible contact by a minimum cover of 450 mm (18 in.) to any part of the elbow shall not be required to be connected to the grounded system conductor or grounding electrode conductor.
Substantiation: By changing the text to reflect all nonmetallic raceways, we are spared having to revise this section each time a new nonmetallic raceway comes out. This closes the door on any lapses in Code cycles, such as the current omission of NUCC and HDPE.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-135 Log #2766 NEC-P05 **Final Action: Accept**
(250.86)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-218
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-136 Log #1449 NEC-P05 **Final Action: Reject**
(250.86 Exception No. 2)

TCC Action: The Technical Correlating Committee notes that the panel statement reference is to 334.15(C), not 310.15(C).
Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-220
Recommendation: Accept the proposal with the following revisions:
Exception No. 2: Short sections of isolated metal enclosures or raceways used primarily to provide support or protection of cable assemblies or as required by 398.15(C)(4).
Substantiation: Raceways covered by 398.15(C)(4) should be covered.
Panel Meeting Action: Reject
Panel Statement: No technical substantiation was provided that this additional text is required beyond the text already provided in 310.15(C). See panel statement for Proposal 5-220.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-137 Log #2767 NEC-P05 **Final Action: Accept**
(250.92(A))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-221
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-138 Log #2564 NEC-P05 **Final Action: Accept**
(250.92(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-223
Recommendation: Continue to accept the proposal only in part.
Substantiation: This comment reaffirms the panel action in rejecting the note. A far more common example of an oversized knockout in the field is a concentric knockout where one or more too many rings fell out during the installation process, resulting in the necessity of resorting to reducing washers. These have notoriously poor continuity. The note as submitted would have defined out of existence the most common instances of oversized knockouts. Inserting the word “oversized” into this rule, as was included in the panel action, is useful and has clear uses in the field.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-139 Log #510 NEC-P05 **Final Action: Accept**
(250.94)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 5-228
Recommendation: Continue to reject this proposal.
Substantiation: There are many situations where the IBT is placed inside the building where it is more secure and better protected from the elements. The Panel is correct that the submitter has provided no technical substantiation to require the IBT to always be placed outside.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-140 Log #528 NEC-P05 **Final Action: Reject**
(250.94)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 5-225a
Recommendation: Reject the proposal.
Substantiation: The IBT is not intended for connection of ‘grounding electrode conductors’ but to accomplish intersystem bonding between the power and communications systems. Identifying a communications grounding conductor as a ‘grounding electrode conductor’ is confusing and misleading, and may lead to subsequent use of this conductor as a point of connection to the building or structure grounding electrode system. See my comments to Proposals 5-13 and 5-21.
Panel Meeting Action: Reject
Panel Statement: The definition of Grounding Electrode Conductor indicates it is a conductor that can be connected to an Intersystem Bonding Termination. In other situations the connection is made using a bonding conductor.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-141 Log #529 NEC-P05 **Final Action: Accept**
(250.94)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 5-229
Recommendation: Continue to reject this proposal.
Substantiation: There are many situations where the IBT is placed outside the building. Placement of the IBT should be determined by the physical location of the power/communications facilities at the premises, length minimization of the communications bonding/grounding conductor and access for service/ maintenance. The Panel is correct that the IBT does not always need to be placed within the building.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-142 Log #1846 NEC-P05 **Final Action: Accept in Principle**
(250.94)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-227
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
250.94 Bonding for Other Systems. An intersystem bonding termination for connecting intersystem bonding and grounding electrode conductors required for other systems shall be provided external to enclosures at the service equipment or metering equipment enclosure and at the disconnecting means for any additional buildings or structures. The intersystem bonding termination shall comply with the following:
(1) Be accessible for connection and inspection. ~~The intersystem bonding termination~~
(2) Consist of a set of terminals or a bonding bar with ~~Have~~ the capacity for connection of not less than three intersystem bonding conductors. ~~The intersystem bonding termination device shall~~
(3) Not interfere with opening the enclosure for a service, building or structure disconnecting means, or metering equipment ~~enclosure~~.
~~The intersystem bonding termination shall be one of the following:~~
(4) ~~(1)~~ At the service equipment, be ~~set of terminals~~ securely mounted and electrically connected to ~~the~~ an enclosure for the ~~meter enclosure or~~ service equipment, to the electric utility meter, or to an exposed nonflexible metallic service raceway, ~~enclosure~~ or be mounted at one of these enclosures and be connected to the enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor.
(5) At the disconnecting means for a building or structure, be securely mounted and electrically connected to the metallic enclosure for the building or structure disconnecting means, or be mounted at the disconnecting means and be connected to the metallic enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor.
(6) The terminals or bonding bar shall be listed as grounding and bonding equipment.
~~(2) A bonding bar near the service equipment enclosure, meter enclosure, or raceway for service conductors. The bonding bar shall be connected with a minimum 6 AWG copper conductor to an equipment grounding conductor(s) in the service equipment enclosure, meter enclosure, or exposed nonflexible metallic raceway.~~
~~(3) A bonding bar near the grounding electrode conductor. The bonding bar shall be connected to the grounding electrode conductor with a minimum 6 AWG copper conductor.~~
Substantiation: This Comment is intended to be editorial in nature primarily to organize the requirements in list format. In addition, an effort is made to remove duplicate requirements in the subsections. An effort is also made to indicate the locations acceptable for the intersystem bonding termination at or near the service and at or near the building disconnecting means for buildings or structures supplied by a feeder.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
250.94 Bonding for Other Systems. An intersystem bonding termination for connecting intersystem bonding conductors required for other systems shall be provided external to enclosures at the service equipment or metering equipment enclosure and at the disconnecting means for any additional buildings or structures. The intersystem bonding termination shall comply with the following:
(1) Be accessible for connection and inspection.
(2) Consist of a set of terminals with the capacity for connection of not less than three intersystem bonding conductors.
(3) Not interfere with opening the enclosure for a service, building or structure disconnecting means, or metering equipment.

(4) At the service equipment, be securely mounted and electrically connected to an enclosure for the service equipment, to the meter enclosure, or to an exposed nonflexible metallic service raceway, or be mounted at one of these enclosures and be connected to the enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor.

(5) At the disconnecting means for a building or structure, be securely mounted and electrically connected to the metallic enclosure for the building or structure disconnecting means, or be mounted at the disconnecting means and be connected to the metallic enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor.

(6) The terminals shall be listed as grounding and bonding equipment.

Panel Statement: The panel accepts the organization provided in this comment but deletes the words, "and grounding electrode" in the first sentence of the opening paragraph so as to correct the purpose of the intersystem bonding termination. The term "bonding bar" was removed from two locations as it was not necessary. The action on this comment does not revise the existing exception or the existing Informational Notes which are to remain.

The panel understands the action taken on Comment 5-143 modifies the text of Informational Note 2.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

5-143 Log #527 NEC-P05 **Final Action: Accept**
(250.94, FPN 2)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)

Comment on Proposal No: 5-232

Recommendation: Revise FPN No. 2 as follows: "FPN No. 2: See 770.100, 800.100, 810.21, ~~and~~ 820.100 and 830.100 for intersystem bonding and grounding requirements for conductive optical fiber cables, communications circuits, radio and television equipment, ~~and~~ CATV circuits, and network-powered broadband communications systems, respectively".

Substantiation: 250.94 FPN No. 2 is incorrect in the proposal and also in the preprint. It does not properly reflect the coverage of each of the NEC sections identified.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

5-144 Log #526 NEC-P05 **Final Action: Reject**
(250.94 Exception)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)

Comment on Proposal No: 5-230a

Recommendation: Reject the proposal.

Substantiation: Identifying a communications grounding conductor as a 'grounding electrode conductor' is confusing and misleading, and may lead to subsequent use of this conductor as a point of connection to the building or structure grounding electrode system. The IBT is not intended for connection of 'grounding electrode conductors' but to accomplish intersystem bonding between the power and communications systems. See my comments to Proposals 5-13 and 5-21.

Panel Meeting Action: Reject

Panel Statement: The term "grounding electrode conductor" was determined to be properly applied.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

5-145 Log #2769 NEC-P05 **Final Action: Accept**
(250.94(2))

Submitter: James J. Rogers, Bay State Inspectional Agency

Comment on Proposal No: 5-234

Recommendation: Continue to reject.

Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

5-146 Log #1452 NEC-P05 **Final Action: Reject**
(250.97)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 5-235

Recommendation: Accept the proposal with the following revisions:

For circuits over 250 volts, the electrical continuity of metal raceways and metal-covered cables that contain conductors other than service conductors shall be provided by one or more of the methods specified for services in 250.92(B), except for 250.92(B)(1).

Exception: Where there are no oversized, concentric, or eccentric knockouts used, or where a box or other enclosure with concentric or eccentric knockouts is listed to provide reliable bonding connections, the following methods shall be permitted:

(1) Couplings and connectors identified for the use.

(2) Two locknuts, one inside and one outside of boxes and other enclosures.

(3) Connectors for metal raceways and metal-covered cables, with shoulders that seat firmly against a metal box or enclosure with at least one locknut on the inside of the box or enclosure, or firmly threaded into a metal hub or hole of the box or enclosure.

(4) Fittings listed for the use.

Substantiation: Threadless couplings and connectors are used with RMC, IMC, and EMT. Enclosures other than cabinets should be included such as wireways and auxiliary gutters. Proposed (3) covers threadless connectors for raceways and cables.

Panel Meeting Action: Reject

Panel Statement: There are several text changes from the 2008 NEC 250.97 and even from Proposal 5-235, which is referenced to be used as the base, that have no technical substantiation. The threadless fittings cited are already permitted in the 2008 NEC 250.97 Exception (4).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

5-147 Log #2770 NEC-P05 **Final Action: Accept**
(250.97)

Submitter: James J. Rogers, Bay State Inspectional Agency

Comment on Proposal No: 5-236

Recommendation: Continue to reject.

Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

5-148 Log #89 NEC-P05 **Final Action: Accept**
(250.102)

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 5-240

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal in accordance with 3.2.3 of the NEC Style Manual related to the use of acronyms.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action and statement on Comment 5-151.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

5-149 Log #2337 NEC-P05 **Final Action: Accept in Principle**
(250.102)

Submitter: Mike Holt, Mike Holt Enterprises

Comment on Proposal No: 5-240

Recommendation: Remove all references to "SSBJ" and replace with "supply side bonding jumper" or "supply side bonding jumpers", as appropriate.

Substantiation: The use of acronyms does not make this section clearer, particularly as the acronym and concept are new to this Code cycle. If acronyms must be used, they should be inserted next Code cycle, when the concept of the supply side bonding jumper is not brand new.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 5-151.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

5-150 Log #2338 NEC-P05 **Final Action: Accept in Principle**
(250.102)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-240
Recommendation: Revise the title of this section as follows:
250.102 ~~Equipment~~ Bonding Jumpers and Bonding Conductors.
Remaining text to remain unchanged.
Substantiation: It appears that the panel didn't address the proposed section title. Considering the other actions accepted in this section, it would appear that the title should have the word "equipment" removed, and the word "conductors" inserted.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-151.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-151 Log #1847 NEC-P05 **Final Action: Accept in Principle**
(250.102(C))

TCC Action: The Technical Correlating Committee directs that in the text of 250.102(C) the word "if" be change to the word "where".
In this instance, the Technical Correlating Committee has determined that the revised wording is more appropriate.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-240
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
250.102 ~~Equipment~~ Bonding Conductors and Jumpers.
250.102(A) and (B) are not proposed to be changed by this Comment.
(C) Size— Supply Side Bonding Jumper (SSBJ) ~~on Supply Side of an Overcurrent Device~~.
(1) Size for Supply Conductors in Single Raceway or Cable. The SSBJ shall not be smaller than the sizes shown in Table 250.66 for grounding electrode conductors ~~GEC~~. If the ungrounded supply conductors are larger than 1100 kcmil copper or 1750 kcmil aluminum, the SSBJ shall have an area not less than 121/2 percent of the area of the largest set of ungrounded supply conductors.
(2) Size for Parallel Conductor Installations. If the ungrounded supply conductors are paralleled in two or more raceways or cables, and an individual SSBJ is used for bonding these raceways or cables, the size of the SSBJ for each raceway or cable shall be selected from Table 250.66 based on the size of the ungrounded supply conductors in each raceway or cable. A single SBBJ installed for bonding two or more raceways or cables shall be sized in accordance with (C)(1).
(3) Different Materials. If the ungrounded supply conductors and the SSBJ are of different materials (copper or aluminum), the minimum size of the SSBJ shall be based on the assumed use of ungrounded conductors of the same material as the SSBJ and with an ampacity equivalent to that of the installed ungrounded supply conductors.
~~If the ungrounded supply conductors are paralleled in two or more raceways or cables, the SSBJ, if routed with the raceways or cables, shall be installed in parallel. The size of the SSBJ for each raceway or cable shall be based on the size of the ungrounded supply conductors in each raceway or cable.~~
250.102(D) and (E) are not proposed to be changed by this Comment.
Substantiation: The title of 250.102 needs to be changed as shown to correlate with other changes made to the subsections in this section. The section now includes both supply-side bonding jumpers and equipment bonding jumpers.
It is intended that the use of acronyms in these sections complies with 3.2.3 of the NEC Style Manual.
It is noted the term "Supply Side Bonding Jumper" is defined in 250.2 of the 2011 NEC ROP Draft and thus can be used in this section as defined. As a result, it does not seem the term "on the Supply Side of an Overcurrent Device" is needed in the section title.
The organization of the section into subsections is intended to improve usability of the rules and to clearly identify the rules applicable to installing SBBJs for single and parallel conductor installations.
Adding the concept included in Proposal 5-242 of clearly stating the permission to use a single bonding jumper that is properly sized for bonding two or more raceways or cables is added to this Comment as it is concluded this will add clarity. Installing bonding jumpers in this manner also seems to be standard industry practice.
Panel Meeting Action: Accept in Principle
Revise the text of the 2011 NEC ROP Draft to read as follows:
250.102 Bonding Conductors and Jumpers."
Sections 250.102(A) and (B) are not changed by this Comment.
(C) Size- Supply-Side Bonding Jumper.
(1) Size for Supply Conductors in a Single Raceway or Cable. The supply-side bonding jumper shall not be smaller than the sizes shown in Table 250.66 for grounding electrode conductors. If the ungrounded supply conductors are larger than 1100 kcmil copper or 1750 kcmil aluminum, the supply-side bonding jumper shall have an area not less than 121/2 percent of the area of the largest set of ungrounded supply conductors.
(2) Size for Parallel Conductor Installations. If the ungrounded supply conductors are paralleled in two or more raceways or cables, and an individual supply-side bonding jumper is used for bonding these raceways or cables, the size of the supply-side bonding jumper for each raceway or cable shall be selected from Table 250.66 based on the size of the ungrounded supply conductors in each raceway or cable. A single supply-side bonding jumper installed for bonding two or more raceways or cables shall be sized in accordance with (C)(1).
(3) Different Materials. If the ungrounded supply conductors and the supply-side bonding jumper are of different materials (copper or aluminum), the minimum size of the supply-side bonding jumper shall be based on the assumed use of ungrounded conductors of the same material as the supply-side bonding jumper and with an ampacity equivalent to that of the installed ungrounded supply conductors.
Sections 250.102(D) and (E) are not changed by this comment.
Panel Statement: The panel has considered the use of the term and the acronym and determined that the term "Supply-Side Bonding Jumper" is to be used without the acronym (SSBJ) at each location where the term is used.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-152 Log #2339 NEC-P05 **Final Action: Accept in Principle**
(250.102(C))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-240
Recommendation: Revise 250.102(C) by changing all occurrences of "SSBJ" to "supply side bonding jumper" (or "jumpers", as appropriate). Also revise the title to "Bonding Jumpers on Supply Side of an Overcurrent Device".
Substantiation: Because the concept of the supply side bonding jumper is new to the Code, the acronym may be difficult for many Code users this cycle. The suggested title change is intended to make the title more accurate. As currently written it is "supply side bonding jumper on supply of…" The proposed change removes the redundancy.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-151.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-153 Log #1697 NEC-P05 **Final Action: Reject**
(250.102(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-247
Recommendation: Accept revised as follows: Where flexibility is required due to equipment that while in operation results in continuous flexing, the equipment bonding jumper shall be a stranded type conductor.
Substantiation: Where continuous flexing is a condition, the bonding jumper should be stranded to minimize conductor damage and loose connections.
Panel Meeting Action: Reject
Panel Statement: No technical substantiation has been provided that the existing requirements are insufficient.
It is not clear where the recommended text is intended to be added.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-154 Log #1264 NEC-P05 **Final Action: Accept in Principle**
(250.104(B))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 5-252
Recommendation: We support the panel's action of continuing to reject this proposal concerning the technical provisions.
Substantiation: Corrugated Stainless Steel Tubing (CSST) gas piping systems would be an added burden to the Authority Having Jurisdiction and by an electrician or electrical industry as their was in the past class action litigation taken against this product.
This is a fuel gas issue concerning "passive lightning protection" and not addressed by the National Electrical Code as stated in 90.1(A) "the use of electricity" and 90.2(A)(3) "and equipment that connect to the supply of electricity" and 250.104(B) "The equipment grounding conductor for the circuit that is likely to energize the piping shall be permitted to serve as the bonding means."
The National Electrical Code would not prohibit this gas piping method from being bonded to the intersystem bonding required by section 250.94 CSST may need to have internal design changes or other incorporated engineering corrections when there is a national problem with lightning and not the use concerns with electricity and the scope of the National Electrical Code to correct this product dilemma.
Panel Meeting Action: Accept in Principle
Panel Statement: It is the panels understanding that this comment was intended to address Proposal 5-251 not Proposal 5-252. See panel action and statement on Comment 5-158. An informational note was added to address the issue.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-155 Log #2247 NEC-P05 **Final Action: Reject**
(250.104(B))

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 5-251
Recommendation: Proposal 5-251 should be accepted.
Substantiation: CMP-5 rejected the submitter's proposal on the grounds that the proposed change may not solve the problems outlined in the proposal, that no test records were provided to substantiate the adequacy of the 6 AWG conductor, that the problems may be related to the product design, that the mitigation of the effects of lightning is a design option, that the proposed recommendation is not currently prohibited by the NEC and that it should be covered in the product standards, and that NFPA 54 contains the bonding requirements specific to the product in question and those requirements do not conflict with the NEC requirements.

Aside from all of the technical substantiation, or lack thereof, I would respectfully request CMP-5 to consider this dilemma: bonding of gas piping systems is generally considered electrical work, and if the NEC does not contain rules related specifically to bonding of gas piping systems, electrical inspectors will not have any authority outlined in NEC 90.4 to ensure that the gas piping systems are properly bonded. Another way of looking at this conundrum is as follows: the mechanical contractor chooses to install CSST gas piping; the manufacturer's installation instructions require the CSST to be bonded in accordance with NFPA 54 and the installation instructions; due to occupational and regulatory licensing, the mechanical contractor must secure the services of an electrical contractor to install the required bonding because it is classified as electrical work;
the electrical contractor does not have any correlated rules in the NEC, and must now familiarize himself with NFPA 54 and the installation instructions for the gas piping products that he did not install; the electrical contractor also must have his work inspected by the electrical inspector, yet the electrical inspector has the same predicament, whereby there are no rules in the NEC that correlate with NFPA 54; lacking any authority to inspect the bonding of the gas piping system, the electrical inspector will defer to the mechanical inspector because the rules are in NFPA 54, yet the mechanical inspector defers to the electrical inspector because bonding is electrical work. At the end of the day, the bonding may or may not be installed because it is too easy for the mechanical contractor to simply walk away while the mechanical inspector and electrical inspector continue the debate as to who has the proper authority or lack thereof.

I realize these strict boundaries related to trades, disciplines, occupational licensing, and inspection authority are not universal, but they are very real, and in those areas where the boundaries are established in state law or in local ordinances, accepting the submitter's proposal certainly does more good than harm, and it will allow the inspection community the opportunity to uniformly enforce the required rules and manufacturer's installation instructions in an effort to ensure fire and life safety for persons and property.
Panel Meeting Action: Reject
Panel Statement: The panel concluded to not include requirements but to add an informational note to address the issue. See panel action and statement on Comment 5-158.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-156 Log #2248 NEC-P05 **Final Action: Reject**
(250.104(B))

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 5-252
Recommendation: Proposal 5-252 should be accepted.
Substantiation: Referring to Proposal 2-251, CMP-5 rejected changes to 250.104(B) on the grounds that the proposed change may not solve the problems outlined in the proposal, that no test records were provided to substantiate the adequacy of the 6 AWG conductor, that the problems may be related to the product design, that the mitigation of the effects of lightning is a design option, that the proposed recommendation is not currently prohibited by the NEC and that it should be covered in the product standards, and that NFPA 54 contains the bonding requirements specific to the product in question and those requirements do not conflict with the NEC requirements, and that the current NEC rules provide the necessary safeguarding.

Aside from all of the technical substantiation, or lack thereof, I would respectfully request CMP-5 to consider this dilemma: bonding of gas piping systems is generally considered electrical work, and if the NEC does not contain rules related specifically to bonding of gas piping systems, electrical inspectors will not have any authority outlined in NEC 90.4 to ensure that the gas piping systems are properly bonded. Another way of looking at this conundrum is as follows: the mechanical contractor chooses to install CSST gas piping; the manufacturer's installation instructions require the CSST to be bonded in accordance with NFPA 54 and the installation instructions; due to occupational and regulatory licensing, the mechanical contractor must secure the services of an electrical contractor to install the required bonding because it is classified as electrical work;
the electrical contractor does not have any correlated rules in the NEC, and must now familiarize himself with NFPA 54 and the installation instructions for the gas piping products that he did not install; the electrical contractor also must have his work inspected by the electrical inspector, yet the electrical inspector has the same predicament, whereby there are no rules in the NEC that correlate with NFPA 54; lacking any authority to inspect the bonding of the gas piping system, the electrical inspector will defer to the mechanical inspector because the rules are in NFPA 54, yet the mechanical inspector defers to the electrical inspector because bonding is electrical work. At the end of the day, the bonding may or may not be installed because it is too easy for the mechanical contractor to simply walk away while the mechanical inspector and electrical inspector continue the debate as to who has the proper authority or lack thereof.

I realize these strict boundaries related to trades, disciplines, occupational licensing, and inspection authority are not universal, but they are very real, and in those areas where the boundaries are established in state law or in local ordinances, accepting the submitter's proposal certainly does more good than harm, and it will allow the inspection community the opportunity to uniformly enforce the required rules and manufacturer's installation instructions in an effort to ensure fire and life safety for persons and property.
Panel Meeting Action: Reject
Panel Statement: The panel concluded to not include requirements but to add an informational note to address the issue.

See panel action and statement on Comment 5-158.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
BRENDER, D.: See my statement on Comment 5-159.

5-157 Log #2360 NEC-P05 **Final Action: Reject**
(250.104(B))

Submitter: Marcus R. Sampson, Lysistrata Electric
Comment on Proposal No: 5-252
Recommendation: The panel should review this proposal and accept it as written.
Substantiation: The submitter is correct – gas piping systems pose the same risk as water piping systems and exposed structural steel and they need to be bonded with a conductor sized by Table 250.66. Just like metal water piping that is not used as an electrode, an interior metal gas piping system, prohibited from being used as an electrode, calls for a full size bonding conductor.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-159.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
BRENDER, D.: See my statement on Comment 5-159.

5-158 Log #2402 NEC-P05 **Final Action: Accept in Principle**
(250.104(B))

Submitter: Robert Torbin, Cutting Edge Solutions, LLC
Comment on Proposal No: 5-251
Recommendation: Locate a second Informational Note at the end of Section 250.104(B) as follows:
Informational Note: Additional bonding requirements for corrugated stainless steel tubing (CSST) gas piping systems can be found in Section 7.13.2 of the National Fuel Gas Code/NFPA 54-2009.
Substantiation: NFPA has recently reconfirmed that the National Fuel Gas Code (NFPA-54) has primary jurisdiction for the requirements for bonding of corrugated stainless steel tubing (CSST) systems. Based on CMP#5 rejection of original Proposal 5-251, and in consideration of ongoing efforts by the NFPA Standards Council to coordinate the coverage for bonding of CSST within all NFPA codes/standards, the inclusion of an informational note (in lieu of the requirements in Proposal 5-251) would be sufficient to alert the code user that additional bonding requirements for gas piping can be found in Section 7.13.2 of NFPA-54. The CSST bonding requirements in NFPA-54 do not conflict with any requirements within Section 250.104(B) of the NEC as noted by CMP#5 in the Panel Statement. A test report on the effectiveness of bonding with a 6 AWG wire and the electrical properties of the CSST product is provided for further substantiation for the bonding requirement.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle
Locate a second Informational Note at the end of Section 250.104(B) to read as follows:
Informational Note: Additional information for gas piping systems can be found in Section 7.13 of the National Fuel Gas Code, NFPA 54-2009.
Panel Statement: Revisions to the recommended text were made to inform users that additional information for all gas piping is available in NFPA 54. The panel concludes that the submitters intent has been met.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

Comment on Affirmative:

BRENDER, D.: The Informational Note should have included revised as follows, "Informational Note: Additional information for bonding of gas piping systems can be found in Section 7.13 of the National Fuel Gas Code, NFPA 54-2009."

5-159 Log #1848 NEC-P05 **Final Action: Reject**
(250.104(B) and (C))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-252
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(B) Metal Gas Piping. Metal gas piping installed in or attached to a building or structure shall be bonded in accordance with (A)(1, (A)(2) and (A)(3). The bonding conductor or jumper shall be connected in an accessible location to a non-flexible and non-corrugated portion of the gas piping between the downstream side of the utility meter and the point of entrance into the building or structure.
(C) Other Metal Piping. If installed in or attached to a building or structure, a metal piping system(s)~~, including gas piping,~~ that is likely to become energized shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor if of sufficient size, or to one or more grounding electrodes used. The bonding conductor(s) or jumper(s) shall be sized in accordance with 250.122, using the rating of the circuit that is likely to energize the piping system(s). The equipment grounding conductor for the circuit that is likely to energize the piping shall be permitted to serve as the bonding means. The points of attachment of the bonding jumper(s) shall be accessible.

Informational Note: Bonding all piping and metal air ducts within the premises will provide additional safety.

Renumber existing 250.104(C) as (D) and 250.104(D) as (E).
Substantiation: This Comment intends to simplify the text from that in Proposal 5-252 in recognition that bonding of gas piping systems in buildings or structures should be treated identically to that for water piping as covered in 250.104(A).

Even though implementing lightning protection is not the primary purpose of the NEC, Article 250 does address bonding of lightning protection systems to the premises wiring system in 250.60 and 250.106. In fact, not bonding the systems together can create a serious overvoltage and side-flash hazard. Section 250.4(A)(1) and (B)(1) states that a connection to earth is needed to "… limit the voltage imposed by lightning …" It is hard to reconcile the 250.66 bonding conductor sizing for metal water piping with the 250.122 bonding conductor sizing for metal gas piping.

Many commercial and industrial occupancies contain as much or more metallic gas piping as metal water piping that is not being used as a grounding electrode. It is just as conductive and poses an identical risk of electric shock as metal water pipe.

Section 250.104(A)(1) requires the bonding of metal water piping with a conductor sized according to Table 250.66 even though the metal water piping is not a grounding electrode. It is inconsistent to not apply the same requirement to metal gas piping. This Comment should be accepted to be consistent with the Panel's action on Proposal 5-254 for bonding of structural metal that is not a grounding electrode.

The utility gas piping supply to a dwelling or small commercial building may be nonmetallic. This is similar to the water pipe supply to smaller buildings or structures. Yet, metal water piping in these buildings or structures is required to be bonded with a "full size" conductor even though not connected to a water pipe grounding electrode. Likewise, exposed metal structural frames that are not installed or connected as a grounding electrode or grounding electrode conductor are required to be bonded with a "full size" conductor. Gas piping presents an identical safety hazard and should be bonded in the same manner. Comparing the bonding rules in 250.104 we find:

Metallic Piping or Structure	Bonding with Table 250.66-sized conductor even though not a grounding electrode	Required to be "Likely to become energized" before the rule is triggered?	Poses shock or electrocution hazard if energized
Water Pipe 250.104(A)	Yes	No	Yes
Gas Piping 250.104(B)	No	Yes	Yes
Structural Metal 250.104(C)	Yes	Yes	Yes
Metal Water Piping Systems from Separately Derived Systems 250.104(C)(1)	Yes	No	Yes
Structural Metal in area of Separately Derived Systems 250.104(C)(2)	Yes	No	Yes

The bonding of the metal gas piping systems needs to be treated identically to the comprehensive rules for bonding water piping in 250.104(A). The rules there include buildings or structures supplied by a service or a feeder as well as multiple-occupancy buildings. Metal gas piping is installed identically to metal water piping systems in these buildings or structures. The gas piping system in many buildings often consists of hundreds of feet of metal piping. An equipment grounding conductor of a 12 AWG will not properly bond this system to safely de-energize the system in a ground fault or over-voltage condition. The gas piping includes additional hazards with the volatile mixture that could explode.

Other changes are intended to be editorial or for uniformity or consistency with similar requirements for bonding metal water piping or metal structural frames.
Panel Meeting Action: Reject
Panel Statement: The substantiation supports only using bonding conductors sized to Table 250.66 yet the reference to 250.104(A)(2) allows for the bonding conductor to be sized to Table 250.122. This is a conflict within the substantiation. No evidence of a problem with the present requirements was provided by the submitter. The panel concludes that the present requirements covering the bonding of gas piping system provide the practical safeguarding required.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:

BRENDER, D.: The Panel's statement is not responsive to the substantiation. The focus of the proposal and comment is to address the need to bond metallic gas piping identical to the bonding requirements of metal water piping. The Panel should recognize this purpose as discussion was held on these issues at the Panel meeting. In fact, due to the expanded use of nonmetallic water piping systems, many buildings have more metal gas piping in or on the building or structure than metal water piping. The substantiation provides more than adequate logic to support the proposed change to this section. The Comment should have been accepted.

5-160 Log #2094 NEC-P05 **Final Action: Reject**
(250.104(B), (C), and (D))

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 5-252
Recommendation: This proposal should be accepted.
Substantiation: The submitted has provided a valid substantiation why metal gas piping should be bonded to the same extent as metal water piping systems. There is even a greater hazard with metal gas piping if it becomes energized. By increasing the size of the metal gas piping bonding conductor this will help ensure safer installations. We are relying on the equipment grounding conductor for the circuit that could energize the piping system as a reliable bond. I have seen installations where the gas piping is not effectively connected to the equipment grounding conductor for the appliance. By accepting the proposal we will correct this type of hazards.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-159.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:

BRENDER, D.: See my statement on Comment 5-159.

5-161 Log #34 NEC-P05 **Final Action: Reject**
(250.108)

Submitter: Joseph A. Hren, Uhrichsville, OH
Comment on Proposal No: 5-259
Recommendation: Delete text as follows:
~~**250.108 Use of Equipment Grounding Conductors.** An equipment grounding conductor shall not be used as a grounding electrode conductor.~~
Substantiation: The proposed section is in direct conflict with 250.54. Additionally, 250.130 permits an equipment grounding conductor (EGC) to be connected to a grounding electrode conductor (GEC), or in other words, a GEC is permitted to be used as an EGC. Electrical current is not discriminatory based on any assigned name. Furthermore, current code does not prohibit routing a GEC with service, feeder, or branch circuit conductors. Should a separate EGC also be required, both the GEC and the EGC are permitted to be bare conductors (250.62, 250.118), allowing both to contact each other. This is electrically illogical when one grounding conductor would suffice. There are also many, many instances where an EGC is unknowingly or inadvertently used as a GEC. One example is a feeder EGC between structures, each with an independent GES*. Under any situation where current must flow to grounding electrodes, this EGC will be used no differently than a GEC. Another example is metal conduit secured to structural metal, where the frame is an electrode.
*Grounding Electrode System.
Panel Meeting Action: Reject
Panel Statement: The proposed new requirement does not conflict with either 250.54 or 250.130. The fact that an equipment grounding conductor is permitted to be connected to a grounding electrode conductor, does not imply that one conductor is being used for both purposes.
Grounding electrode conductors and equipment grounding conductors are sized differently, and are installed under widely differing requirements.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-162 Log #2340 NEC-P05 **Final Action: Accept**
(250.108)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-240
Recommendation: Move this new requirement to 250.121.
Substantiation: Placing this new requirement in part V really doesn't make sense. Because it addresses both EGCs, it should be in Part VI of the article. Although the panel statement agreed with this concept, the panel accepted the proposal (as opposed to accepting in principle), and therefore the relocation got missed.
Panel Meeting Action: Accept
Panel Statement: The panel concludes that the comment is intended to apply to Proposal 5-259.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-163 Log #2565 NEC-P05 **Final Action: Accept**
(250.108 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-259
Recommendation: Continue to accept the proposal. Locate the text in Part VI of Article 250, as 250.121.
Substantiation: Although this location was given in the panel statement, the panel action did not stipulate an "Accept in Principle" with the revised location. The ROP Draft shows the location as 250.108. This comment provides the vehicle to correctly locate this material.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-164 Log #1849 NEC-P05 **Final Action: Accept in Principle**
(250.110)

TCC Action: The Technical Correlating Committee directs that the text of 250.110 be revised to read as follows:
"250.110 Equipment Fastened in Place (Fixed) or Connected by Permanent Wiring Methods. Exposed, normally non–current-carrying metal parts of fixed equipment supplied by or enclosing conductors or components that are likely to become energized shall be connected to an equipment grounding conductor under any of the following conditions:
(1) Where within 2.5 m (8 ft) vertically or 1.5 m (5 ft) horizontally of ground or grounded metal objects and subject to contact by persons
(2) Where located in a wet or damp location and not isolated
(3) Where in electrical contact with metal
(4) Where in a hazardous (classified) location as covered by Articles 500 through 517
(5) Where supplied by a wiring method that provides an equipment grounding conductor, except as permitted by 250.86, Exception No. 2, for short sections of metal enclosures
(6) Where equipment operates with any terminal at over 150 volts to ground
Exception No. 1: If exempted by special permission the metal frames of electrically heated appliances that have the frames permanently and effectively insulated from ground, shall not be required to be grounded.
Exception No. 2: Distribution apparatus, such as transformer and capacitor cases, mounted on wooden poles, at a height exceeding 2.5 m (8 ft) above ground or grade level shall not be required to be grounded.
Exception No. 3: Listed equipment protected by a system of double insulation, or its equivalent, shall not be required to be connected to the equipment grounding conductor. Where such a system is employed, the equipment shall be distinctively marked."
In this instance, the Technical Correlating Committee had determined that the revised wording is more appropriate.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-260
Recommendation: Revise the existing text of the 2008 NEC as follows:
250.110 Equipment Fastened in Place (Fixed) or Connected by Permanent Wiring Methods ~~(Fixed)~~.
Exposed, normally non–current-carrying metal parts of fixed equipment supplied by or enclosing conductors or components that are likely to become energized shall be connected to an ~~the~~ equipment grounding conductor under any of the following conditions:
(1) If ~~Where~~ within 2.5 m (8 ft) vertically or 1.5 m (5 ft) horizontally of ground or grounded metal objects and subject to contact by persons
(2) If ~~Where~~ located in a wet or damp location and not isolated
(3) If ~~Where~~ in electrical contact with metal
(4) If ~~Where~~ in a hazardous (classified) location as covered by Articles 500 through 517
(5) If ~~Where~~ supplied by a ~~metal-clad, metal-sheathed, metal-raceway, or other~~ wiring method that provides an equipment grounding conductor ~~ground~~, except as permitted by 250.86~~,~~ Exception No. 2~~;~~ for short sections of metal enclosures
(6) If ~~Where~~ equipment operates with any terminal at over 150 volts to ground
Exception No. 1: The metal frames ~~of electrically heated appliances, exempted by special permission, that have in which case the frames shall be~~ permanently and effectively insulated from ground, shall not be required to be grounded if exempted by special permission.
Exception No. 2: Distribution apparatus, such as transformer and capacitor cases, mounted on wooden poles, at a height exceeding 2.5 m (8 ft) above ground or grade level shall not be required to be grounded.
Exception No. 3: Listed equipment protected by a system of double insulation, ~~or its equivalent~~, shall not be required to be connected to the equipment grounding conductor. If ~~Where~~ such a system is employed, the equipment shall be distinctively marked.
Substantiation: The word "fixed" is proposed to be relocated in the bold-face title to more clearly describe the portion of the title it describes.
The word "normally" is proposed to be added to the beginning of the first sentence as the metallic parts of equipment governed by this section are not intended to carry current on a normal basis but only when a line-to-ground fault occurs.
Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if." This proposal intends to use the word "if" where appropriate.
Section 3.1.4.1 of the NEC Style Manual requires exceptions to be complete sentences. Changes are proposed to Exceptions No. 1 and 2 to bring these exceptions into compliance and to improve sentence structure.
For Exception No. 3, the words "*~~or its equivalent~~*" are proposed to be deleted as there does not seem to be an "equivalent" to a system of double insulation. The NEC does not regulate the design or function of double-insulation but relies on electrical product safety standards to determine suitability.
Other proposed changes are intended to be editorial in nature.
Panel Meeting Action: Accept in Principle
Retain recommended text as submitted except Exceptions No. 1 and No. 3 to read as follows:
Exception No. 1: If exempted by special permission the metal frames ~~of~~ electrically heated appliances, that have the frames ~~permanently~~ and effectively insulated from ground, shall not be required to be grounded.
Exception No. 3: Listed equipment protected by a system of double insulation, or its equivalent, shall not be required to be connected to the equipment grounding conductor. If such a system is employed, the equipment shall be distinctively marked.
Panel Statement: Revise the text in exception No. 1 to put the qualifier "If exempted by special permission" in front of the statement to provide greater clarity. Reject the deletion of the phrase "or its equivalent" in Exception No. 3 as there is no technical substantiation for its removal and its allowance under the purview of listed equipment allow future technology innovations that are determined to be equivalent to double insulation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-165 Log #2538 NEC-P05 **Final Action: Accept**
(250.112)

Submitter: Richard A. Janoski, Finleyville, PA
Comment on Proposal No: 5-262
Recommendation: Revise text to read as follows:
250.112 Fastened in Place or Connected by Permanent Wiring Methods (Fixed) - Specific. Except as permitted in 250.112 (F) and (I), exposed, non-current carrying metal parts of the kinds of equipment described in 250.112 (A) through (K) and non-current-carrying metal parts of equipment and enclosures described in 250.112 (L) and (M), shall be connected to an equipment grounding conductor regardless of voltage.
Substantiation: The phrase "shall be grounded regardless of voltage" is a statement the is "mandatory" and specifically requires that 250.112 (A) through (K) and (L) through (M) to be grounded regardless of voltage. This phrase is contradictory to it's proceeding subsections since 250.112 (F) and (I) contain voltage restrictions. To eliminate and confusion the new text in the opening paragraph should be added.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-166 Log #2566 NEC-P05 **Final Action: Accept in Principle**
(250.112)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-262
Recommendation: Accept the proposal in principle. Revise the rule in 250.112 as follows: ~~Except as permitted in 250.112(I),~~ Exposed, noncurrent-carrying metal parts of the kinds of equipment described in 250.112(A) through (K), and noncurrent-carrying metal parts of equipment and enclosures described in 250.112(L) and (M), shall be connected to the equipment grounding conductor unless otherwise permitted by particular provisions within or referenced by 250.112(A) through (M).
Substantiation: The submitter is correct that numerous locations in the list of equipment exempt equipment grounding connections. The recent exemption for 250.112(I) (which the proposal submitter erroneously failed to include in his recitation of the section text) is only one such location; paragraphs (A), (B), (C), (D), (F), and (J) also include instances where exemption is taken. For just one example, item (J) on luminaires cross references Part V of Article 410. This part includes 410.42(B) Exception No. 2 that allows for GFCI protection to be used in lieu of an equipment grounding connection in a particular case. For another example, 250.112(A) by itself waives the connection for certain dc switchboards, etc. The wording in this comment resolves the recurring correlation problem.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 5-165.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-167 Log #1850 NEC-P05 **Final Action: Accept in Part**
(250.114)

TCC Action: The Technical Correlating Committee directs that the word "if" be replaced with the word "where" in 250.114.
In this instance, the Technical Correlating Committee had determined that the revised wording is more appropriate.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-266
Recommendation: Revise the existing text of the 2008 NEC as follows:
250.114 Equipment Connected by Cord and Plug.
Under any of the conditions described in 250.114(1) through (4), exposed normally non–current-carrying metal parts of cord-and-plug-connected equipment ~~likely to become energized~~ shall be connected to the equipment grounding conductor.
Exception: Listed tools, listed appliances, and listed equipment covered in 250.114(2) through (4) shall not be required to be connected to an equipment grounding conductor if ~~where~~ protected by a system of double insulation ~~or its equivalent~~. Double insulated equipment shall be distinctively marked.
(1) In hazardous (classified) locations (see Articles 500 through 517)
(2) If ~~Where~~ operated at over 150 volts to ground
Exception No. 1: Motors, if ~~where~~ guarded and isolated from conductive material, shall not be required to be connected to an equipment grounding conductor.
Other portions of 250.114 are not intended to be changed by this Comment.
Substantiation: This Comment introduces "normally non-current-carrying metal parts" as similar language has been accepted for use in other sections of Article 250. The phrase "likely to become energized" does not seem to be needed here since the equipment that is cord-and-plug connected as covered by this section is connected to a source of electromotive force and thus is likely to become energized if there is a failure of insulation internally or externally. There does not seem to be an equivalent to a double insulation system.
The concept of "guarded" included in Exception No. 1 is not described in the exception yet has been in the NEC for many editions. If these motors that are operated at over 150 volts to ground are cord-and-plug connected and are permitted to be operated without an equipment grounding conductor, where is the ground-fault return path? It seems very important, from a safety standpoint, to require that this equipment is either supplied by an equipment grounding conductor or if an equipment grounding conductor is not supplied, that the motor is both guarded from contact by persons or animals such as in agricultural buildings as well as being isolated from conductive materials that could become a shock hazard if energized.
Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if." This Comment intends to use the word "if" where appropriate.
Panel Meeting Action: Accept in Part
Retain recommended text as submitted except Exception and Exception No. 1 to read as follows:
Exception: Listed tools, listed appliances, and listed equipment covered in 250.114(2) through (4) shall not be required to be connected to an equipment grounding conductor if protected by a system of double insulation or its equivalent. Double insulated equipment shall be distinctively marked.
Exception No. 1: Motors, if guarded, shall not be required to be connected to an equipment grounding conductor.
Panel Statement: Reject the elimination of the phrase "or its equivalent" in the exception. With the qualification that these products have to be listed, there was no technical substantiation to delete this option and potentially stifle innovation of some future design that has an equivalency to double insulation. The added text "*and isolated from conductive material*" was also not accepted. The panel concludes the word guarded is sufficient.
Accept the remainder of the proposed changes.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-168 Log #1696 NEC-P05 **Final Action: Reject**
(250.114 Exception No. 1 for (2) and Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-266
Recommendation: Accept revised as follows: Exception No. 1: Motors, where guarded and isolated from conductive material within the guarded area that extends outside the guarded areas shall not be required to be connected to an equipment grounding conductor.
Substantiation: The "point of danger" in the definition of guarded in Article 100 as applied to ungrounded motors is presumably contact with an energized motor frame. If the motor is in contact with ungrounded conductive material that extends outside the guarded area and the motor frame becomes energized, this condition can extend outside the guarded area.
Panel Meeting Action: Reject
Panel Statement: The revised text does not provide clarity and the definition of the "area" around the motor to be guarded is not provided. This then makes enforcement subjective and inconsistent. It is also unclear where the submitter intends this text to be inserted, in the exception or the exception to (2).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-169 Log #2341 NEC-P05 **Final Action: Accept in Principle**
(250.118(10)(a) and (b))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-269a
Recommendation: Replace "equipment grounding conductor" with "bare conductor" in two locations, as follows:
(10) Type MC cable where listed and identified for grounding in accordance with the following:
a. The combined metallic sheath and ~~equipment grounding~~ bare conductor of interlocked metal tape–type MC cable
b. The metallic sheath or the combined metallic sheath and ~~equipment grounding~~ bare conductors of the smooth or corrugated tube-type MC cable.
Substantiation: The bare conductor of type MC Cables is not an equipment grounding conductor—it is a component of the equipment grounding conductor (metal sheath plus bare conductor). By referring to these bare conductors as equipment grounding conductor, the role of the conductor is lost in the text.
Panel Meeting Action: Accept in Principle
Revise the text from 2008 NEC to read as follows:
(10) Type MC cable that provides an effective ground-fault current path in accordance with one or more of the following:
a. It contains an insulated or uninsulated equipment grounding conductor in compliance with 250.118(1)
b. The combined metallic sheath and uninsulated equipment grounding/bonding conductor of interlocked metal tape–type MC cable that is listed and identified as an equipment grounding conductor
c. The metallic sheath or the combined metallic sheath and equipment grounding conductors of the smooth or corrugated tube-type MC cable that is listed and identified as an equipment grounding conductor.

Panel Statement: The use of the term equipment grounding/bonding conductor is included to parallel with the UL product safety standard. The panel relocated the listing requirement for the cable types to those that are appropriate. This action meets the intent of the submitter.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
BRETT, JR., M.: I believe we acted inappropriately, the revision accepted is new material that has not had public review. The submitter only requested replacing "equipment grounding" with "bare" in two locations. The committee went far beyond that request by adding new language that has not had public review. As a committee member I did not have the opportunity to review this new wording for compliance with the testing laboratories listing criteria.

5-170 Log #1851 NEC-P05 **Final Action: Reject**
(250.118(5)(d))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-273
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
d. If used to connect equipment where flexibility is necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation, an equipment grounding conductor of the wire type shall be installed through or with the flexible metal conduit.
Substantiation: In addition to reorganizing the sentence for improved syntax, the words "of the wire type" is added to the rule to clarify the type of equipment grounding conductor that is appropriate for supplementing the performance of flexible metal conduit as an equipment grounding conductor. This is necessary as flexible metal conduit is itself an equipment grounding conductor. The phrase "through or with the flexible metal conduit" is added to clarify the application of the rule.
Panel Meeting Action: Reject
Panel Statement: Reject the additional text for the wire type equipment grounding conductor and the statement about routing through or inside the metal conduit. These requirements are already clearly stated in 348.60 and this text is redundant.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-171 Log #1852 NEC-P05 **Final Action: Reject**
(250.118(6)(e))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-274
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
e. If used to connect equipment where flexibility is necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation, an equipment grounding conductor of the wire type shall be installed through or with the liquidtight flexible metal conduit.
Substantiation: In addition to reorganizing the sentence for improved syntax, the words "of the wire type" is added to the rule to clarify the type of equipment grounding conductor that is appropriate for supplementing the performance of flexible metal conduit as an equipment grounding conductor. This is necessary as liquidtight flexible metal conduit is itself an equipment grounding conductor. The phrase "through or with the liquidtight flexible metal conduit" is added to clarify the application of the rule.
Panel Meeting Action: Reject
Panel Statement: Reject the additional text for the wire type equipment grounding conductor and the statement about routing through or inside the metal conduit. These requirements are already clearly stated in 350.60 and this text is redundant.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-172 Log #531 NEC-P05 **Final Action: Reject**
(250.119)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 5-275
Recommendation: Reject the proposal.
Substantiation: The panel is writing requirements for communications circuits over which they do not have purview. The proposed requirements have no applicability unless specifically referenced in Chapter 8 (see 90.3).
Panel Meeting Action: Reject
Panel Statement: Types and sizes of equipment grounding conductors are specifically listed in 250.1 as requirements within the scope of Article 250. Communication cables are permitted in many applications throughout the NEC such as in Table 725.154(G).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-173 Log #1663 NEC-P05 **Final Action: Reject**
(250.119)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-277
Recommendation: Delete the proposed wording and substitute:
Identification of Bonding Conductors and Equipment.
Grounding Conductors 6 AWG or Smaller. Unless otherwise provided in this Code, bonding conductors and equipment grounding conductors shall be permitted to be bare, insulated, or covered. Individually insulated or covered bonding conductors and equipment grounding conductors shall have a continuous outer covering that is green, green with one more continuous yellow stripes, or otherwise identified as permitted in this section. Conductors with insulation or individual covering that is green, green with one or more yellow stripes, or otherwise identified with green color shall not be used for ungrounded or grounded circuit conductors.
Exception: Power-limited Class 2 or Class 3 cables, power-limited fire alarm cables, communications cables, or network-powered broadband communications cables containing only circuits operating at less than 50 volts where connected to equipment not required to be grounded in accordance with 250.112(I) shall be permitted to use such identified conductors for other than bonding or equipment grounding conductors.
(A) Conductors Larger than 6 AWG. Bonding conductors and equipment grounding conductors larger than 6 AWG shall be permitted to be permanently identified at the time of installation at each end and at every point where the conductor is accessible.
Exception No. 1: Bonding conductors and equipment grounding conductors larger than 6 AWG shall not be required to be identified in conduit bodies that contain no splices or unused hubs.
Exception No. 2: Insulated or covered bonding conductors and equipment grounding conductors larger than 6 AWG installed as open individual conductors in overhead aerial spans, as open wiring on insulators, as concealed knob-and-tube wiring, or as permitted in the Exception for 590.4(C) shall be permitted to be identified only at each termination and splice point.
Exception No. 3: Insulated or covered bonding and equipment grounding conductors installed as single individual conductors in cable trays, wireways, or auxiliary gutters shall be permitted to be identified at each termination and splice point and at intervals acceptable to the authority having jurisdiction.
Exception No. 4: This provision does not apply to bonding conductors installed outside of a raceway, cable or enclosure.
Substantiation: Bonding conductors should be included; they are not always short and easily recognized. Where a conductor is installed in a nonmetallic raceway interposed between two metal raceways and connected to those metal raceways, it meets the definition of equipment bonding jumper. The proposal covers other types of installations not presently addressed. Yellow stripes should be specified continuous. The word "comply" implies (A)(1) and (A)(2) must be used for identification, not green insulation or covering.
"At every point where the conductor is accessible" requires continuous identification for open individual conductors in aerial spans or open wiring on insulators, in cable trays, wireways and auxiliary gutters, which doesn't correlate with green color or tape at terminations.
Panel Meeting Action: Reject
Panel Statement: The proposed text is not clear as to conductors larger than 6 AWG. The revised text is confusing and inconsistent.
The substantiation does not support the numerous revisions.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-174 Log #17 NEC-P05 **Final Action: Reject**
(250.119 Exception)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 5-275
Recommendation: Reject this proposal.
Substantiation: Section 90.3 Code Arrangement states that "Chapter 8 covers communications systems and is not subject to the requirements of Chapters 1 through 7 except where the requirements are specifically referenced in Chapter 8."
There are no correlating requirements in Articles 800 and 830 that limit communications cables and network-powered broadband communications cables to 50 volts. See Table 830.15 which sets the voltage limits for network-powered broadband circuits.
Having a requirement for communications cables in Article 250 without correlating requirements in Chapter 8 is bad code. This is an issue for the TCC.
The panel can correlate with 90.3 either by accepting the proposal without any voltage limitation on communications cables or rejecting the proposal in its entirety.
Panel Meeting Action: Reject
Panel Statement: Communication cables are permitted in many applications throughout the NEC such as in table 725.154(G). Types and sizes of equipment grounding conductors are specifically listed in 250.1 as requirements within the scope of article 250. The panel removed network-powered broadband communications cables from the exception. See panel action and statement on Comment 5-175.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-175 Log #1853 NEC-P05 **Final Action: Accept in Principle**
(250.119 Exception)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-275
Recommendation: Revise the text of the 2011 NEC ROP as follows:
Exception: Power-limited, Class 2 or Class 3 cables, power-limited fire alarm cables, communications cables, or network-powered broadband communications cables, containing only circuits operating at less than 50 volts that are supplied by a system that is where connected to equipment not required to be grounded in accordance with Part II or Part VIII of Article 250 250.112(I) shall be permitted to use a conductor with green insulation or green with one or more yellow stripes for other than equipment grounding purposes.
Substantiation: Changes are intended to be editorial rather than substantive. Setting off the opening qualifying phrases in commas makes the first part of the sentence read correctly. The phrase "that are supplied by a system that is not required to be grounded" rather than a reference to equipment seems to correct the reference. It is the system the equipment operates at that may or may not be required to be grounded rather than the equipment itself. The grounding of systems is shown in 250.112(I) to be Part II or Part VIII of Article 250. The direct reference to the system grounding requirements in this exception would save one "chase your tail" for the user of the Code.
Panel Meeting Action: Accept in Principle
Revise the Exception to read as follows:
Exception: Power-limited Class 2 or Class 3 cables, power-limited fire alarm cables, or communications cables, containing only circuits operating at less than 50 volts where connected to equipment not required to be grounded in accordance with 250.112(I) shall be permitted to use a conductor with green insulation or green with one or more yellow stripes for other than equipment grounding purposes.
Panel Statement: Network-powered broadband communications cables are only permitted in Chapter 8 and not used for the circuits described in 250.112(I). The intent of the exception is to allow specific wiring methods, connected to specific equipment, to be exempt from the rule in 250.119 as to the use of a conductor with green insulation. The exception lists the wiring methods. Section 250.112(I) addresses the equipment.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-176 Log #1854 NEC-P05 **Final Action: Accept**
(250.120(C))

TCC Action: The Technical Correlating Committee directs that the word "if" be replaced with the word "where" in 250.120(C).
In this instance, the Technical Correlating Committee had determined that the revised wording is more appropriate.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-279
Recommendation: Revise the existing text of the 2008 NEC as follows:
(C) Equipment Grounding Conductors Smaller Than 6 AWG. If not routed with circuit conductors as permitted in 250.130(C) and 250.134(B) Exception No. 2, equipment grounding conductors smaller than 6 AWG shall be protected from physical damage by an identified ~~a~~ raceway or cable armor unless installed within hollow spaces of the framing members of buildings or structures ~~except where run in hollow spaces of walls or partitions,~~ and if ~~where~~ not subject to physical damage~~, or where protected from physical damage~~.
Substantiation: The proposal should have been Accepted in Principle as the concepts contained therein would improve the application of the NEC. The substantiation provided with the Proposal is persuasive and articulates the need for the change in this section.
These changes are largely editorial and are intended to build upon the substantiation provided with the Proposal.
Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if." This Comment intends to use the word "if" where appropriate.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
MOHLA, D.: Remove the word "identified" in front of the raceway
Neither the Proposal substantiation nor the Comment substantiation provided any indication that there were problems in the field that would be alleviated by identifying this raceway or cable armor. What is an identified raceway? By requiring "identification" without indicating by what means, the installer is left at the mercy of the electrical inspector who may want it painted green over its entire length. Article 200 covers identification of conductors but not of raceways or cable armor. This change adds cost without improving safety and should be rejected. Use of word " identified" is a new material that has not had any public review. This is not editorial change as indicated in the substantiation.
FPN under the definition of Identified clearly provides guidance on what is normally required by AHJ.
Identified (as applied to equipment). Recognizable as suitable for the specific purpose, function, use, environment, application, and so forth, where described in a particular Code requirement.
FPN: Some examples of ways to determine suitability of equipment for a specific purpose, environment, or application include investigations by a qualified testing laboratory (listing and labeling), an inspection agency, or other organizations concerned with product evaluation.

5-177 Log #1916 NEC-P05 **Final Action: Reject**
(Table 250.122)

Submitter: Paul E. Guidry, Fluor Enterprises, Inc. / Rep. Associated Builders and Contractors
Comment on Proposal No: 5-281
Recommendation: Add Tables 250.122(A), (B), (C) and (D) as follows:

See Table 250.122(A) on page 155
See Table 250.122(B) on page 155
See Table 250.122(C) on page 156
See Table 250.122(D) on page 156

Substantiation: Substatiation: The panel was correct in pointing out that the submitted table was incomplete. Please reconsider the proposal based on the Tables 250.1 22(A), (B), (C), and (D) entitled "Exhibit 1, 2, 3, and 4". These tables are based upon Tables 7.1, 7.2 and 7.3 in UL 1277. "Smallest grounding conductor in cable containing 90°C (194°F) Circuit Conductors", "Smallest grounding conductor in cable containing 75°C (167°F).
Circuit Conductors" and "Smallest grounding conductor in cable containing 60°C (140°F) Circuit Conductors", and existing Table 250.122 respectively.
This proposal will add the ability to use equipment grounding conductors based on ungrounded conductor sizes available in multiconductor cable s in addition to basing the equipment grounding conductor (EGC) on an overcurrent protective device (OCPD) size as is currently the case. Currently, manufacturers of multiconductor cable assemblies install a standard size of EGC with a given size of ungrounded conductor. If the conductors are increased due to voltage drop (not because of an increase in the OCPD, you lose the curve that is built in to Table 250.122 for reducing the size of EGCs due to 250. 122(B).
For example, a 50A OCPD on a circuit requires a 8 AWG, type XHHW, CU ungrounded conductor. It is increase d to a 2 AWG due to voltage drop. Utilizing 250.122(B), the proportion is 2 AWG to 8 AWG = 66,360cm/16,510cm = 4.02. For a 50A OCPD according to existing Table 250.122. A 10AWG was originally able to be used for an EGC. So, multiply (10AWG) 10,380cm X 4.02 = 41,721cm. So, now the EGC would have to be a 4 AWG. This typically isn't a problem when installing raceways with single conductor wire. However, with multi-conductor cables, the standard EGC that is manufactured with a 2 AWG cable is a 6 AWG for 90°C insulation. This is a fairly typical problem in industrial plants today. The proportion calculation specified in 250.122 isn't being adhered to since it requires special cables to be ordered, or possibly the use of a four conductor cable with the EGC sized equivalent to the ungrounded conductors. When four insulated conductors are required plus the EGC, then special cable has to be ordered. This isn't a cost issue as much as it' s a waste of copper or aluminum. Table 250.122 as it stands today allows a reduction for the EGC. Utilizing the new tables would allow the reduction to be utilized in multiconductor cables.
This a companion comment to one submitted for 250.122(B), Proposal 5-292.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: There was no substantiation provided to justify the reduction in size of the equipment grounding conductor in multiconductor cable that would assure the panel that an adequately low impedance fault path is achieved to comply with 110.10.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:
MOHLA, D.: This comment and Proposal 5-281 have highlighted a concern that ground fault carrying conductors on the line and load side of the overcurrent device are required to be of different sizes even though they carry the same fault current. I have provided a sketch to illustrate the inequity without any technical basis.
Note: Supporting Material is available for review at NFPA Headquarters.

Table 250.122 (A) Minimum Size Equipment Grounding Conductors For Grounding Raceway and Equipment. For 90°C (194°F) conductor insulation in multiconductor cables.

Equivalent Size of Largest Ungrounded Copper Conductors (AWG or kcmil)	Minimum Equivalent Size of Unsectioned Copper Equipment Grounding Conductor (AWG or kcmil)	Equivalent Size of Largest Ungrounded Aluminum or Copper-clad AL Conductors (AWG or kcmil)*	Minimum Equivalent Size of Unsectioned Aluminum or Copper-clad AL Equipment Grounding Conductor (AWG or kcmil)*
18	18	12	12
16	16	10	10
14	14	8	8
12	12	6	8
10	10	4	6
8	10	3	6
6	8	2	6
4	8	1	4
3	6	1/0	4
2	6	2/0	4
1	6	3/0	4
1/0	6	4/0	2
2/0	6	250	2
3/0	4	300	2
4/0	4	350	2
250	4	400	1
300	3	500	1
350	3	600	1
400	3	700	1/
500	2	750	1/0
600	2	800	1/0
700	1	900	1/0
750	1	1000	1/0
800	1	1250	3/0
900	1	1500	4/0
1000	1/0	1750	250kcmil
1250	3/0	2000	250kcmil
1500	4/0	-	-
1750	250kcmil	-	-
2000	250kcmil	-	-

Note: Where necessary to comply with 250.4(A)(5) or (B)(4), the equipment grounding conductor shall be sized larger than given in this table.

* See installation restrictions in 250.120 .

Table 250.122(B) Minimum Size Equipment Grounding Conductors For Grounding Raceway and Equipment. For 75°C (167°F) conductor insulation in multiconductor cables.

Equivalent Size of Largest Ungrounded Copper Conductors (AWG or kcmil)	Minimum Equivalent Size of Unsectioned Copper Equipment Grounding Conductor (AWG or kcmil)	Equivalent Size of Largest Ungrounded Aluminum or Copper-clad AL Conductors (AWG or kcm il)*	Minimum Equivalent Size of Unsectioned Aluminum or Copper-clad AL Equipment Grounding Conductor (AWG or kcmil)*
18	18	12	12
16	16	10	10
14	14	8	8
12	12	6	8
10	10	4	6
8	10	3	6
6	8	2	6
4	8	1	6
3	8	1/0	4
2	6	2/0	4
1	6	3/0	4
1/0	6	4/0	4
2/0	6	250	2
3/0	6	300	2
4/0	4	350	2
250	4	400	2
300	4	500	1
350	3	600	1
400	3	700	1
500	3	750	1
600	2	800	1
700	2	900	1/0
750	2	1000	1/0
800	2	1250	3/0
900	1	1500	4/0
1000	1	1750	250kcmil
1250	3/0	2000	250kcmil
1500	4/0	-	-
1750	250kcmil	-	-
2000	250kcmil	-	-

Note: Where necessary to comply with 250.4(A)(5) or (B)(4), the equipment grounding conductor shall be sized larger than give n in this table.

* See installation restrictions in 250.120.

Table 250.122(C) Minimum Size Equipment Grounding Conductors For Grounding Raceway and Equipment. For 60°C (140°F) conductor insulation in multiconductor cables.

Equivalent Size of Largest Ungrounded Copper Conductors (AWG or kcmil)	Minimum Equivalent Size of Unsectioned Copper Equipment Grounding Conductor (AWG or kcmil)	Equivalent Size of Largest Ungrounded Aluminum or Copper-clad AL Conductors (AWG or kcmil)*	Minimum Equivalent Size of Unsectioned Aluminum or Copper-clad AL Equipment Grounding Conductor (AWG or kcmil)*
18	18	12	12
16	16	10	10
14	14	8	8
12	12	6	8
10	10	4	8
8	10	3	6
6	10	2	6
4	8	1	6
3	8	1/0	6
2	8	2/0	4
1	6	3/0	4
1/0	6	4/0	4
2/0	6	250	4
3/0	6	300	4
4/0	6	350	2
250	4	400	2
300	4	500	2
350	4	600	2
400	4	700	1
500	3	750	1
600	3	800	1
700	3	900	1/0
750	3	1000	1/0
800	2	1250	3/0
900	2	1500	4/0
1000	2	1750	250kcmil
1250	3/0	2000	250kcmil
1500	4/0	-	-
1750	250kcmil	-	-
2000	250kcmil	-	-

Note: Where necessary to comply with 250.4(A)(5) or (B)(4), the equipment grounding conductor shall be sized larger than given in this table.
* See installation restrictions in 250.120.

Table 250.122(D) Minimum Size Equipment Grounding Conductors For Grounding Raceway and Equipment, other than multiconductor cables.

Rating or Setting of Automatic Overcurrent Device in Circuit Ahead of Equipment, Conduit, etc., Not Exceeding (Amperes)	Size (AWG or kcmil)	
	Copper	Aluminum or Copper-Clad Aluminum*
15	14	12
20	12	10
30	10	8
40	10	8
60	10	8
100	8	6
200	6	4
300	4	2
400	3	1
500	2	1/0
600	1	2/0
800	1/0	3/0
1000	2/0	4/0
1200	3/0	250
1600	4/0	350
2000	250	400
2500	350	600
3000	400	600
4000	500	800
5000	700	1200
6000	800	1200

Note: Where necessary to comply with 250.4(A)(5) or (8)(4), the equipment grounding conductor shall be sized larger than given in this table.
* See installation restrictions in 250.120.

5-178 Log #1075 NEC-P05 **Final Action: Reject**
(250.122(A))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 5-287
Recommendation: This proposal should have been accepted.
Substantiation: The panel statement says the proposal would reduce the current sizing requirement. This is not true unless the current language is disregarded. The substantiation stated that a clarification was desired - essentially asking the panel to agree that "in no case" means exactly that. The panel chose to leave the "in no case" language intact and then said they didn't mean it as it applies to parallel circuits. "In no case" would mean, to most people, exactly what it says. If the panel intent is to say "in no case except parallel circuits" then the the language should say that. The Explanations of Negative should be more carefully considered, particularly that of Mr. Tremblador, Mr. Mohla, and Mr. Dobrowsky also point out the inconsistency between the requirements on the load side and those on the supply side. These are glaring inconsistencies, but I don't see current proposals to address them and past proposals that would have been rejected.
Panel Meeting Action: Reject
Panel Statement: The size of the circuit conductors supplying the equipment referred to in 250.122(A) is the equivalent area of the circuit conductors in parallel.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
MOHLA, D.: CMP 5 should reconsider the substantiation provided for rejection and accept the comment. The statement provided by the panel "The size of the circuit conductors supplying the equipment referred to in 250.122(A) is the equivalent area of the circuit conductors in parallel." Is not what the wording in 250.122 (A) states.
The submitter is correct that there is inconsistency in what is in the code and the way panel is reading it. Mr. Williams is pointing out how " in no case" is understood by most people. CMP should either change the wording as suggested by Mr. Williams or accept the rationale provided in Proposal 5-287. Will the same rationale advanced by CMP 5 for EGC sizes apply to Grounded conductors because same statement " but shall not be required to be larger than the phase conductors" appear in 250.30(A)(8) ?
Also, see my negative vote on Comment 5-179.
Comment on Affirmative:
BRENDER, D.: I believe the proposed additional text in the proposal and Comment 5-179 is not needed. The customary way to read and interpret the language in 250.122(A) General, "but in no case shall they (the EGC) be required to be larger than the circuit conductors" is, the general rule in (A) applies throughout 250.122 including parallel conductors in (F).
PORTER, C.: I agree with the original substantiation provided in proposal 5-287 and believe this comment should have been accepted. I agree with the comments provided by Mr. Dobrowsky, Mr. Mohla, and Mr. Temblador at the proposal stage.

5-179 Log #2734 NEC-P05 **Final Action: Reject**
(250.122(A))

Submitter: Christel K. Hunter, Alcan Cable
Comment on Proposal No: 5-287
Recommendation: Revise as follows:
250.122 Size of Equipment Grounding Conductors.
(A) General. Copper, aluminum, or copper-clad aluminum equipment grounding conductors of the wire type shall not be smaller than shown in Table 250.122, but in no case shall they be required to be larger than the circuit conductors supplying the equipment, including in parallel circuits. Where a cable tray, a raceway, or a cable armor or sheath is used as the equipment grounding conductor, as provided in 250.118 and 250.134(A), it shall comply with 250.4(A)(5) or (B)(4).
Substantiation: As stated by CMP-5 member Mr. Mohla, "Sizing requirements for supply side grounded conductors and load side EGC should be same as they perform the same function during ground fault conditions." There has been no justification provided for sizing the EGC larger than the supply-side grounded conductors in parallel circuits, and the disparity between supply side and load side conductor sizing makes no sense electrically. While a larger EGC is beneficial where multiple circuits are included in one raceway (as required in 250.122(C)), it does not make sense where each parallel run is enclosed in its own raceway or cable.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms that the substantiation provided does not support reducing the present sizing requirement. The panel concludes that the rating of the overcurrent device is the determining factor for sizing all equipment grounding conductors, including those installed in parallel circuits. No additional technical substantiation was provided.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
MOHLA, D.: There is no technical basis for requiring basic rules not to apply to equipment grounding conductors when contained in multiple raceways.
The circuit conductors can share the normal and ground fault current on both line and load side of the overcurrent device. Grounded conductor can share the fault current on the line side of the overcurrent device. Grounded conductors are the fault current path on the line side of the overcurrent device. What is the technical justification for maintaining that ground fault current cannot be shared on the load side of the overcurrent device? Grounded conductor on the supply side of overcurrent
protective device performs the same function as EGC on the load side of the overcurrent protective device i.e. provides a path for ground fault currents.
Sizing requirements for supply side grounded conductors and load side EGC should be same as they perform the same function during ground fault conditions. Electrons do not discriminate whether they are on the line side or the load side of the overcurrent device and will equally divide between parallel conductors if they have been installed in compliance with 310.4(B) i.e same material, same length,same size in circular mill area and terminated in the same manner.
I have provided a sketch that uses same configuration used in submitter of comment 5-177. Ground fault current has been rounded up to show the current division,
Note the current division is same on both sides of the overcurrent device,Only the conductor sizes are required to be different on the load and line side even though the ground fault current is the same on both sides (42,000 A) and is shared equally between the six conductors on the line and load side (6000 A each).
Also note, that the purpose of ground fault current on the line side and load side is the same : to facilitate tripping of overcurrent device. In case of a transformer, line side of the overcurrent device is load side of the overcurrent device on the primary of the transformer.
Note: Supporting Material is available for review at NFPA Headquarters.
Comment on Affirmative:
BRENDER, D.: See my statement on Comment 5-178.
PORTER, C.: I agree with the original substantiation provided in proposal 5-287 and believe this comment should have been accepted. I agree with the comments provided by Mr. Dobrowsky, Mr. Mohla, and Mr. Temblador at the proposal stage.

5-180 Log #90 NEC-P05 **Final Action: Accept**
(250.122(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 5-290
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action to Reject this proposal while also providing revised text.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: CMP 5 rejected this proposal as indicated by the panel statement. The text from the proposal was inadvertently copied to the panel action.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-181 Log #2235 NEC-P05 **Final Action: Hold**
(250.122(B))

TCC Action: The Technical Correlating Committee directs that the action on the comment be reported as "Hold" consistent with 3.3.1 of the NEC Style Manual in that it is not written in clear and concise language.
Submitter: Charles E. Beck, Affiliated Engineers NW, Inc.
Comment on Proposal No: 5-290
Recommendation: Revise text to read as follows:
(B) Increased in Size: Where ungrounded conductors are increased in size from the minimum size that would have had sufficient ampacity, (BEFORE/ AFTER) any adjustment or correction factors are applied, grounding conductors...".
NOTE:The submitter advises that the panel will need to pick the word "before" or the word "after", in the comment below, whichever word describes your intent.
Substantiation: Something has to be added to this article, in order to declare the "starting point" from which conductor size is to be considered "increased". One cannot proportionally increase the size of the EGC, without knowing the ratio of the "size of the increased ungrounded" to the "size of ungrounded prior to the increase". What, then, is the "size of ungrounded prior to the increase?" If the starting point is Table 310.16, then say so. If we are supposed to begin with Table 310.16 and then apply adjustment and correction factors before we say we have the starting point, then say so.
Panel Meeting Action: Accept in Principle
Revise the text in 250.122(B) to read as follows:

(B) Increased in Size. If ungrounded conductors are increased in size from the minimum size that has sufficient ampacity for the intended installation before the ungrounded conductors are increased in size for any reason including but not limited to application of any adjustment or correction factors, equipment grounding conductors, if installed, shall be increased in size in proportion to the increase in circular mil area of the ungrounded conductors.
Panel Statement: The panel clarifies that the equipment grounding conductor is required to be increased in proportion to any increase of related ungrounded conductors above the minimum size required for the circuit before any increase in size is made to the ungrounded conductors for any reason.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-182 Log #2567 NEC-P05 **Final Action: Accept in Principle**
(250.122(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-290
Recommendation: Accept the proposal in principle, worded as indicated in the panel statement.
Substantiation: Unfortunately the wording in the panel statement was obviated due to the unfortunate action of reporting the proposal as "reject". Since the panel will revisit this issue due to the TCC action, the purpose of this comment is to commend CMP 5 for their presumed intent as reflected in the panel statement. This submitter's technical reasons for this recommendation are as presented in his Proposal 5-293.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-181.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-183 Log #2853 NEC-P05 **Final Action: Reject**
(250.122(B))

Submitter: Paul Guidry, Fluor Enterprises, Inc / Rep. Associated Builders and Contractors
Comment on Proposal No: 5-292
Recommendation: Revise 250.122(B). This is a companion proposal to one to revise Table 250.122 (proposal 5-281).

(B) Increased in Size. Where ungrounded conductors are increased in size, equipment grounding conductors, where installed, shall be increased in size proportionately according to the circular mil area of the ungrounded conductors, or where installed with multiconductor cables shall comply with Tables 250.122(A), (B) or (C).

Substantiation: 250.122(B) will need to be revised if my comment for proposal 5-281 is accepted.
Panel Meeting Action: Reject
Panel Statement: There was no substantiation provided to justify the reduction in size of the equipment grounding conductor in multiconductor cable that would assure the panel that an adequately low impedance fault path is achieved to comply with 110.10.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-184 Log #1855 NEC-P05 **Final Action: Accept in Principle**
(250.122(F))

TCC Action: See the Technical Correlating Committee Note on Comment 5-193.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-295
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(F) Conductors in Parallel. If ~~Where~~ conductors are installed ~~run~~ in parallel in multiple raceways or cables as permitted in 310.4 ~~310.10(H)~~, the equipment grounding conductors, if ~~where~~ used, shall be installed ~~run~~ in parallel in each raceway or cable. If ~~Where~~ conductors are installed ~~run~~ in parallel in the same raceway, cable, or cable tray as permitted in 310.10(H), a single equipment grounding conductor shall be permitted. Equipment grounding conductors installed in cable tray shall meet the minimum requirements of 392.10(B)(1)(c). Each equipment grounding conductor shall be sized in compliance with ~~on the basis of the ampere rating of the overcurrent device protecting the circuit conductors in the raceway, cable, or cable tray in accordance with Table~~ 250.122.
Substantiation: Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if." This Comment intends to use the word "if" where appropriate.

The word "installed" is preferred to "run" as it is more descriptive for use in the NEC which is an installation Code.

The changes proposed for the last paragraph correct the reference to all of 250.122 and not only to the Table. This is needed as circuit conductors may be increased in size in (B), be conductors for motors in (D), be in flexible cord (E), be for cable trays in (A) or (C), or be for feeder taps in (G). This change is intended to be editorial in nature and not introduce a new concept.
Panel Meeting Action: Accept in Principle

Correct the reference to 310.10(H) in the first sentence of the recommended text and do not accept the revision to 310.4. Accept the reminder of the recommended text.
Panel Statement: The reference was corrected to reflect the correct section in the ROP draft. The remainder of the recommended text remains unchanged.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:

BRETT, JR., M.: The committee accepted a major change without substantiation that will likely cause confusion and misapplications. This change was stated as an editorial change, but will likely cause confusion. By deleting the prescribed sizing requirements for equipment grounding conductors installed in parallel raceways and cables the installer may believe that the charging statement in section 250-122 applies to each parallel path and not the rule which requires the equipment grounding conductor never needs to be larger than the sum total of the circuit conductors paralleled. This Section 250.122(F) was written to clarify these exact requirements and the present language is much better and should be retained.
Comment on Affirmative:

WILLIAMS, D.: The panel concluded that when conductors are paralleled in multiple raceways that the equipment grounding conductor in each raceway is required to be sized per 250.122 for each equipment grounding conductor in each raceway. An example is a 3,000 amp feeder paralleled in 8 raceways using 500 kcmil conductors rated 380 amperes each. Using 250.122 based on the overcurrent device protecting the feeders, a 400 kcmil copper equipment grounding conductor would be required in each raceway. It appears that this is not enforced properly in many areas of the country. The change is editorial in nature and the last sentence was simplified. Hopefully this change will increase the understanding on how equipment grounding conductors are sized when installed in parallel.

5-185 Log #2771 NEC-P05 **Final Action: Accept**
(250.130(A))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-299
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-186 Log #2772 NEC-P05 **Final Action: Accept**
(250.130(C)(4))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-300
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-187 Log #1698 NEC-P05 **Final Action: Reject**
(250.132)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-301
Recommendation: Accept revised as follows: Isolated sections of metal raceways and metal-covered cables to be grounded shall be connected to an equipment grounding conductor or bonding conductor.
Substantiation: The provision should apply where grounding is done by choice. Direct connection to an equipment grounding conductor is not always necessary; an equipment bonding conductor can be provided in many cases to accomplish grounding.
Panel Meeting Action: Reject
Panel Statement: There was no technical substantiation to remove the requirement and only leave the option provided. References to the requirements of 250.134 were deleted without technical substantiation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-188 Log #1699 NEC-P05 **Final Action: Reject**
(250.146(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-305
Recommendation: Accept revised as follows: Where the box is surface mounted or extends outside the surface, or where a metal extension ring is secured to a flush box, direct metal-to-metal contact between the device yoke and the box or extension ring or a device that complies with 250.146(B) shall be permitted to ground the receptacle to the box.
Substantiation: The provision should include semi-recessed boxes and boxes provided with an extension ring, a common installation.
Panel Meeting Action: Reject
Panel Statement: A bonding jumper is required unless direct metal-to-metal contact is ensured such as for surface-mounted boxes. The proposed revision dilutes this provision.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-189 Log #1665 NEC-P05 **Final Action: Reject**
(250.148)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-307
Recommendation: Accept the proposal.
Substantiation: These provisions are covered by 250.86 and 314.40(D). The provision doesn't apply if conductors are not spliced or terminated within the box or on equipment, but 250.86 requires connecton to an equipment grounding conductor without conditions of splices or terminations of circuit conductors. 250.146 already applies.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement Proposal 5-307. No added information or technical substantiation was submitted.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-190 Log #1681 NEC-P05 **Final Action: Reject**
(250.162(A) Exception No. 2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-309
Recommendation: Accept the proposal.
Substantiation: Some rectifier derived circuits, unless separately derived, will be in effect be a ground system as indicated with the sketch, I have provided.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The present exception refers to 250.20 for systems required to be grounded and is not limited to separately derived systems as the proposal suggests.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-191 Log #1664 NEC-P05 **Final Action: Reject**
(250.166(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-310
Recommendation: Accept the proposal with the following revisions:
(A)...the grounding electrode conductor shall have an ampacity not less than the neutral conductor and be not smaller than 8 AWG if copper or 6 AWG if aluminum or copper-clad aluminum.
(B)...the grounding electrode shall have an ampacity not less than the largest conductor supplied by the system and be not smaller than 8 AWG, if copper, or 6 AWG, if aluminum or copper-clad aluminum.
Substantiation: A copper and aluminum conductor of the same size do not have the same ampacity.
"Smaller" does not necessarily relate to ampacity.
Panel Meeting Action: Reject
Panel Statement: There is no technical substantiation that supports adding an ampacity requirement for the grounding electrode conductor.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-192 Log #495 NEC-P05 **Final Action: Accept in Principle**
(250.190)

TCC Action: See the Technical Correlating Committee Note on Comment 5-193.
Submitter: Code-Making Panel 10,
Comment on Proposal No: 5-313
Recommendation: CMP-10 supports the CMP-5 action to Accept in Principle in Part Proposal 5-313.
Substantiation: The action taken by CMP-5 is correct based on the submitter's substantiation. While information for additional change may exist, it was not included with the proposal.
12 Eligible to vote
11 Affirmative (S.E. Townsend for D.M. Darling)
1 Negative (C. Fredericks)
The following Negative Comment on Vote was received:
C. Fredericks stated: Proposal 5-313 did not include substantiation to support the limits it proposed on grounding conductor size or cable shield dimensioning.
Medium and high voltage protection can be significantly different than low voltage protection, in that fast acting independent ground trips can be provided, that can safely protect smaller conductors than are required per Table 250.122, and in some cases a tape shield may be safely applied on a solidly grounded system without additional grounding conductors. See also Mr. Mohla's comments provided in the ROP.
Consequently, Panel 5 should have further modified 250.190(C)(2) and (C)(3)(a) from the language as accepted to the following:
(2) Shielded Cables. If the cable assembly is suitably rated for the ground fault current ~~and is of the concentric neutral type~~, the shield conductors shall be permitted as the equipment grounding conductor. ~~For solidly grounded systems, the cable copper screen or ribbon shield or combination of both shall not be used as an equipment grounding conductor.~~
(3) Sizing. Equipment grounding conductors shall be sized in accordance with (a) and (b) as follows:
(a) Equipment grounding conductors shall be sized in <u>either in accordance with recognized time-current limits or</u> accordance with Table 250.122 based on the current rating of the fuse or the overcurrent setting of the protective relay.
The following Affirmative Comment on Vote was received:
S.E. Townsend stated: "I concur with Mr. D. Mohla's Affirmative Comment on 250,190."
Panel Meeting Action: Accept in Principle
See panel action on Comment 5-193.
Panel Statement: See panel statement on Comment 5-193.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-193 Log #570 NEC-P05 **Final Action: Accept in Principle**
(250.190)

TCC Action: It was determined by the Technical Correlating Committee that Code-Making Panel 5 considered it unnecessary to "Reject" or "Hold" the comment, and incorporated the actions from Comments 5-192, 5-193, and 5-194 into the action taken on this comment.
Submitter: Code-Making Panel 6,
Comment on Proposal No: 5-313
Recommendation: If the panel considers it necessary, for the reasons indicated below, they could either "Reject" the original proposal, or "Hold" it for refined action and public review next cycle.
1. Include the technical reasons for these changes in the panel statement.
2. Include the technical reasoning for 250.122's "rating or setting of automatic overcurrent device" being inadequate.
3. Either reword the sections Title/Scope, or remove the reference to sizing a GEC.
4. The sizing requirements of 250.190(C)(3) appear to conflict with the permission of 250.190(C)(2), since (C) requires compliance with (1), (2), and (3).
5. (C)(3)(b) appears to be a redundant statement of the already required (C)(1).
6. Does any cable assembly have "a ground fault rating"?
7. Consider defining the terms "copper screen" and "ribbon shield".
Substantiation: We have to believe that there are unexplained good reasons for the panel's action, but shouldn't these technical reasons have been put into the public forum for review at the ROP stage? Why is the 2008 EGC sizing inadequate?
The substantiation does not present understood technical reasoning for 250.122's "rating or setting of automatic overcurrent device" (already required by 250.180) being a problem.
250.190 "Grounding of Equipment." addresses non-current carrying metal parts. What has it to do with a grounding electrode conductor, other than the GEC possibly being an acceptable place to connect the EGC? Isn't the sizing of any required GEC already addressed by 250.180 ("all applicable preceding"), 250.190 ("not smaller than"), and 250.66?

The sizing requirements of 250.190(C)(3) appear to conflict with the permission of 250.190(C)(2), since (C) requires compliance with (1), (2), and (3).
(C)(3)(b) appears to be a redundant statement of the already required (C)(1).

We do not know of a cable assembly that has a ground fault rating.

The UL standard 1072 "does not include requirements for cable with concentric neutral conductors." (Clause 1.4).

There is a Pity7 (cUL for MV) certification for a concentric neutral construction.

The terms "copper screen", and "ribbon shield" have no known Code definitions.

Panel member D. Mohla indicated in his affirmative comment on vote a need to edit the action's text.

We are reluctant to question a panel's action, but we have been directed to review it, and there are parts we do not understand.

We separately wish that the ROP for P-5-313-2011 had presented the revised Code text in full legislative format.

This comment was developed by a CMP-6 Task Group and balloted through the entire panel with the following ballot results:
11 Eligible to vote

7 Affirmative

4 Ballots Not Returned (S.B. Friedman, R.L. Huddleston, Jr., R. Hunter & J.M. Thompson)

The following Affirmative Comment on Vote was received:

L.B. McClung stated:

"I Agree with the affirmative vote by CMP-5, and also agree with comments by both Mr. Hammel, D. and Mr. Mohla, D.
For clarity - identify that metallic insulation shields can be tape/screen/drain wire or concentric neutral as well as point out that concentric neutral is a special grounding electrode conductor that also may serve as the electrical system neutral. Its main difference from drain wire construction is in size of the individual conductors that are wrapped concentrically or straight crinkled in parallel construction to the power conductor. Concentric neutral wires in combination should equal or exceed the cross section of the individual power conductor."

Panel Meeting Action: Accept in Principle
Revise Section 250.190(C)(2) and (3) to read as follows:

(2) Shielded Cables. The metallic insulation shield encircling the current carrying conductors shall be permitted to be used as an equipment grounding conductor, if it is rated for clearing time of ground fault current protective device operation without damaging the metallic shield. The metallic tape insulation shield and drain wire insulation shield shall not be used as an equipment grounding conductor for solidly grounded systems.
(3) Sizing. Equipment grounding conductors shall be sized in accordance with Table 250.122 based on the current rating of the fuse or the overcurrent setting of the protective relay.
Informational Note: The overcurrent rating for a circuit breaker is the combination of the current transformer ratio and the current pickup setting of the protective relay.

Panel Statement: Text has been revised to incorporate suggestions expressed by CMP 6 and CMP 10.

The 2008 NEC has no guidance given in Art. 250, Part X (systems over 1kV) on what the minimum equipment grounding conductor size is to be based on other than the automatic overcurrent device ahead of the equipment. 240.100(A) permits two types of protection. 1) Overcurrent Relays and Current Transformers. 2) Fuses. The addition of the new subsection (C) and the Informational Note should clarify that the size should be based upon the protective device whether it's a breaker, fuse or relay.

The revised wording removes a repeated rule. The revised wording reflects typical applications for the use of cable shielding. The panel does not accept the language "recognized time-current limits" because it is not suitable for mandatory text has cited in 4.2 of the NEC Style Manual.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-194 Log #1789 NEC-P05 **Final Action: Accept in Principle**
(250.190)

TCC Action: See the Technical Correlating Committee Note on Comment 5-193.
Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 5-313
Recommendation: Modify 250.190(C)(2) and (C)(3)(a) from the language as accepted to the following:

(2) Shielded Cables. If the cable assembly is suitably rated for the ground fault current ~~and is of the concentric neutral type,~~ the shield conductors shall be permitted as the equipment grounding conductor. ~~For solidly grounded systems, the cable copper screen or ribbon shield or combination of both shall not be used as an equipment grounding conductor.~~
(3) Sizing. Equipment grounding conductors shall be sized in accordance with (a) and (b) as follows:

(a) Equipment grounding conductors shall be sized in either in accordance with recognized time-current limits or accordance with Table 250.122 based on the current rating of the fuse or the overcurrent setting of the protective relay.

Substantiation: Proposal 5-313 did not include substantiation to support the limits it proposed on grounding conductor size or cable shield dimensioning. Consequently, these parts should have been modified by Panel 5 similar to the edits that are provided with this comment.

The limits proposed by Proposal 5-313 on grounding conductor sizing are the same as the existing NEC requirements for low voltage, but medium and high voltage protection can be significantly different than low voltage protection in that fast acting independent ground trips can be provided, that can safely protect smaller conductors than are required per Table 250.122.

The limits proposed by Proposal 5-313 on cable shielding do reflect typical applications, but there are cases where a tape shield may be safely applied on a solidly grounded system without additional grounding conductors.

See also Mr. Mohla's comments provided in the ROP.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-193.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

ARTICLE 280 — SURGE ARRESTERS

5-195 Log #1231 NEC-P05 **Final Action: Accept**
(280.5)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 5-317
Recommendation: NEMA supports the panel action to accept proposals 5-317, 5-318 and 5-319.

~~280.5 Listing. A surge arrester shall be a listed device.~~

Substantiation: The 2008 NEC introduced a Listing requirement for surge arresters rated over 1000V for the first time in the history of the NEC. There was no substantiation presented that a safety issue exists with arresters rated over 1kV. The Listing requirement for surge protection was introduced into the NEC when Article 285 was introduced into the NEC to ensure the technology employed in a TVSS would protect safely.

The UL substantiation for adding 280.5 to the 2008 NEC refers strictly to low voltage arresters and UL1449. However section 280 is titled Surge Arresters Over 1kV. These arresters are not tested to UL1449 (as they note) and have very different application and test requirements. The only reference to high voltage arresters is that "The Surge Arrester designation will only be retained for devices used in circuits of 1 kV and over". Therefore Article 280.5 does not apply to low voltage surge protective devices or conflict with the requirement to list them. Therefore their argument provides no substantiation for listing surge arresters over 1kV.

Surge arresters rated above 1000V are governed by the ANSI/IEEE standard. More than 99% of arresters installed in the US are for use by the electric utilities. Electric utilities maintain their own approval process for manufacturers based on the ANSI/IEEE standard. UL does not have the capability to test surge arresters rated 1000V and above. To require listing by UL will be redundant testing for products that have already been certified independently for utility approval.

Installation of surge arresters is performed by installers trained and certified specifically for equipment 1000V and above. Of the arresters installed in non-utility plant, by virtue of the safety requirements for higher than 1kV, all of these arresters are installed in safe locations not accessible to the public. Safety requirements are described in the 2007 National Electrical Safety Code (NESC) and OSHA 1910.269.

The UL category has been in existence for years but there have been no market or safety issues that have led any surge arrester manufacturers to pursue such a listing. To date, there are no Listed surge arresters over 1000V. Currently there is no means to comply with the NEC requirement for Listed arrester over 1000V and there is no substantiation that would indicate a safety issue exists for arresters rated over 1000V. The Listing requirement for arrester has no basis for being in the NEC and should be deleted.

Response to Panel 5 circulation report comments and Panel 5 meeting discussion:

Comment - *"Just because there are no Listings is no reason to delete this requirement. This is a new requirement and has not been really implemented by enforcement to cause listings to happen."*
Response – As noted with the original submittal above, the reason to delete is not based on not having listings, rather the fact that there was "No substantiation presented" to add the listing requirement in the first place. The balance of the arguments support why there is no substantiation.

Comment - *" Without a Listed surge arrester there is no way for users that are not part of utilities to have assurance of its safety, proper operation, and compliance with the applicable safety standard(s)."*
Response – As noted in the proposal, surge arresters rated above 1kV are governed by the ANSI/IEEE standard. Electric Utilities maintain approvals based on the standard and all existing manufacturers comply. If in doubt, users can easily contact the local utility or the manufacturer for documentation of compliance.

Comment - *Contrary to what was presented, these surge arrestors at the 5 kV, 8 kV, 15 kV, 25 kV and higher voltage classes are being installed at other than the interface of the utility and the premises wiring. These products are being installed by regular electricians separately or being installed within medium voltage equipment being installed or maintained by electricians. There are numerous projects underway today with outdoor substations, padmounted transformers and medium voltage switchgear incorporating these type surge arresters.*

Response – It was noted during the presentation a small percentage (potentially less than one percent) of arresters rated above 1kV are in fact installed by non-utility installers, in non-utility installations. However, it was also presented that, per the 2007 National Electrical Safety Code (NESC) and OSHA 1910.269 code, equipment access be limited to and work on equipment over 1kV to be performed only by trained and qualified personnel.

NESC Section 11: "Rooms and spaces in which electric supply conductors or equipment are installed shall be so arranged with fences, screens, partitions, or walls to form an enclosure as to limit the likelihood of entrance of unauthorized persons or interference by them with equipment inside."

From NESC Section 42: "Employees whose duties require working on or in the vicinity of energized equipment or lines shall perform only those tasks for which they are trained, equipped, authorized."

From OSHA 1910.269: "This section covers the operation and maintenance of electric power generation, control, transformation, transmission, and distribution lines and equipment. These provisions apply to: Power generation, transmission, and distribution installations, including related equipment for the purpose of communication or metering, which are accessible only to qualified employees. Note: The types of installations covered by this paragraph include the generation, transmission, and distribution installations of electric utilities, as well as equivalent installations of industrial establishments. Training. Employees shall be trained in and familiar with the safety-related work practices, safety procedures, and other safety requirements in this section that pertain to their respective job assignments."

Comment - *Changes to the IEEE standard for surge arresters adopted since the completion of the 2008 NEC cycle, now requires short circuit testing and a short circuit rating. The present surge arrestors on the market likely are not tested for short circuit as yet and will not be unless there is a requirement to do so. The base technology of these surge arresters, is a MOV, which is the same technology as the under 1KV SPDs covered in UL 1149 and required by 285.5. The substantiation for the inclusion of listing for these in Article 285 was based on the same concerns for the reliability and performance under abnormal conditions and that a failure does not cause additional damage or hazards to the installation.*

Response – This statement is true as it relates to surge arresters below 1kV, it is false as it relates to surge arresters above 1kV. The short circuit tests, or sometimes referred to fault withstand or pressure relief tests, have been in the C62.11 standard since 1993. The pressure relief test for station class arresters goes back to at least the 1970s. All available products have been tested, as this is an absolute requirement for the market. There is no substantiation to require all designs to re-perform this specialized testing since all have already been qualified.

Comment at the CMP-5 panel discussion – Paraphrased -*"Tests for surge arresters rated below 1kV are the same as surge arresters above 1kV as they are both MOV arresters. Therefore arresters over 1kV can be tested as easily as low voltage arresters."*

Response – It is true that above 1kVarresters use MOV technology and most arresters below 1kV use MOV technology. Therefore there are similarities in some of the tests. However, due to the high voltage conditions, significantly higher surge exposure and outdoor installation properties, the tests requirements are significantly different and require significantly different laboratory capabilities. The test standard C62.11 for above 1kV arresters has 23 separate designs tests compared to only 8 design tests in the C62.62 standard for less than 1kV arresters. For the C62.11 test the voltage requirements include impulses greater than 750kV, 60 cycle voltages greater than 150kV, surge currents up to 100kA and short circuit currents up to 80kA at voltages up to 115kV. UL is not capable of performing these tests, and there are only a handful of laboratories in the world that can perform these tests, with most not able to perform the entire series of tests. Based on the range of applications, there are up to 10 different classes of arresters rated over 1kV, compared to only 4 classes of below 1kV arresters. In order to list all models of arresters, a manufacturer for above 1kV arresters could be required to perform over 130 separate tests, as compared to below 1kV up to only 28 separate tests. The testing burden for above 1kV arresters must be based on appropriate substantiation, not just a desire to have listed products.

Comment - *"Surge Arresters should remain listed and this proposal be rejected. As an electrician or an electrical inspector we often refer to the installation instructions that come with listed products for installing them properly. There is comfort in knowing that the product being installed has been evaluated by a National Recognized Testing Laboratory and tested to an appropriate listing standard. There are no surge arresters listed at this time, because they have not been submitted to a testing laboratory to be considered for meeting the standard criteria for surge arresters. Surge arresters are a product that electricians and inspectors are not very familiar with and the listing mark should be something they look for in choosing a product."*

Response – Substantiation is a requirement to make changes to the NEC and in particular, to add listing requirements. This was not done when section 280.5 was added. To date, the arguments for adding the listing requirement have not substantiated it. Surge arresters above 1kV are already required to meet the very stringent requirements of ANSI/IEEE C62.11. All manufacturers have available certified test reports they can provide to qualified electricians as they select and use surge arresters rated above 1kV.The UL substantiation for adding 280.5 to the 2008 NEC refers strictly to low voltage arresters and UL1449. However section 280 is titled Surge Arresters Over 1kV. These arresters are not tested to UL1449 (as they note) and have very different application and test requirements. The only reference to high voltage arresters is that "The Surge Arrester designation will only be retained for devices used in circuits of 1 kV and over". Therefore Article 280.5 does not apply to low voltage surge protective devices or conflict with the requirement to list them. Therefore their argument provides no substantiation for listing surge arresters over 1kV.

Surge arresters rated above 1000V are governed by the ANSI/IEEE standard. By far into the 95th plus percentile of arresters installed in the US are for use by the electric utilities. Electric utilities maintain their own approval process for manufacturers based on the ANSI/IEEE standard. UL does not have the capability to test surge arresters rated 1000V and above. To require listing by UL will be redundant testing for products that have already been certified independently for utility approval.

Installation of surge arresters is performed by installers trained and qualified specifically for equipment 1000V and above. Of the arresters installed in non-utility plant, by virtue of the safety requirements for higher than 1kV, all of these arresters are installed in safe locations not accessible to the public. Safety requirements are described in the 2007 National Electrical Safety Code (NESC) and OSHA 1910.269.

The UL category has been in existence for years but there have been no market or safety issues that have led any surge arrester manufacturers to pursue such a listing. To date, there are no Listed surge arresters over 1000V. Currently there is no means to comply with the NEC requirement for Listed arrester over 1000V and there is no substantiation that would indicate a safety issue exists for arresters rated over 1000V. The Listing requirement for arresters over 1000V has no basis for being in the NEC and should be deleted.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 14 Negative: 2

Explanation of Negative:

MELLO, C.: The substantiation for accepting the deletion of this requirement is based on enforcement of another Code, not typically adopted by local Authorities Having Jurisdictions, and on OSHA requirements that are enforced only by OSHA. The acceptance of this comment by the panel is basically substantiating that the Authorities Having Jurisdiction are enforcing the National Electrical Safety Code and that OSHA is enforcing the qualified worker provision of the OSHA regulations for all these installations, both which are false statements.

The MOV technology for the surge protection devices over 1 kV, and as covered in the scope of the ANSI/IEEE Standard C62.11, referenced in the Article, is the same technology employed in SPDs under 1000 Volts as covered in 285.5. The panel failed to address the technical issue on why the MOV technology for SPDs under 1000 Volts is required to be Listed, NEC 285.5, yet SPDs with the same MOV technology over 1000 Volts do not require Listing.

The substantiation that the local utility will provide a "certification" that a certain lightning arrester is "acceptable" or that an AHJ reviewing manufacturer's provided test data could determine acceptability are also false premises. Listing of products provides a foundation for installers, users, and inspectors of the acceptability of a device to perform the intended function in a safe manner and in the event of a failure to fail safely. As was presented, based on a visual inspection of a lighting arrester, how does the user or the inspector know it will perform safely when called upon to provide the intended safety function?

WILLIAMS, D.: The requirement for listing of surge arresters can protect designers, contractors, installers, and inspectors to ensure that the product has been evaluated by a third party Nationally Recognized Testing Laboratory. There are products we are finding that are coming from other countries that have been found to be less than what is required in the product standard. This can be a serious safety concern. The Listing requirement is vital to the electrical industry to ensure that electrical products that are being used are in compliance with the product standards. Surge arresters are no different. Authorities Having Jurisdiction, AHJ, depend on the product listing to assist them in their approval process. By these products not being listed could end up delaying approval on jobsites.

5-196 Log #1273 NEC-P05 **Final Action: Reject**
(280.5)

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 5-316
Recommendation: The panel should reconsider and reject the proposal to eliminate the requirement for Listing.
Substantiation: This was a new requirement established in the 2008 NEC. That Code has been adopted in less than 50% of jurisdictions so enforcement, if any, has not had an opportunity to happen. There have been submittals to UL for this product and are being processed along with a number of submittals that resulted in changes to UL 1449 for less than 1000 Volts SPDs.

Article 285 requires SPDs under 1000 Volts to be listed, and the over 1KV surge arresters (SA) are of the same construction, so why are they excluded. They certainly pose at least the same or possibly a greater potential hazard due to the energy available if they fail.

We are dealing with SAs that are not utility owned or installed, but are located on the customers premises where the NEC prevails and public safety is a concern, just like an SPD under 1KV. There are numerous locations where these have been identified by AHJs, such as Amherst, MA; Shelby County, AL; Salt Lake City, UT; Los Angeles, CA; Longview, WA; and Colorado Springs, CO. These AHJs are unable to readily approve the installation because they have no basis to just accept the uncertified part. The identified units were found in padmounted switchgear, padmounted transformers, medium voltage motor control equipment, owner owned substations on outdoor power transformers, medium voltage generators and metal clad switchgear assemblies.

SAs are being manufactured all over the world and are now being imported into the USA. In order to level the playing field and ensure compliance with IEEEC62.11, 3rd party Certification would be beneficial in achieving this goal and mitigating a potential hazard and providing the AHJ a means to accept the product and approve the installation.

The excuse that there are no Listed SAs is a catch 22 situation and should not be used as justification for not requiring a Listed SA. This same excuse could be used for Signs, PV systems, and other products being installed. Users should demand compliance with IEEEC62.11 that has been verified by a qualified testing laboratory, to mitigate their liability and the AHJs should have a means of ensuring safety by a listing mark on the SA.
Panel Meeting Action: Reject
Panel Statement: The application of surge arrestors is an engineered solution on a situational basis. Listing is not required as these products can be purchased according to the engineered specifications. There was no field evidence presented to show that there is a problem with unlisted surge arresters.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 2
Explanation of Negative:

MELLO, C.: See my explanation for negative vote Comment 5-195.

WILLIAMS, D.: The submitter has provided reasoning why surge arresters should be listed. Additionally, the requirement for listing of surge arresters can protect designers, contractors, installers, and inspectors to ensure that the product has been evaluated by a third party Nationally Recognized Testing Laboratory. There are products we are finding that are coming from other countries that have been found to be less than what is required in the product standard. This can be a serious safety concern. The Listing requirement is vital to the electrical industry to ensure that electrical products that are being used are in compliance with the product standards. Surge arresters are no different. Authorities Having Jurisdiction, AHJ, depend on the product listing to assist them in their approval process. By these products not being listed could end up delaying approval on jobsites.

5-197 Log #1275 NEC-P05 **Final Action: Reject**
(280.5)

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 5-317
Recommendation: The panel should reconsider and reject the proposal to eliminate the requirement for Listing.
Substantiation: This was a new requirement established in the 2008 NEC. That Code has been adopted in less than 50% of jurisdictions so enforcement, if any has not had an opportunity to happen. There have been submittals to UL for this product and they are being processed along with a number of submittals that resulted in changes to UL 1449 for less than 1000 Volts SPDs.

Article 285 requires SPDs under 1000 Volts to be listed, and the other 1KV surge arresters (SA) are of the same construction, so why are they excluded. They certainly pose at least the same or possibly a greater potential hazard due to the energy available if they fail.

We are dealing with SAs that are not utility owned or installed, but are located on the customers premises where the NEC prevails and public safety is a concern, just like an SPD under 1KV. There are numerous locations where these have been identified by AHJs, such as Amherst, MA; Shelby County, AL; Salt Lake City, UT; Los Angeles, CA; Longview, WA; and Colorado Springs, CO. These AHJs are unable to readily approve the installation because they have no basis to just accept the uncertified part. The identified units were found in padmounted switchgear, padmounted transformers, medium voltage motor control equipment, owner owned substations on outdoor power transformers, medium voltage generators and metal clad switchgear assemblies.

SAs are being manufactured all over the world and are now being imported into the USA. In order to level the playing field and ensure compliance with IEEEC62.11, 3rd party Certification would be beneficial in achieving this goal and mitigating a potential hazard and providing the AHJ a means to accept the product and approve the installation.

The excuse that there are no Listed SAs is a catch 22 situation and should not be used as justification for not requiring a Listed SA. This same excuse could be used for Signs, PV systems, and other products being installed. Users should demand compliance with IEEEC62.11 that has been verified by a qualified testing laboratory, to mitigate their liability and the AHJs should have a means of ensuring safety by a listing mark on the SA.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 5-196.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 2
Explanation of Negative:

MELLO, C.: See my explanation for negative vote Comment 5-195.

WILLIAMS, D.: The submitter has provided reasoning why surge arresters should be listed. Additionally, the requirement for listing of surge arresters can protect designers, contractors, installers, and inspectors to ensure that the product has been evaluated by a third party Nationally Recognized Testing Laboratory. There are products we are finding that are coming from other countries that have been found to be less than what is required in the product standard. This can be a serious safety concern. The Listing requirement is vital to the electrical industry to ensure that electrical products that are being used are in compliance with the product standards. Surge arresters are no different. Authorities Having Jurisdiction, AHJ, depend on the product listing to assist them in their approval process. By these products not being listed could end up delaying approval on jobsites.

5-198 Log #1276 NEC-P05 **Final Action: Reject**
(280.5)

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 5-318
Recommendation: The panel should reconsider and reject the proposal to eliminate the requirement for Listing.
Substantiation: This was a new requirement established in the 2008 NEC. That Code has been adopted in less than 50% of jurisdictions so enforcement, if any has not had an opportunity to happen. There have been submittals to UL for this product and they are being processed along with a number of submittals that resulted in changes to UL 1449 for less than 1000 Volts SPDs.

Article 285 requires SPDs under 1000 Volts to be listed, and the other 1KV surge arresters (SA) are of the same construction, so why are they excluded. They certainly pose at least the same or possibly a greater potential hazard due to the energy available if they fail.

We are dealing with SAs that are not utility owned or installed, but are located on the customers premises where the NEC prevails and public safety is a concern, just like an SPD under 1KV. There are numerous locations where these have been identified by AHJs, such as Amherst, MA; Shelby County, AL; Salt Lake City, UT; Los Angeles, CA; Longview, WA; and Colorado Springs, CO. These AHJs are unable to readily approve the installation because they have no basis to just accept the uncertified part. The identified units were found in padmounted switchgear, padmounted transformers, medium voltage motor control equipment, owner owned substations on outdoor power transformers, medium voltage generators and metal clad switchgear assemblies.

SAs are being manufactured all over the world and are now being imported into the USA. In order to level the playing field and ensure compliance with IEEEC62.11, 3rd party Certification would be beneficial in achieving this goal and mitigating a potential hazard and providing the AHJ a means to accept the product and approve the installation.

The excuse that there are no Listed SAs is a catch 22 situation and should not be used as justification for not requiring a Listed SA. This same excuse could be used for Signs, PV systems, and other products being installed. Users should demand compliance with IEEEC62.11 that has been verified by a qualified testing laboratory, to mitigate their liability and the AHJs should have a means of ensuring safety by a listing mark on the SA.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 5-196.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 2
Explanation of Negative:

MELLO, C.: See my explanation for negative vote Comment 5-195.

WILLIAMS, D.: The submitter has provided reasoning why surge arresters should be listed. Additionally, the requirement for listing of surge arresters can protect designers, contractors, installers, and inspectors to ensure that the

product has been evaluated by a third party Nationally Recognized Testing Laboratory. There are products we are finding that are coming from other countries that have been found to be less than what is required in the product standard. This can be a serious safety concern. The Listing requirement is vital to the electrical industry to ensure that electrical products that are being used are in compliance with the product standards. Surge arresters are no different. Authorities Having Jurisdiction, AHJ, depend on the product listing to assist them in their approval process. By these products not being listed could end up delaying approval on jobsites.

5-199 Log #1277 NEC-P05 **Final Action: Reject**
(280.5)

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 5-319
Recommendation: The panel should reconsider and reject the proposal to eliminate the requirement for Listing.
Substantiation: This was a new requirement established in the 2008 NEC. That Code has been adopted in less than 50% of jurisdictions so enforcement, if any has not had an opportunity to happen. There have been submittals to UL for this product and they are being processed along with a number of submittals that resulted in changes to UL 1449 for less than 1000 Volts SPDs.

Article 285 requires SPDs under 1000 Volts to be listed, and the other 1KV surge arresters (SA) are of the same construction, so why are they excluded. They certainly pose at least the same or possibly a greater potential hazard due to the energy available if they fail.

We are dealing with SAs that are not utility owned or installed, but are located on the customers premises where the NEC prevails and public safety is a concern, just like an SPD under 1KV. There are numerous locations where these have been identified by AHJs, such as Amherst, MA; Shelby County, AL; Salt Lake City, UT; Los Angeles, CA; Longview, WA; and Colorado Springs, CO. These AHJs are unable to readily approve the installation because they have no basis to just accept the uncertified part. The identified units were found in padmounted switchgear, padmounted transformers, medium voltage motor control equipment, owner owned substations on outdoor power transformers, medium voltage generators and metal clad switchgear assemblies.

SAs are being manufactured all over the world and are now being imported into the USA. In order to level the playing field and ensure compliance with IEEEC62.11, 3rd party Certification would be beneficial in achieving this goal and mitigating a potential hazard and providing the AHJ a means to accept the product and approve the installation.

The excuse that there are no Listed SAs is a catch 22 situation and should not be used as justification for not requiring a Listed SA. This same excuse could be used for Signs, PV systems, and other products being installed. Users should demand compliance with IEEEC62.11 that has been verified by a qualified testing laboratory, to mitigate their liability and the AHJs should have a means of ensuring safety by a listing mark on the SA.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 5-196.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 2
Explanation of Negative:

MELLO, C.: See my explanation for negative vote Comment 5-195.

WILLIAMS, D.: The submitter has provided reasoning why surge arresters should be listed. Additionally, the requirement for listing of surge arresters can protect designers, contractors, installers, and inspectors to ensure that the product has been evaluated by a third party Nationally Recognized Testing Laboratory. There are products we are finding that are coming from other countries that have been found to be less than what is required in the product standard. This can be a serious safety concern. The Listing requirement is vital to the electrical industry to ensure that electrical products that are being used are in compliance with the product standards. Surge arresters are no different. Authorities Having Jurisdiction, AHJ, depend on the product listing to assist them in their approval process. By these products not being listed could end up delaying approval on jobsites.

5-200 Log #2398 NEC-P05 **Final Action: Reject**
(280.5)

Submitter: Donald R. Cook, Shelby County Development Services
Comment on Proposal No: 5-316
Recommendation: Submitter request CMP-5 reconsider action on Proposal 5-316 and reject as submitted.
Substantiation: Surge arresters are intended to serve a safety function. Installers and enforcement need some basis to determine if equipment is capable of serving that function. no field inspection or testing procedure exists to make that decision after the product is installed. While many utilities have company testing facilities and can rely on their own review of such products, few if any installation and enforcement organizations have access to their own test facilities. While premises wiring installations above 1000 volts are becoming more common each year, manufacturers must realize the approval of these products has to be based on independent third party certification (listing).
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 5-196.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 2
Explanation of Negative:

MELLO, C.: See my explanation for negative vote Comment 5-195.

WILLIAMS, D.: The submitter has provided reasoning why surge arresters should be listed. Additionally, the requirement for listing of surge arresters can protect designers, contractors, installers, and inspectors to ensure that the product has been evaluated by a third party Nationally Recognized Testing Laboratory. There are products we are finding that are coming from other countries that have been found to be less than what is required in the product standard. This can be a serious safety concern. The Listing requirement is vital to the electrical industry to ensure that electrical products that are being used are in compliance with the product standards. Surge arresters are no different. Authorities Having Jurisdiction, AHJ, depend on the product listing to assist them in their approval process. By these products not being listed could end up delaying approval on jobsites.

5-201 Log #2465 NEC-P05 **Final Action: Accept**
(280.5)

Submitter: Alan Manche, Schneider Electric
Comment on Proposal No: 5-316
Recommendation: Continue to accept this proposal.
Substantiation: There was no substantiation presented in the 2008 NEC that demonstrated a safety issue existed to require surge arrester listing on systems Over 1000V. Adding a listing requirement for equipment in the NEC is typically introduced when a significant safety issue must be addressed. Many products hold a listing requirement as the manufacturer understands it will assist the AHJ in determining the product has been built to its appropriate safety standard. Consider panelboards, switchboards, busway and many other products in the NEC that do not have a listing requirement. Placing a listing requirement in the NEC without substantive issues places the industry in a position to ask the AHJ for written permission to accept unlisted surge arrester since there are no products listed and it would take months for that listing process to be completed and make it to the field as has been demonstrated via the requirement that has been in place not for 2 years in some states and we still do not see listed arresters.

I agree with Mr. Williams that if the AHJ has concerns about the product safety, he can either ask for a listed product or a report from the (surge arrester) manufacturer that his product complies with the appropriate product standards. Square D does NOT manufacture surge arresters over 1000V. If there are safety issues being experienced in the field, then that data needs to be collected and provided to the code panel for further discussion that may then support such a requirement.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 2
Explanation of Negative:

MELLO, C.: See my explanation for negative vote Comment 5-195.

WILLIAMS, D.: The submitter has provided reasoning why surge arresters should be listed. Additionally, the requirement for listing of surge arresters can protect designers, contractors, installers, and inspectors to ensure that the product has been evaluated by a third party Nationally Recognized Testing Laboratory. There are products we are finding that are coming from other countries that have been found to be less than what is required in the product standard. This can be a serious safety concern. The Listing requirement is vital to the electrical industry to ensure that electrical products that are being used are in compliance with the product standards. Surge arresters are no different. Authorities Having Jurisdiction, AHJ, depend on the product listing to assist them in their approval process. By these products not being listed could end up delaying approval on jobsites.

5-202 Log #2773 NEC-P05 **Final Action: Accept**
(280.21(1))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 5-320
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

ARTICLE 285 — TRANSIENT VOLTAGE SURGE SUPPRESSORS: TYSSs

5-203 Log #2873 NEC-P05 **Final Action: Reject**
(285.4)

Submitter: Tom Baker, Puget Sound Electrical Training
Comment on Proposal No: 5-321
Recommendation: Accept this proposal
Substantiation: Accept this proposal. New Article 694 Small Wind Electric Systems was accepted and will require SPDs [(694.4 (D)]. There are wind turbines installed in areas subject to lightning, just are there are dwelling units installed in areas subject to lighting. The rational for SPDs is valid for both locations.
If not, then the requirement in 694.4(D) should be deleted.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms that the installation of surge protection is a design issue. The reference to special equipment is inadequate substantiation to demonstrate a need for requiring surge protection in the type of occupancy listed in this proposal.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-204 Log #1856 NEC-P05 **Final Action: Accept**
(285.25)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-324
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
285.25 Type 3 SPDs. Type 3 SPDs (TVSSs) shall be permitted to be installed ~~anywhere~~ on the load side of branch-circuit overcurrent protection up to the equipment served. If included in the manufacturer's instructions, the Type 3 SPD connection shall be a minimum 10 m (30 ft) of conductor distance from the service or separately derived system disconnect ~~if the Type 3 SPD includes a cautionary marking, tag, or instruction statement pertaining to the 10-m (30-ft) distance~~.
Substantiation: It seems the word "anywhere" should be deleted as it seems it invites locations that may not be permitted by other sections of the NEC. SPDs are required to be listed by 285.5. As such, the listing agency will typically require and review installation instructions to be certain they comply with the safety standard. As a result, the installation details in this section seem more appropriate for the listing instructions.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

5-205 Log #2345 NEC-P05 **Final Action: Accept in Principle**
(285.25)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 5-324
Recommendation: Delete the word "must" from the text.
Substantiation: It appears that this was a small error on the part of the panel when the text was accepted in principal.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel notes the word "must" does not appear in this section of the 2011 NEC ROP Draft. See panel action on Comment 5-204.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

ARTICLE 300 — WIRING METHODS

2-187 Log #91 NEC-P02 **Final Action: Accept**
(300.3(B)(5))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 3-11
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 2 for action.
This action will be considered by Code-Making Panel 2 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Continue to Reject Proposal 3-11.
Panel Statement: The panel Accepts the direction of the the Technical Correlating Committee. Code-Making Panel 3 rejected the proposal and referred it to Code-Making Panel 2. The panel does not agree that all conductors of general branch circuits should be required to be grouped. The provisions in 210.4 for grouping are specific to the need to identify the grounded conductor as part of a multiwire branch circuit.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-188 Log #92 NEC-P02 **Final Action: Accept**
(300.3(B)(5))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 3-12
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 2 for action.
This action will be considered by Code-Making Panel 2 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Continue to Reject Proposal 3-12.
Panel Statement: The panel Accepts the direction of the the Technical Correlating Committee. Code-Making Panel 3 rejected the proposal and referred it to Code-Making Panel 2. The panel does not agree that all conductors of general branch circuits should be required to be grouped. The provisions in 210.4 for grouping are specific to the need to identify the grounded conductor as part of a multiwire branch circuit.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

3-4 Log #1821 NEC-P03 **Final Action: Reject**
(300.3(C)(2))

Submitter: Peter D. Noval, Jr., Philadelphia, PA
Comment on Proposal No: 3-15
Recommendation: This proposal should be accepted as follows:
(2) Over 600 Volts, Nominal. Conductors of circuits rated over 600 volts, nominal, shall not occupy the same equipment wiring enclosure, cable, cable tray or raceway with conductors of circuits rated 600 volts, nominal, or less unless otherwise permitted in (C)(2)(a) through (C)(2)(e).
(a) Secondary Wiring to electric-discharge lamps of 1000 volts or less, if insulated for the secondary voltage involved, shall be permitted to occupy the same luminaire, sign, or outline lighting enclosure as the branch-circuit conductors.
(b) Primary leads of electric-discharge lamp ballast's insulted for the primary voltage of the ballast, where contained within the individual wiring enclosure, shall be permitted to occupy the same luminaire, sign, or outline lighting enclosure as the branch-circuit conductors.
(c) Excitation, control, relay, and ammeter conductors used in connection with any individual motor or starter shall be permitted to occupy the same enclosures as the motor-circuit conductors.
(d) In motors, switchgear and control assemblies, and similar equipment, conductors of different voltage ratings shall be permitted.
(e) In manholes, if the conductors of each system are permanently and effectively separated from the conductors of the other systems and securely fastened to racks, insulators, or other approved supports, conductors or different voltage ratings shall be permitted.
(f) In cable trays, where installation is in accordance with 392.6(F). Conductors having nonshielded insulation and operating at different voltage levels shall not occupy the same enclosure, cable, cable tray, or raceway.
Exception: Conductors installed in cable tray and separated by a barrier in accordance with 392.6(F) shall be permitted to have nonshielded insulation where all conductors rated over 600 volts are operating at the same voltage level.
Substantiation: The panel statement and the comment on affirmative vote both refer to 392.6(G), with regard to conductors (rated less than 600 volts) being installed with those conductors rated over 600 volts in cable tray.
392.6(F), however does not appear to specifically address the shielding requirement for conductors rated over 600 volts installed in cable tray.
For example, conductors rated over 600 volts could be installed in cable tray with conductors rated 600 volts or less, with barrier between them in accordance with 392.6(F).
Within the section of cable tray containing conductors rated over 600 volts, there could be conductors operating at different voltage levels.
The proposed new text clarifies the intent of NEC 300.3(C)(2), with regard to shielding requirements for cable tray installations to help eliminate potential misinterpretations.
Panel Meeting Action: Reject
Panel Statement: Section 300.1(A) states that Article 300 applies, unless modified by other articles, and Section 392.6(F)(2) already requires a solid fixed barrier to separate cables rated at 600 volt or less from over 600 volt cables. The proposed exception in the Comment would permit unshielded cables rated over 600 volts without the limitations for shielding found in 310.6. Panel 6 would have to review and accept the proposed changes and the comment introduces specific text that has not had public review.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-5 Log #1667 NEC-P03 **Final Action: Reject**
(300.3(C)(2)(e))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-16
Recommendation: Accept the proposal with the following revisions:
In manhole and handhole enclosures, if the conductors of each system are permanently and effectively separated from the conductors of the other system(s). Where installed in a manhole, conductors shall be securely supported and fastened to racks, insulators or other approved supports. (remainder unchanged).
Substantiation: These provisions should include handhole enclosures defined in Article 100, not handholes covered in 410.30(B). Handhole enclosures are various sizes. 314.16 requires free space in junction boxes (handhole enclosures). Effective separation can be accomplished where system conductors are in a raceway and the handhole enclosure is provided to provide access to a junction or pull box or conduit body in the raceway.
Panel Meeting Action: Reject
Panel Statement: Providing permanent and effective separation of 600-volt or less from over 600-volt conductors within a handhole would be very difficult, if not impossible. The submitter has not provided additional technical substantiation and data showing handholes and the method of providing permanent and effective separation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

6-2 Log #93 NEC-P06 **Final Action: Accept**
(300.3(D) (New))

TCC Action: The Technical Correlating Committee directs that the Chair of Code-Making Panel 6 appoint a Task Group comprised of members from Code-Making Panels 6, 7, and 13 to correlate the requirements of fire-rated and non-fire-rated cables for the 2014 edition of the NEC.
Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 3-17
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 6 for action in Article 310.
This action will be considered by Code-Making Panel 6 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review Proposal 3-17, and action was taken on Comment 6-15. The panel requests the TCC to redirect this issue to CMP 7 or CMP 13 for consideration.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

3-6 Log #1666 NEC-P03 **Final Action: Reject**
(300.4)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-19
Recommendation: Delete or accept the proposal.
Substantiation: Although "likely" is a term to be avoided, it is used numerous times in the NEC. "Adequately" is also a term to be avoided without specific conditions. If the requirements of 90.4, 90.7, 110.2, and 110.3 already apply and are sufficient, this section is superfluous.
Panel Meeting Action: Reject
Panel Statement: The panel rejected the addition of the term "likely" at the proposal stage and stands by it's decision and substantiation. Deleting the entire phrase would be counterproductive since the phrase is the basic rule and subsequent parts describe how to accomplish this basic rule.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-7 Log #1395 NEC-P03 **Final Action: Reject**
(300.4(A) Exception No. 1)

Submitter: Russell LeBlanc, The Peterson School
Comment on Proposal No: 3-22
Recommendation: The proposal should be accepted but modified as follows:
Exception No. 1: Steel plates shall not be required to protect rigid metal conduit, intermediate metal conduit, (~~rigid non-metallic conduit~~) Schedule 80 PVC, RTRC Type-XW, *or electrical metallic tubing.*
Substantiation: 300.4(A)(1), 300.4(A)(2), 300.4(D), and 300.4(F) all require steel plates for protection of the wiring methods. This is because these wiring methods may be exposed to physical damage from nails and screws and such. If this were not true, then a plate would not be required. It seems logical to me that if the wiring method is an area that is exposed to physical damage then we must use a plate for protection or a wiring method that is identified for use in that area. Not all "rigid nonmetallic conduits" are identified for this. See U.L. info. I realized that in all of my original proposals that I missed 300.4(F) Exception No. 1, but maybe that section can also be modified so that all of sections coordinate the same requirements.
The following info is from the 2008 U.L. White Book
REINFORCED THERMOSETTING RESIN CONDUIT (DZKT)
XW-type reinforced thermosetting resin conduit is Listed for aboveground use and is suitable for use wherever IPS, ID, RTRC 40 and RTRC 80 conduit may be used. The marking "AG, XW, RTRC" identifies conduit suitable for use **where exposed to physical damage** in accordance with the NEC.
RIGID NONMETALLIC SCHEDULE 40 AND SCHEDULE 80 PVC CONDUIT (DZYR)
Schedule 80 conduit has a reduced cross-sectional area available for wiring space and is suitable for use wherever Schedule 40 conduit may be used. The marking "Schedule 80 PVC" identifies conduit suitable for use **where exposed to physical damage** and for installation on poles in accordance with the NEC.
Panel Meeting Action: Reject
Panel Statement: Although the addition of RTRC Type XW is new material, there was still no technical substantiation provided to justify the change from rigid nonmetallic conduit to Schedule 80 PVC conduit. The purpose of the steel plates is to protect certain wiring methods from screws and nails so any change to this exception must provide substantiation that regular nonmetallic raceways must have nail plates.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-8 Log #2085 NEC-P03 **Final Action: Reject**
(300.4(A)(1), 300.4(A)(2), 300.4(D), and 300.4(F) Exception No. 1)

Submitter: Jim Davis, Electrical Education Services, LLC
Comment on Proposal No: 3-25
Recommendation: Revise as follows:
Exception No. 1: Steel plates shall not be required to protect rigid metal conduit, intermediate metal conduit, ~~rigid nonmetallic conduit,~~ or electrical metallic tubing.
Substantiation: The substantiation for this proposed deletion cites multiple ACTUAL occurrences of penetrations of raceway and contained conductors, which are presumed by the submitter to be "technical" in nature. In any event, it is respectfully requested that the panel consider this matter once again in light of the fact that the current edition of the NEC does not include PVC or EMT in the exception to 300.4(E) which is an installation environment that could present less of a hazard to the wiring method than that presented by notches or holes in studs.
Panel Meeting Action: Reject
Panel Statement: The purpose of the steel plates are to protect certain wiring methods from screws and nails so any change to this exception must provide substantiation that nonmetallic raceways must have nail plates.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-9 Log #1670 NEC-P03 **Final Action: Reject**
(300.4(A)(2) Exception No. 1)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-26
Recommendation: Accept the proposal.
Substantiation: 352.12(C), 355.12(C), and 358.12(1) cover uses not permitted these wiring methods are rather easily penetrated by nails and screws, especially are power driven.
Panel Meeting Action: Reject
Panel Statement: The purpose of the steel plates are to protect certain wiring methods from screws and nails so any change to this exception must provide substantiation that nonmetallic raceways and EMT must have nail plates.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-10 Log #1394 NEC-P03 **Final Action: Reject**
(300.4(A)(2) Exception No. 2)

Submitter: Russell LeBlanc, The Peterson School
Comment on Proposal No: 3-27
Recommendation: The proposal should be accepted but modified as follows:
Exception No. 1: Steel plates shall not be required to protect rigid metal conduit, intermediate metal conduit, (~~rigid non-metallic conduit~~) Schedule 80 PVC, RTRC Type-XW, *or electrical metallic tubing.*
Substantiation: 300.4(A)(1), 300.4(A)(2), 300.4(D), and 300.4(F) all require steel plates for protection of the wiring methods. This is because these wiring methods may be exposed to physical damage from nails and screws and such. If this were not true, then a plate would not be required. It seems logical to me that if the wiring method is an area that is exposed to physical damage then we must use a plate for protection or a wiring method that is identified for use in that area. Not all "rigid nonmetallic conduits" are identified for this. See U.L. info. I realized that in all of my original proposals that I missed 300.4(F) Exception No. 1, but maybe that section can also be modified so that all of

sections coordinate the same requirements.

The following info is from the 2008 U.L. White Book

REINFORCED THERMOSETTING RESIN CONDUIT (DZKT)

XW-type reinforced thermosetting resin conduit is Listed for aboveground use and is suitable for use wherever IPS, ID, RTRC 40 and RTRC 80 conduit may be used. The marking "AG, XW, RTRC" identifies conduit suitable for use **where exposed to physical damage** in accordance with the NEC.

RIGID NONMETALLIC SCHEDULE 40 AND SCHEDULE 80 PVC CONDUIT (DZYR)

Schedule 80 conduit has a reduced cross-sectional area available for wiring space and is suitable for use wherever Schedule 40 conduit may be used. The marking "Schedule 80 PVC" identifies conduit suitable for use **where exposed to physical damage** and for installation on poles in accordance with the NEC.

Panel Meeting Action: Reject

Panel Statement: See the panel statement in Comment 3-7.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

3-11 Log #1393 NEC-P03 **Final Action: Reject**

(300.4(D) Exception No. 1)

Submitter: Russell LeBlanc, The Peterson School

Comment on Proposal No: 3-31

Recommendation: The proposal should be accepted but modified as follows:

Exception No. 1: Steel plates shall not be required to protect rigid metal conduit, intermediate metal conduit, ~~(rigid non-metallic conduit)~~ Schedule 80 PVC, RTRC Type-XW, or electrical metallic tubing.

Substantiation: 300.4(A)(1), 300.4(A)(2), 300.4(D), and 300.4(F) all require steel plates for protection of the wiring methods. This is because these wiring methods may be exposed to physical damage from nails and screws and such. If this were not true, then a plate would not be required. It seems logical to me that if the wiring method is an area that is exposed to physical damage then we must use a plate for protection or a wiring method that is identified for use in that area. Not all "rigid nonmetallic conduits" are identified for this. See U.L. info. I realized that in all of my original proposals that I missed 300.4(F), Exception No. 1, but maybe that section can also be modified so that all of sections coordinate the same requirements.

The following info is from the 2008 U.L. White Book

REINFORCED THERMOSETTING RESIN CONDUIT (DZKT)

XW-type reinforced thermosetting resin conduit is Listed for aboveground use and is suitable for use wherever IPS, ID, RTRC 40 and RTRC 80 conduit may be used. The marking "AG, XW, RTRC" identifies conduit suitable for use **where exposed to physical damage** in accordance with the NEC.

RIGID NONMETALLIC SCHEDULE 40 AND SCHEDULE 80 PVC CONDUIT (DZYR)

Schedule 80 conduit has a reduced cross-sectional area available for wiring space and is suitable for use wherever Schedule 40 conduit may be used. The marking "Schedule 80 PVC" identifies conduit suitable for use **where exposed to physical damage** and for installation on poles in accordance with the NEC.

Panel Meeting Action: Reject

Panel Statement: See the panel statement in Comment 3-7.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

3-12 Log #507 NEC-P03 **Final Action: Reject**

(300.4(G) (New))

Submitter: Richard E. Loyd, Sun Lakes, AZ

Comment on Proposal No: 3-41

Recommendation: Reconsider in CMP-3 and Accept Proposal 3-41.

Please consider this comment on its safety merits regardless of the panel it is assigned to.

Substantiation: Although the Technical Correlating Committee assigned this issue to CMP-9, I believe they did so incorrectly. 300.4 is "the protection of conductors". This is the issue we are concerned with and that exists in the field. CMP-9 failed to address the substantiation and safety aspects in the proposals and comments related. More importantly, it is a safety issue that can be avoided during the installation process by protecting these conductors that are typically exposed to physical damage during the construction of a building or structure. This damage often goes undetected during construction and failure occurs later when the building is occupied. By placing protection over the conductors and components until trim-out and wall finishes are completed, will minimize failure which may be in the form of a fire or shock to occupants.

Panel Meeting Action: Reject

Panel Statement: The NEC Technical Correlating Committee established a task group, between the 2008 NEC and the 2011 NEC code cycles, to study the issue of whether Code-Making Panel 1, Code-Making Panel 3, or Code-Making Panel 9 has jurisdiction over requirements for protective cover plates for boxes.

The task group determined that Code-Making Panel 9 would have jurisdiction over this issue since Code-Making Panel 9 specifically deals with conductors within the box, box and cover construction requirements, and common box as well as cover sizes. The NEC Technical Correlating Committee has assigned coverage of this issue to Panel 9 rather than Panel 3 so any action on this issue in Article 300 would be inappropriate.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

CASPARRO, P.: This comment should have been accepted. Although the TCC assigned this to CMP #9, 300.4 is the protection of conductors, which is the concern that the submitter has. There has been more than enough documentation presented to justify this code change.

3-13 Log #680 NEC-P03 **Final Action: Reject**

(300.4(G))

Submitter: Carlo Compagnone, Jr., Compa Covers, Inc.

Comment on Proposal No: 3-43

Recommendation: This proposal should be accepted.

Substantiation: As a Master electrician and having been involved in the electrical field for almost twenty (20) years, I am concerned about home-safety issues and the harm, liabilities and expenses inherent therein. In particular, many home fires arise from faulty premises wiring group equipment[1] resulting from damage to wiring within the electrical outlet box. For instance, according to statistics provided by the National Fire Protection Association ("NFPA"), in 2006, "an estimated 16,380 reported U.S. non-confined home structure fires involving premises wiring group equipment resulted in 145 civilian deaths [and] 458 civilian injuries...".

(Please see "Home Electrical Fires," John R. Hall, Jr., March 2009, National Fire Protection Association.)

According to the NFPA, "The two leading specific factors contributing to ignition were unclassified electrical failure or malfunction (33%) and unspecified short circuit arc (28%). These two leading factors lack details on the nature of the failure. **The leading factors contributing to ignition with details were short circuit arc from defective or worn insulation (12%), arc from faulty contact or broken conductor (6%),** short circuit arc from mechanical damage (4%), and equipment overloaded (3%)." (emphasis added) (See Id.)

The main purpose of the National Electrical Code ("NEC") is the safeguarding of persons and property, which in turn is a primary reason why the NFPA sponsors the code making process and publishes the NEC. According to the NFPA's March 2009 analysis on home electrical fires, "Two-fifths (38%) of the 2003-2006 reported non-confined home structure fires involving premises wiring group equipment involved unclassified or unknown-type wiring. Because such a large share of these fires and associated losses are unclassified or unknown-type, the numbers and percentages for every specific type of equipment are probably severely understated. Comparisons within a group are not a problem. **For example, note that the number of fires declines for wiring as one moves from inside the house along the wiring network toward the connections to the utility poles outside the house.**" (*emphasis added*) (Id.) According to this analysis, the majority of fires begin within the outlet box, which is the one area of premises wiring in which the NEC provides no specific guidelines. This is an issue that has been raised in at least the past two (2) Code cycles, and numerous proposals have been submitted in this cycle in an attempt to address the matter. Clearly, it is necessary for the NEC to provide a specific mandate to electricians, that when implemented, would serve as a safeguard against death, injury and the loss of property due to home electrical fires caused within the house along the wiring network.

Acceptance of Proposal 3-43 would be a definitive step towards this mandatory.

It is unclear why the NEC contains provisions for protecting the wiring at almost all points of vulnerability throughout the construction process, but excludes the wiring located within the electrical outlet box. In fact, the NEC's newest provision, Section 406.11, involves a requirement for tamper-resistant receptacles with a built-in shutter system at the outlet plug post-construction. While the NEC has added this provision, it blatantly fails to ensure the integrity of the wiring once it reaches the outlet box. What good is Section 406.11, if the wiring behind the receptacle is damaged? This is certainly a problem that must be addressed by the NEC with specificity which includes a mandator provision for protecting wiring within the electrical outlet box.

While there are broad provisions contained in the NEC for safeguarding all electrical equipment and connections from damage and contamination, these provisions are not specific enough. For instance, Section 110.12, which provides that the equipment must be installed in a "neat and workmanlike manner," and states that "there shall be no damaged parts that may adversely affect safe operation or mechanical strength of the equipment...". While it is a nice concept that electrical equipment be neat and workmanlike, this phrase is unenforceable, and ultimately meaningless. In addition, despite its use of the word "equipment," Section 110.12 is not broad enough to address the concerns raised in Proposal 3-43. Nowhere in Section 110.12 is there a reference to wiring or the protection of wiring within electrical outlet boxes during the construction phase. The section only refers to equipment, including, "busbars, wiring terminals, insulators, and other surfaces...". It is not enough to assume Section 110.12 requires the protection of wiring in electrical boxes, particularly given the alarming statistics provided by the NFPA.

The concept of providing specific solutions for the protection of wiring is not foreign to the NEC, which mandates prescriptive requirements upon all areas of the wiring, except for wiring within the electrical outlet box. For example, Article 300 provides for very detailed methods of safeguarding cables which

are subject to damage during the construction phase. Article 300.4 requires the installation of a nail plate where cable wiring is subject to nail or screw penetration. Article 300.4(B)(1) requires installation of bushings or grommets on all metal edges of punched out or factory-installed holes. If an electrician does not meet these Code requirements, wires are damaged and the inspection is deemed a failure.

Clearly, wiring is damaged during the construction process because wires sit exposed for months, while various tradesmen work, subjecting the wiring in the outlet boxes to damage from plaster, power routers, insulation and paint contamination. Drywall installers no longer cut box openings by marking the location and cutting away from the box. Conductors are damaged by pin routers, since the operator cannot see where the box is located and wires located near the edge of the box can be severely damaged. When spray foam is utilized and sprayed into a box, wiring inside the box may be corroded over time as a result of chemicals contained in the spray foam. When paint is sprayed, the paint covers the colored wiring, including the ground wiring, making it unclear which wire is which and requiring the electrician to make a cut into the paint-covered wire, potentially damaging it. Further, when the ground wiring is covered in paint, the grounding bond is lost, since the paint disrupts the copper wire. Faulty ground wires cause short circuits, sparks and arcs, all of which cause fire.

Since there is no mandate for protecting wiring within the electrical box, electricians may or may not chose to cover the boxes once they have completed their wiring. Given the NFPA's grim statistics, it does not appear that enough electricians are choosing to provide protection for the electrical outlet boxes during construction.

Wiring damaged during the construction process also poses a financial hardship upon electricians since they oftentimes have to remove numerous sheets of drywall to rewire to box if enough additional cable is not available outside the box. Much of the time, the electrician must scrape the spray foam out of the box, or try to remove the paint from covered wires. Wire left exposed, having been contaminated by paint, plaster, power routers or other materials, must be cleaned out or cut, and the requirements of Section 110.12 are not met, since the work is no longer "neat."

What is more, while the Code requires, in Section 300.14, that six (6) inches of "free-flowing" conductor be left in an electrical box, the Code provides no specific provisions requiring protection of this length of wiring. Unfortunately, when wiring is compromised during the construction process, it is nearly impossible for an electrician to comply with this provision of the Code, as they oftentimes must cut portions of the damaged six (6) inches out of the box.

Requiring a cover, which is reusable, is a simple and cost-effective manner of ensuring that wiring is protected once it reaches the electrical outlet box. In fact, it should cost less than $100 to cover electrical boxes in most new construction homes, and these covers will be re-useable, lessening the cost substantially. This is a small expense in comparison to an electrician returning to the construction site and fixing the damage which occurred while other tradesmen did their jobs. In addition, there would be no need for re-inspection, since covers would be placed in boxes upon completion of rough wiring. Thus, boxes would be covered at the time of rough inspection, similar to nail plates having to be on at the time of rough inspection, pursuant to provision 300.4. Given that the electrical boxes would be covered at the completion of rough wiring, the wiring inside the box would not get damaged during construction.

Moreover, and most importantly, Proposal 3-43 offers a specific solution to a significant issue at a minimal expense in comparison to death, injury and property damage. Simply stated, requiring covers in electrical boxes at the time of rough inspection ensures the integrity of the wiring, ensures uniformity in protection of the wiring within electrical boxes, and ensures safety within the premises and conformity and compliance with the provisions and purpose of the National Electrical Code.

I have also submitted this proposal to Code-Making Panel 9 for 314.17(E) or 314.26.

[1]As defined by the National Fire Protection Association, "premises wiring" refers to all installed wiring equipment between power source and outlet. "Premises wiring" includes all electrical distribution equipment except cords, plugs and light fixtures. (Please see "Home Electrical Fires," John R. Hall, Jr., March 2009, National Fire Protection Association.)

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: See the panel statement in Comment 3-12.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

CASPARRO, P.: This comment should have been accepted. See 3-12.

3-14 Log #1090 NEC-P03 **Final Action: Accept in Principle**
(300.4(H))

Submitter: David H. Kendall, Thomas & Betts Corporation

Comment on Proposal No: 3-46

Recommendation: This proposal should have been Accepted.

Substantiation: Thomas & Betts, Cooper Couse Hinds and EGS Electrical (Appleton) offer LISTED Expansion/Deflection Fittings. UL has addressed their listing issues by publishing a Certification Requirement Decision (CRD) for standard UL514B, Conduit, Cable and Tubing Fittings (See Attached). This CRD includes specific performance requirements for the deflection characteristic of the expansion/deflection fittings.

Also attached is the Thomas & Betts instruction sheet and catalog cut for the T&B Listed Expansion/Deflection Fitting.

Proposal 3-46 identified a real safety issue that needs to be addressed by the Code. Raceways are damaged when improperly installed in structural construction joints leaving conductors or cables exposed. Structural construction joints will experience shear and lateral loads due to gravity, expansion and contraction and movement of the structure. The International Building Code, Section 1906, refers the user to the provisions of ACI 318 (American Concrete Institute). However, neither of these codes addresses the use of an expansion/deflection fitting or other approved means when electrical raceways cross the construction joint.

Section 300.7(B) addresses "thermal" expansion and contraction due to temperature. Section 300.7(B) does not address Structural Expansion Fittings found in buildings, bridges and other structures that are affected by other forces such as wind, loading and ground movement.

This new section will emphasize that a raceway can be damaged if improperly installed in a construction joint and will be a tool for the electrical inspector to ensure the proper installation of electrical raceways.

It is important to note that the proposal not only stated that listed expansion/deflection fittings were permitted to be used but the language in the new section allow for "other approved means".

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Add new 300.4(H) to read as follows:

(H) Structural Joints. A listed expansion/deflection fitting or other approved means shall be used where a raceway crosses a structural joint intended for expansion, contraction or deflection, used in buildings, bridges, parking garages, or other structures.

Panel Statement: The changes in the suggested text were editorial in nature but necessary to ensure that the expansion and deflection fitting is installed at the point on the structure where the movement would occur in the raceway. Conduit and tubing were deleted since they are raceways.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

3-15 Log #1227 NEC-P03 **Final Action: Accept in Principle**
(300.4(H) (New))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 3-46

Recommendation: This Proposal should be accepted to add a new section 300.4(H) Structural Construction Joints.

Substantiation: Several NEMA Members including Thomas & Betts, Cooper Couse Hinds and EGS Electrical (Appleton) offer LISTED Expansion/Deflection Fittings. UL has addressed their listing issues by publishing a Certification Requirement Decision (CRD) for standard UL514B, Conduit, Cable and Tubing Fittings (see attached). This CRD includes specific performance requirements for the deflection characteristic of the expansion/deflection fittings.

Proposal 3-46 identified a real safety issue that needs to be addressed by the Code. Raceways are damaged when improperly installed in structural construction joints leaving conductors or cables exposed. Structural construction joints will experience shear and lateral loads due to gravity, expansion and contraction and movement of the structure. The International Building Code, Section 1906, refers the user to the provisions of ACI 318 (American Concrete Institute). However, neither of these codes addresses the use of an expansion/deflection fitting or other approved means when electrical raceways cross the construction joint.

Section 300.7(B) addresses "thermal" expansion and contraction due to temperature. Section 300.7(B) does not address Structural Expansion Fittings found in buildings, bridges and other structures that are affected by other forces such as wind, loading and ground movement.

This new section will emphasize that a raceway can be damaged if improperly installed in a construction joint and will be a tool for the electrical inspector to ensure the proper installation of electrical raceways. Not only are there listed expansion/deflection fittings on the market but the language in the new section allow for "other approved means".

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 3-14.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

3-16 Log #2879 NEC-P03 **Final Action: Reject**
(300.5(A))

Submitter: Paul J. Casparro, Scranton Electricians JATC
Comment on Proposal No: 3-50
Recommendation: This Proposal should have been accepted.
Direct-buried cables or conduit or other raceways shall be installed to meet the minimum cover requirements of Table 300.5 and have their location identified by a warning ribbon that is placed in the trench above the undergound installation.
Substantiation: Overcurrent protection is not the full proof answer for safety. Available fault currents are higher today than ever before because of the expanding equipment in facilities today. We can't assume the correct AIC ratings on fuses and circuit breakers is correct. The liability is too great to not provide warning ribbons in underground installations today.
Panel Meeting Action: Reject
Panel Statement: The panel understands that the intent of the submitter is to have a warning ribbon for direct-buried cables that do not have some form of protective covering such as concrete. However the addition of such a requirement would be impractical as it would not be inclusive for all installation practices such as directional boring.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
CASPARRO, P.: This comment should have been accepted. After a very lengthy Panel discussion, it was obvious that something has to be done, we just couldn't come to an agreement. The contractors on Panel #3 even agreed that this is becoming a major problem in our industry. Somehow we need to start fixing this problem.
WHISTLER, W.: There is a definite need to provide a warning ribbon to identify direct buried cables that are feeders or branch circuits as they are not typically identified by utility locating services and many of these circuits are installed on residential properties with an open trench not directional boring or vibratory plow. Without the warning ribbon there is a lack of indication to the homeowner that danger is just a shovel full away.
Comment on Affirmative:
STENE, S.: The submitter must provide technical substantiation to address the issues in the Panel Statement in the proposal. This issue has been discussed by the Panel for the past two Code cycles and none of the proposals or comments during these Code cycles have provided any data on the occurrence of accidents that would have been prevented if warning ribbon had been installed above all underground branch circuit and feeder installations. To warrant such a sweeping change in the installation of underground wiring, substantial data must be provided to warrant this change.

3-17 Log #574 NEC-P03 **Final Action: Accept**
(300.5(C))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 3-52
Recommendation: NEMA supports the panel action. MC Cable is suitable for direct burial and concrete encasement.
Substantiation: We support this panel action as a positive and logical improvement to the Code. MC Cable is available as a listed assembly suitable for direct burial and concrete encasement.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-18 Log #1669 NEC-P03 **Final Action: Reject**
(300.5(D)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-55
Recommendation: Accept the proposal with the following revisions:
Direct-buried conductors, cables and raceways that are not encased in a minimum 50 mm (2 in.) cement concrete envelope or not installed under a minimum 102 mm (4 in.) cement concrete slab shall have their location indicated by a continuous warning ribbon identified for the purpose placed in the trench at least 300 mm (12 in.) above the conductors, cables, or raceways.
Exception No. 1: This provision shall not apply to:
(1) Rigid metallic conduit or intermediate metal conduit installed at a depth less than 450 mm (18 in.).
(2) Grounding electrode conductors or electrode bonding conductors.
(3) Conductors protected by ground-fault circuit interrupters.
(4) Conductors operating at less than 50 volts.
Substantiation: The panel comment that his provision does not apply to raceways is the reason for the proposal. Conductors other than service conductors can provide shock and explosion hazards, especially high MVA circuits such as on industrial premises. The purpose is presumably for safety, not to prevent interruption of power. Some conductors which do not present a safety hazard of shock or explosion should be exempted.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-16.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
STENE, S.: The purpose of 300.5(D) is to provide directly buried conductors and cables with protection and to have the directly buried service conductors and cables identified with a ribbon buried in the trench at least 12 inches above the cables. This entire subsection does not apply to raceways, only conductors and cables.

3-19 Log #2568 NEC-P03 **Final Action: Reject**
(300.5(D)(3))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 3-55
Recommendation: The proposal should be accepted in principle. In 300.5(D), delete the words "Direct-buried" from the beginning of the parent text in 300.5(D).
Substantiation: The rule requires service conductors buried at least 18 in. below grade to have their location identified with a warning ribbon in the trench. This presently applies to service conductors if not enclosed in a raceway, but as the original submitter of this concept (Proposal 4-89 and Comment 3-3 for the 1999 NEC cycle), it was always intended to apply whether or not a raceway protected the conductors, unless concrete encasement was applied to the raceway. The original submittal was in Article 230, where this sort of confusion could not have happened. In fact, it did apply generally in that code cycle because it was a simple paragraph in a section entitled "Protection from Damage." Direct buried conductors are not encased in concrete, and this rule makes no sense unless the direct-burial criterion is removed. The burial depth limitation of 18 inches was chosen by this submitter exactly because that is the minimum cover depth of rigid nonmetallic conduit used in service applications, and the intent was for this to apply to these raceways.
In the 2002 cycle, the section was editorially reorganized with numbered paragraphs under what became parent language in 300.5, using a direct-burial criterion. This introduced the inadvertent error that now remains and is just coming to light. In addition, Paragraph 300.5(D)(4) is also now in direct conflict with the parent language of 300.5(D), because it squarely addresses raceways where subject to physical damage. A review of each provision under 300.5(D) shows that none of those provisions depend on the words "direct-buried" in the parent text, and work well without them. This provision is routinely applied in accordance with the original intent and this inadvertent editorial mistake should be corrected.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement in Comment 3-16.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
STENE, S.: While the Panel agrees that there is an issue with 300.5(D)(4), none of the proposals in this section for the 2011 NEC dealt with removing the words "direct buried" from the parent text. This proposed deletion would totally change the installation requirements for direct buried cables and would constitute new material that has not had public review.

3-20 Log #2759 NEC-P03 **Final Action: Accept**
(300.5(D)(3))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 3-56
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-21 Log #1490 NEC-P03 **Final Action: Reject**
(300.5(G) and 300.50(E))

Submitter: Timothy M. Croushore, Allegheny Power
Comment on Proposal No: 3-59
Recommendation: Please reconsider this proposal. Please revise 300.5 (G) to read identically as 300.50 (E) and remove the FPN after 300.5 (G)

300.5 (G) Raceway Seal. Where a raceway enters from an underground system, the end within the building shall be sealed with an identified compound so as to prevent the entrance of moisture or gases, or it shall be so arranged to prevent moisture from contacting live parts.

Substantiation: This comment requests a change in 300.5(G) to provide consistency of the requirements for the raceway seals in both 300.5(G) and 300.50(E) regardless of the voltage of the cable or conductor within the raceway.

If there is a need to have two different raceway seal requirements as currently required in the Code, could the technical committee (CMP-3) explain how the voltage of the cable or conductors necessitates this need?

If the 300.5(G) FPN is desired to be kept, does the "*Presence of hazardous gasses or vapors*" text of the FPN refer to a hazardous (classified), Class I location?
Panel Meeting Action: Reject
Panel Statement: This requirement would mandate the sealing of every raceway meeting these criteria, even in locations where this is not necessary.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:

BURLISON, S.: I agree with the submitter and the intent of the comment. The submitter was not attempting to add or change the requirements only clarify the existing ones. The panel refused to acknowledge the sealing requirements in 300.5(G) and 300.50(E) are different for no apparent reason. If there are reasons for the different requirements, the panel failed to clarify the technical reasons for the difference in sealing requirements for conduits containing high and low voltage conductors.

3-22 Log #1984 NEC-P03 **Final Action: Accept in Principle**
(300.6(A))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 3-64
Recommendation: This proposal should be accepted.
Substantiation: I don't think I made my original proposal completely clear. When the electrician purchases a "factory made" elbow or a "factory cut" nipple, the threads of these items do not always have corrosion protection on the threads like the full lengths of made conduit do. Because these unprotected threads are not field cut the current code rule does not require the installer to apply a corrosion protection compound. These threads have the same corrosion issues as a field cut thread and need field applied protection. My proposal will require than any unprotected threads installed in areas where corrosion protection is required to have field applied corrosion protection.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:

(A) Ferrous Metal Equipment. Ferrous metal raceways, cable trays, cablebus, auxiliary gutters, cable armor, boxes, cable sheathing, cabinets, metal elbows, couplings, nipples, fittings, supports, and support hardware shall be suitably protected against corrosion inside and outside (except threads at joints) by a coating of approved corrosion-resistant material. Where corrosion protection is necessary and ~~the conduit is threaded in the field~~, where threads do not have corrosion protection, the threads shall be coated with an approved electrically conductive, corrosion-resistant compound.

Panel Statement: The text was modified to more accurately meet the intent of the submitter.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-23 Log #575 NEC-P03 **Final Action: Reject**
(300.7)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 3-65
Recommendation: Reject the proposal.
Substantiation: Cables have a 100 percent conductor fill which is a natural block for the transmission of condensation. No substantiation was provided to indicate that condensation inside a cable has been a problem. NEMA agrees with the negative comment submitted by Mr. Owen.
Panel Meeting Action: Reject
Panel Statement: See the recommendation and substantiation on Comment 3-24a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-24 Log #2124 NEC-P03 **Final Action: Hold**
(300.7 Exception)

Submitter: Patrick G. Salas, General Electric Company
Comment on Proposal No: 3-65
Recommendation: Add wording to end of 300.7:

Exception: Sealing is not required for busway.

Substantiation: The proposed change will make this requirement applicable to busway. The problems encountered with cable in conduit passing from one temperature to another have not been experienced in busway installations. This is largely due to the fact that while the housing of a conduit is generally intact over the course of its run, busway will have openings minimally at each joint which permit the egress of condensation.

Some busway designs, especially "sandwich style" busway, has very little internal airspace between the housing and the conductors or between the conductors themselves. Airflow through busway is very restrictive as a result.

The present design of busway joints may not lend themselves to the application of sealing meathods such as those used for cable in conduit installations. There is a concern it may not be possible to apply a sealant without the sealant coming in contact with bare conductor, and could compromise the insulation integrity. There has been no testing performed to assure the suitability commercially available sealants applied to internally seal busway and this could jeopardize UL listing of the busway.
Panel Meeting Action: Hold
Panel Statement: Adding an exception to exclude busways constitutes new material that has not had public review.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:

STENE, S.: "Cable raceway" is not a wiring method found in Chapter 3. Rejecting the proposal does not fix the problem. The comma was inserted between "cable" and "raceway in the 2002 NEC but was subsequently left off in the 2005 and 2008 NEC and should have been corrected as errata.

3-24a Log #CC300 NEC-P03 **Final Action: Accept**
(300.7(A))

Submitter: Code-Making Panel 3,
Comment on Proposal No: 3-65
Recommendation: Revise 300.7(A) to read as follows:

300.7 Raceways Exposed to Different Temperatures.

(A) Sealing. Where portions of a raceway or sleeve are known to be subjected to different temperatures and where condensation is known to be a problem, as in cold storage areas of buildings or where passing from the interior to the exterior of a building, the raceway or sleeve shall be filled with an approved material to prevent the circulation of warm air to a colder section of the raceway or sleeve. An explosionproof seal shall not be required for this purpose.

Substantiation: "Cable raceway" is not a wiring method found in Chapter 3. Deleting the word "cable" fixes the problem that was editorially introduced during the comment stage in 2002 when the text was originally inserted into the NEC. The comma was subsequently left off in the 2005 and 2008 NEC and should have been corrected as errata. Also there was no technical substantiation that condensation in cables is a problem.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-25 Log #339 NEC-P03 **Final Action: Accept**
(300.7(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 3-66
Recommendation: Continue to reject the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-26 Log #722 NEC-P03 **Final Action: Accept in Part**
(300.7(B), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-66
Recommendation: The Proposal should be Accepted in Principle as follows:
Change FPN to Informational Note.
Change "per" to "for each" in four places.
Substantiation: Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 stated that spelling and definitions of general words and terms shall follow Webster's Collegiate Dictionary, 11th edition. "For each" is listed as an alternative for "per" when used as an adverb.
Panel Meeting Action: Accept in Part
Accept the change to "Informational Note" and reject the change to "for each" in four places.
Panel Statement: Change for the purpose of change without any technical improvement should not be done. The submitter has admitted that "for each" is an alternative to "per" and no one seems to have a problem understanding the use of "per" so the existing text is being retained.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-27 Log #2848 NEC-P03 **Final Action: Reject**
(300.11(A)(1), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-72
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: There has been no technical reason submitted for creating an additional annex for reference information other than Annex A. Putting this information into an annex in the back will tend to make the Code less user friendly and make it more difficult for the user to access the information in a timely fashion.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-28 Log #9 NEC-P03 **Final Action: Reject**
(300.17, FPN)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 3-84
Recommendation: Accept this proposal.
Substantiation: The panel statement about composite optical fiber cables containing current-carrying conductors is correct. However, the panel ignored 770.3(A) which states:
(A) Composite Cables. Composite optical fiber cables shall be classified as electrical cables in accordance with the type of electrical conductors. They shall be constructed, listed, and marked in accordance with the appropriate article for each type of electrical cable.
Referring to Article 770 can be confusing since 770.3(A) refers the user to the appropriate article for the electrical cable.
Panel Meeting Action: Reject
Panel Statement: The purpose of 300.17 and the Fine Print Note is to refer to requirements and information dealing with the number and size of conductors in a raceway. The reference to Article 770 is necessary since fiber optic cables can be installed with power, lighting, and control conductors and will affect the dissipation of heat and the ready installation or withdrawal of conductors without damaging any of the conductors.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-29 Log #1668 NEC-P03 **Final Action: Reject**
(300.20(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-88
Recommendation: Delete or revise the proposal:
Where conductors of alternating current circuits are installed in ferrous metal raceways or other enclosures, or contained in ferrous metal-covered cables, they shall be arranged and connected to avoid heating the surrounding ferrous metal by induction.
Substantiation: "Cables" is proposed since factory installed conductors in cables cannot prevent a violation of this section. For example, three Type MC cables with three 1/0 AWG conductors in each cable; the conductors in each cable can be paralleled for one phase, and each cable connected to a different phase. This is a violation of 300.3(B)(1), but this provision doesn't specifically prevent such an arrangement. Since 300.3 applies, this provision can be deleted. The panel example makes assumptions that do not always apply.
Panel Meeting Action: Reject
Panel Statement: Section 300.20(A) applies to conductors within a ferrous metal enclosure or ferrous metal raceway since the conductors can be field installed in these raceways and enclosures. Conductors cannot be field installed in ferrous AC or MC cables so grouping of conductors within the ferrous metal covered cable would not be possible.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-30 Log #2389 NEC-P03 **Final Action: Reject**
(300.20(B))

Submitter: James S. Conrad, Tyco Thermal Controls
Comment on Proposal No: 3-90
Recommendation: This proposal should be accepted: **300.20 Induced Currents in Ferrous Metal Enclosures or Ferrous Metal Raceways**
(B) Individual Conductors. Where a single conductor carrying alternating current, that exceeds 200 amps. per conductor, passes through metal with magnetic properties, the inductive effect shall be minimized by (1) cutting slots in the metal between the individual holes through which the individual conductors pass or (2) passing all the conductors in the circuit through an insulating wall sufficiently large for all of the conductors of the circuit.
Substantiation: Section 300.20 Induced Currents in Ferrous Metal Enclosures or Ferrous Metal Raceways (B) Individual Conductors.
A typical situation of single conductor cables entering a metal (ferrous) enclosure would be single conductor MI cables used to supply power for a fire pump (Article 695) or emergency feeders (Article 700). The reason for cutting slots in the enclosure or passing the cable through a non-ferrous plate is to minimize the heating effects on the piece of equipment the cables are entering, thereby preventing the temperature of the piece of equipment from exceeding its listed rating.
We have been involved in engineering and sales of MI cables systems for over 35 years and have closely monitored the installation of hundreds of these systems. The temperature rise for systems where sinble conductor mineral insulated (MI) cables carrying a current under 200 Amps has been insignificant and we have not seem any equipment failure.
I have provided a photograph showing the surface temperature of a 200 ampere 208V, 3-phase, 4-wire ferrous metal enclosure at the point where four MI cables enter the top of the enclosure. As you can see,the enclosure temperature is under 20°C (70°F).
Based on years of successful installation, the CEC allowance of cables up to 200 amp without concern of over heating, I am asking the panel to reconsider and accept this comment.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The submitter still has not provided technical substantiation to justify setting a 200-ampere minimum current threshold as requested by the panel statement in the proposal. Providing a Fact Finding Study covering the various types of individual conductors with a thorough study of induced current would provide the technical substantiation for the acceptable level of induced current. A single photograph showing a single application is not sufficient technical substantiation to justify the suggested change.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-31 Log #1396 NEC-P03 **Final Action: Reject**
(300.21)

Submitter: Russell LeBlanc, The Peterson School
Comment on Proposal No: 3-91
Recommendation: The proposal should be accepted in principal but modified as follows:

If a conduit or raceway of metric designator 53 (trade size 2 inch) or larger, penetrates a fire-resistance-rated wall, partition, floor, or ceiling, and that same conduit or raceway also enters an enclosure of the ventilated type, that conduit or raceway shall be sealed or plugged with an approved fire stopping material at the point of entrance to the enclosure to prevent fire, smoke, or other products of combustion from passing through the raceway or conduit into other areas of the building or structure.

Substantiation: I have modified the wording for clarity and so the application is more focused, and less of a "sweeping" change.

In my original proposal I provided a first hand eyewitness account of what happened.

This was NOT a second hand or third hand story. I saw it happen with my own eyes! I am not a novice. I have been in the trade for over 25 years. I have also been teaching electrician classes for over 10 years. I am OSHA certified. I am an instructor approved by the Mass. Dept. of Education, and The Board of Examiners of Electricians. I have authored several other code changes. I am a member of NFPA. No, I am not a Fire chief or fire science engineer, or some other Fire Dept. Official. But I know what I saw, and it just did NOT seem right to me. I am very concerned. The smoke simply should NOT have been able to spread through the building via the raceways. What more technical substantiation is needed than that?

Lets break it down to simple science and logic.

If I build a fire in a fireplace, the smoke will go up the chimney flue, if the flue damper is OPEN.

If I build a fire in a fireplace, the smoke will NOT go up the chimney flue, if the flue damper is CLOSED!

Try it!

Apply logic here.

If I am wrong then maybe we don't need to seal the raceway ends. But this "chimney effect" of the unsealed pipes has already happened once. I have seen it. If it happens again, the occupants may not be as lucky as the first time I saw this phenomenon happen.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The submitter still has not provided any technical substantiation for the recommended additional text. The suggested text could apply to most switchboards, large panels, transformers, and other metal electrical equipment without proper substantiation of the location of the equipment and the possible air circulation into other areas of the building. The suggested text does not clarify the various building construction that might require the sealing of raceways, for example where a switchboard is installed in a concrete electrical room with 2 inch and larger raceways extending out of that room, the text would seem to require all 2 inch or larger raceways to be sealed even where installed under ground into other parts of the building.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-32 Log #1344 NEC-P03 **Final Action: Reject**
(300.22)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-94
Recommendation: 300.22 Wiring in Unexposed Spaces ~~Ducts Not for Air-Handling, Fabricated Ducts for Environmental Air, and Other Spaces or Environmental Air (Plenums)~~. The provisions of this section shall apply to the installation and uses of electrical wiring and equipment in the following spaces: (a) ducts used for dust, loose stock, or vapor removal; (b) ducts specifically fabricated for environmental air; (c) ~~and~~ other spaces used for environmental air (plenums) and (d) air-handling areas beneath raised floors for information technology equipment .

Exception. *The provisions of this section shall not apply to the installation and uses of electrical wiring or equipment in risers, cable trays, manholes, hoistways or any other unexposed spaces not specifically mentioned.*

(***Note: No changes proposed to the remainder of section 300.22.)***

Substantiation: This comment addresses two issues:

(1) it eliminates a laundry list in the section title, and

(2) it addresses all spaces covered by the section. The exception clarifies the application of this section for four specific applications (risers, cable trays, manholes and hoistways) that are covered in the articles which also address wiring in ducts and plenums.

Panel Meeting Action: Reject
Panel Statement: In the proposed title change, there isn't a definition provided for "unexposed spaces." Air-handling areas beneath raised floors for information technology equipment rooms are already covered in existing 300.22(D). The suggested exception seems to be addressing a wiring method covered in Article 392 that does not involve fabricated ducts or other spaces for environmental air (plenums), manholes that are not involved in fabricated air-handling ducts or other spaces used for environmental air (plenums) so the exception was not pertinent to the requirements in 300.22.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-33 Log #2569 NEC-P03 **Final Action: Reject**
(300.22)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 3-94
Recommendation: Accept the proposal as amended by CMP 3 in principle. In Informational Note No. 2, insert the following as a second sentence:

"The terminology includes, but is not limited to, ceiling cavity plenums and raised floor plenums as used in NFPA 90A."

Substantiation: CMP 3 and the proposal submitters are to be commended for handling a difficult assignment about as well as possible. The terms "ceiling cavity plenum" and "raised floor plenum" are widely used in the field, and according to the proposal substantiation, in the NFPA 90A document as well. The "ceiling cavity plenum" is about to enter Article 645 as well (Proposal 12-122). Therefore there will be no loss of accuracy in including a mention of these words. Adding these references, one after another as synonymous items, will provide a much better point of departure and basis for understanding for the generations of electricians who have been well trained to never use the unmodified word "plenum" to refer to a 300.22(C) space. I have found during extensive training events that if I use, for example, the words "ceiling cavity plenum" both the building officials and the electricians present immediately visualize the same location, whereas a reference to the unmodified word "plenum" leaves the different disciplines on different pages entirely. This is merely an informational note, and as such its wording should be such as to maximize its educational effect.
Panel Meeting Action: Reject
Panel Statement: The accepted text in FPN No. 2 in 300.22(C) in the proposal provides the informational material reference to NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems, for plenum and other air handling spaces that are covered by "Other Spaces Used for Environmental Air (Plenums)" without starting a list or referencing specific sections within NFPA 90A Standard for the Installation of Air-Conditioning and Ventilating Systems. If the area is not specifically fabricated for air handling then the area is an "other space used for environmental air (plenum)".
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-34 Log #483 NEC-P03 **Final Action: Reject**
(300.22, FPN)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 3-94
Recommendation: Accept proposal 3-94 in principle by adding an informational note immediately following 300.22(B) as shown below:
Informational Note: For information on fire protection of wiring installed in fabricated ducts and plenums see sections 4.3.4.1 (air ducts) and 4.3.11.3.3 (apparatus casings plenums) in NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*
Substantiation: The table below shows how section 300.22 in the 2008 NEC tracks the latest (2009) edition of NFPA 90A.

2008 NEC Section	2009 NFPA 90A Section	NFPA 90A Terminology
300.22(B)	4.3.4	Air ducts
300.22(B)	4.3.11.3.3	Apparatus casing plenum
300.22(C)	4.3.11.2	Ceiling cavity plenum
300.22(C)	4.3.11.4	Air-handling unit room plenum
300.22(C)	4.3.11.5	Raised floor plenum

NFPA 90A-2009 has two sets of requirements for wiring in air handling spaces. It greatly restricts the wiring permitted in air ducts and apparatus casing plenums, permitting only limited lengths of cable that is associated with the function of the air handling system. On the other hand, NFPA 90A-2009 permits unlimited amounts of plenum cable in ceiling cavity plenums, raised floor plenums and air-handling unit room plenums.

A new informational note is recommended for 300.22(B) to inform the reader of the correlating sections of NFPA 90A.

Correlating NFPA 90A and NEC section 300.22(B) is a concept that has had public review. See proposals 3-93 and 3-94. Also see panel sixteen's actions on proposals 16-48 (770.113(B) FPN), 16-160 (800.113(B) FPN), 16-267 (820.113(B) FPN) and 16-331(830.113(B) FPN) which introduced a similar informational note (FPN).

Panel Meeting Action: Reject

Panel Statement: See the panel statement in Comment 3-33.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

3-35 Log #482 NEC-P03 **Final Action: Reject**

(300.22(B))

Submitter: Stanley Kaufman, CableSafe Inc.

Comment on Proposal No: 3-94

Recommendation: Accept proposal 3-94 in principle by leaving the text of 300.22(B), except for the title, unchanged from the text in the 2008 Code and changing the title from:

(B) Ducts or Plenums Used for Environmental Air. [Text in the 2008 NEC.]

Or

(B) Ducts Specifically Fabricated for Environmental Air. [CMP 3 action on proposal 3-94]

TO:

(B) Ducts or Plenums Specifically Fabricated for Environmental Air.

Substantiation: The panel action on section 300.22(B) eliminated fabricated plenums from the section and thereby reduced the correlation between 300.22 and NFPA 90A. This comment would restore fabricated plenums to 300.22(B) by reverting to the language in the current (2008) Code and only recommends an editorial change in the title of 300.22(B).

The table below shows how section 300.22 in the 2008 NEC tracks the latest (2009) edition of NFPA 90A.

2008 NEC Section	2009 NFPA 90A Section	NFPA 90A Terminology
300.22(B)	4.3.4	Air ducts
300.22(B)	4.3.11.3.3	Apparatus casing plenum
300.22(C)	4.3.11.2	Ceiling cavity plenum
300.22(C)	4.3.11.4	Air-handling unit room plenum
300.22(C)	4.3.11.5	Raised floor plenum

NFPA 90A-2009 has two sets of requirements for wiring in air handling spaces. It greatly restricts the wiring permitted in air ducts and apparatus casing plenums, permitting only limited lengths of cable that is associated with the function of the air handling system. On the other hand, NFPA 90A-2009 permits unlimited amounts of plenum cable in ceiling cavity plenums, raised floor plenums and air-handling unit room plenums.

The current requirements for wiring in fabricated ducts in section 300.22 correlates with the NFPA 90A requirements for air ducts. Likewise, the current requirements for wiring in fabricated plenums in section 300.22(B) correlates with the NFPA 90A requirements for wiring in apparatus casing plenums.

Acceptance of this comment will restore the correlation in the requirements for wiring in apparatus casing plenums, a type of fabricated plenum.

Panel Meeting Action: Reject

Panel Statement: The definition of "plenum," as found in NFPA 90A and Article 100 in the NEC, is not specific to fabricated or other spaces used for environmental air (plenum). A fabricated return air duct is very specific and obviously covered by 300.22(B). A fabricated return air duct can be connected through the building to an "other space used for environmental air (plenum)," such as the space above a drop ceiling or a raised floor. The intent of the proposal text is to provide the definite line of demarcation between a fabricated duct and all others that are not specifically fabricated for that use but are used for air handling.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

3-36 Log #484 NEC-P03 **Final Action: Reject**

(300.22(C), FPN)

Submitter: Stanley Kaufman, CableSafe Inc.

Comment on Proposal No: 3-94

Recommendation: Accept proposal 3-94 in principle by revising the Informational Notes to 300.22(C) as shown below:

Informational Note No. 1: The spaces over a hung ceiling and below a raised floor used for environmental air-handling purposes are ~~is an~~ examples of the types of other space to which this section applies.

~~Informational Note No. 2: The phrase "Other space used for environmental air (plenum) used in this section correlates with the use of the terms "plenum" in NFPA 90A, the Standard for the Installation of Air-Conditioning and Ventilating Systems, 2009, and other mechanical codes where the plenum is used for return air purposes, as well as some other air-handling spaces.~~

Informational Note No. 2: For information on fire protection of wiring installed in other spaces used for environmental air see sections 4.3.11.2 (ceiling cavity plenum), 4.3.11.4 (air-handling unit room plenum) and 4.3.11.5 (raised floor plenum) of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

Substantiation: The table below shows how section 300.22 in the 2008 NEC tracks the latest (2009) edition of NFPA 90A.

2008 NEC Section	2009 NFPA 90A Section	NFPA 90A Terminology
300.22(B)	4.3.4	Air ducts
300.22(B)	4.3.11.3.3	Apparatus casing plenum
300.22(C)	4.3.11.2	Ceiling cavity plenum
300.22(C)	4.3.11.4	Air-handling unit room plenum
300.22(C)	4.3.11.5	Raised floor plenum

NFPA 90A-2009 has two sets of requirements for wiring in air handling spaces. It greatly restricts the wiring permitted in air ducts and apparatus casing plenums, permitting only limited lengths of cable that is associated with the function of the air handling system. On the other hand, NFPA 90A-2009 permits unlimited amounts of plenum cable in ceiling cavity plenums, raised floor plenums and air-handling unit room plenums.

The panel action on proposal 3-94 correlates with NFPA 90A-2009 for air ducts, ceiling cavity plenums and raised floor plenums, and omits apparatus casing plenums and air-handling unit room plenums. The purpose of this comment is to specifically mention raised floor plenums and air-handling unit room plenums in the informational notes to 300.22(C).

Correlating NFPA 90A and NEC section 300.22(C) is a concept that has had public review. See proposals 3-93 and 3-94. Also see panel sixteen's actions on proposals 16-48 (770.113(C) FPN), 16-160 (800.113(C) FPN), 16-267 (820.113(C) FPN) and 16-331(830.113(C) FPN) which introduced an informational note (FPN) similar to the recommended text for informational Note No. 2.

Panel Meeting Action: Reject

Panel Statement: See the panel statement in Comment 3-33.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

3-37 Log #1343 NEC-P03 **Final Action: Reject**

(300.22(C), FPN 2)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council

Comment on Proposal No: 3-94

Recommendation: FPN No. 2: The phrase "other spaces used for environmental air (plenums)" used in this section is intended to have the same meaning as ~~correlates with the use of~~ the term "plenums" used in NFPA 90A, the *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2009, and in other building or mechanical codes. It refers to plenums ~~where the plenum is~~ used for return air purposes, as well as to some other air-handling spaces.

(***Note: No changes proposed to the remainder of section 300.22).***

Substantiation: This comment resolves the problem of an FPN that addresses a term not used in the singular and points out also that the term "plenums" is used in building codes as well as in mechanical codes (both NFPA 5000 and IBC). Furthermore, the new last sentence includes some editorial clarification.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Reject

Panel Statement: The definition of "plenum" is essentially the same in NFPA 90A and Article 100 of the NEC so the suggested changes to FPN No. 2 are unnecessary. See the panel statement in Comment 3-35.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

3-38 Log #501 NEC-P03 **Final Action: Accept in Principle**
(300.22(C)(2))

Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 3-97
Recommendation: Revise text to read as follows:
(2) Cable Tray. The provisions of this section apply to the use of metallic cable tray systems in such spaces as a supporting method.
(a) Metal Cable Tray Systems. Metal cable tray systems shall be permitted to support the methods in 300.22(C)(1).
(b) Solid Bottom Metal Cable Tray. Solid bottom metal cable trays systems with solid metal covers shall be permitted where accessible to enclose wiring methods and cables in accordance with 392.3(A) and (B).
Renumber the remainder of the section accordingly.
Substantiation: This suggested language does not change the panel's intent and is consistent with 300.22(C)(1). The text is reworded to clarify that open cable tray shall only be permitted to support those methods permitted in 300.22(C)(1), and that solid bottom with solid covers can support any system allowed in Article 392.
Panel Meeting Action: Accept in Principle
Change the proposed text in the panel meeting action in the proposal and this comment as follows:
(2) Cable Tray Systems. The provisions in (a) or (b) apply to the use of metallic cable tray systems in other spaces used for environmental air (plenums), where accessible, as follows:
(a) Metal Cable Tray Systems. Metal cable tray systems shall be permitted to support the wiring methods in 300.22(C)(1).
(b) Solid Side and Bottom Metal Cable Tray Systems. Solid side and bottom metal cable tray systems with solid metal covers shall be permitted to enclose wiring methods and cables, not already covered in 300.22(C)(1), in accordance with 392.3(A) and (B).
Panel Statement: The changes to the comment are editorial in nature and provide more specific text to clarify the intent of cable tray installation in an "other space used for environmental air (plenum)."
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-39 Log #1203 NEC-P03 **Final Action: Accept in Principle**
(300.22(C)(2))

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 3-97
Recommendation: This Proposal should continue to be an Accept in Principle with the following revision to the Panel Action.
(2) Cable Tray in Other Spaces Used for Environmental Air (Plenums). The provisions of this section apply to the use of metallic cable tray systems in other spaces used for environmental air (plenums).
(a) Metal Cable Tray Systems. Metal cable tray systems shall be permitted in other spaces used for environmental air (plenums) to support wiring methods, cable and raceway types permitted in other spaces used for environmental air (plenums).
(b) Solid Bottom Metal Cable Tray. Solid bottom metal cable trays systems with solid metal covers shall be permitted where accessible to enclose other types of cables, conductors, and raceways not specifically permitted to be installed exposed in other spaces used for environmental air (plenums).
Substantiation: Nonmetallic Plenum Optical Fiber Raceways found in Articles 725, 770, 800 and 820 are permitted to be installed in Other Spaces Used for Environmental Air (Plenums). Raceways should be included along with the cable types permitted in other spaces used for environmental air (plenums).
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement in Comment 3-38 that accomplishes the submitter's purpose.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-40 Log #2346 NEC-P03 **Final Action: Accept in Part**
(300.22(C)(2))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 3-97
Recommendation: Remove the double period at the end of the title, and include mandatory text in the requirement, as follows:
(2) Cable Tray in Other Spaces Used for Environmental Air (Plenums). The provisions of this section apply to the use of metallic cable tray systems in other spaces used for environmental air (plenums).
(a) *Metal Cable Tray Systems.* Only ~~M~~metal cable tray systems shall be permitted in other spaces used for environmental air (plenums) to support wiring methods and cable types permitted in other spaces used for environmental air (plenums).
(b) *Solid Bottom Metal Cable Tray.* Only ~~S~~solid bottom metal cable trays systems with solid metal covers shall be permitted where accessible to enclose other types of cables, conductors, and raceways not specifically permitted to be installed exposed in other spaces used for environmental air (plenums).
Substantiation: As currently accepted, the provisions for cable trays contain no mandatory text. By adding the word "only" in two locations, the permissive language becomes mandatory.
Editorially, there seems to be an extra period at the end of the title in the ROP draft.
Panel Meeting Action: Accept in Part
Accept the deletion of the double period and reject the remainder of the comment.
Panel Statement: Inserting the word "only" would only permit cable trays to support these wiring methods, whereas any of these wiring methods could be supported using the appropriate support methods in the.30 section of each Chapter 3 wiring method permitted in an "other space used for environmental air (plenum)."
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-41 Log #94 NEC-P03 **Final Action: Accept**
(300.22(E) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 3-97
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by adding "Systems" to the title in (2) and to the title in (b).
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: Accept the direction of the NEC Technical Correlating Committee to insert "systems" in the titles in (2) and (a). See the panel action and statement in Comment 3-38.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-42 Log #2385 NEC-P03 **Final Action: Reject**
(Table 300.50, Note 3)

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facility Executives
Comment on Proposal No: 3-103
Recommendation: Accept the proposal as written.
3. In industrial establishments, **or campus style facility complexes within a single, contiguous boundary under a single management**, where the conditions of maintenance and supervision ensure that qualified persons shall service the installation, the minimum cover requirements for other than rigid metal conduit, shall be permitted to be reduced 150 mm (6 in.) for each 50 mm (2 in.) of concrete or equivalent placed entirely within the trench over the underground installation.
Substantiation: The submitter has provided adequate substantiation to at least restore the expanded applicability criterion of Table 300.50 Note 3 back to where it was in the 2002 NEC code cycle when it was permitted as an exception. Somewhere in the mix of things (3-101 Log #7 NEC-P03 of the May 2004 ROP) the tradeoff of depth for concrete covering was dropped. It is hard to follow those arguments, counter-arguments, and unsubstantiated claims of lack of substantiation.
In any case, many APPA institutions have congested underground infrastructure (district heating piping tunnels, electric and telecommunication duct banks, water and sewer piping, etc.) where some flexibility in dimensional requirements ought to be permitted -- as it was before the 2005 NEC. It is common for underground duct construction to reveal unforeseen conditions which can be remedied by restoring Note 3, and expanding it to include the campus style facility arrangements. The exemption works for us because of the quality of the management and the standard of care and training common in high voltage workgroups in US colleges and universities, as the submitter asserts.
For the enlightenment of the panel, the NFPA 101 definition of "Industrial Occupancy" is reproduced as shown below:
3.3.178.8* Industrial Occupancy. An occupancy in which products are manufactured or in which processing, assembling, mixing, packaging, finishing, decorating, or repair operations are conducted.
A fair argument could be made that the word "industrial" is much less appropriate in Note 3 than campus style facility arrangements.
Panel Meeting Action: Reject
Panel Statement: The phrase "campus-style facility complexes" is vague and could be interpreted far beyond the submitter's example without proper technical substantiation. As far as the original proposal is concerned, the term "institutional" is vague and could be interpreted far beyond the submitter's example of a university. As the submitter pointed out, if the AHJ accepts a lesser burial depth for high voltage cables in occupancies other than an industrial location, where public access is usually limited, then the AHJ can use 90.4.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-43 Log #2570 NEC-P03 **Final Action: Reject**
(Table 300.50 Note 3)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc. / Rep. Massachusetts Electrical Code Advisory Committee
Comment on Proposal No: 3-103
Recommendation: The proposal should be accepted.
Substantiation: If the note were written in such a way that the greater public access in and the somewhat less precise definition of institutional settings would make a significant difference, then the panel objection would be justified. However, the entirety of the note makes it clear that there must be qualified maintenance and supervision. Any inspectional authority applying this note is therefore required to make that assessment prior to allowing this use. Remember also, this only allows for medium voltage installations to use somewhat reduced burial depths in exchange for more robust underground concrete protection. No vagrant is going to be able to casually dig up one of these installations.

It is very poor code to send inspectors into 90.4 unless the circumstance is so unique that the NEC does not address the issue. These circumstances are anything but unique. And again, a review of NFPA records does not show a single public proposal to limit this provision over the 36 years that it had been in the NEC without any qualification whatsoever. The action in Massachusetts is not an application of 90.4; it is a formal amendment state-wide to the NEC arrived at through a public regulatory process that avoids any necessity for municipal inspectors to apply 90.4 to these installations.
Panel Meeting Action: Reject
Panel Statement: As far as the original proposal is concerned, the term "institutional" is vague and could be interpreted far beyond the submitter's example of a university. As the submitter pointed out, if the AHJ accepts a lesser burial depth for high voltage cables in occupancies other than an industrial location, where public access is usually limited, then the AHJ can use 90.4.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-44 Log #2140 NEC-P03 **Final Action: Hold**
(300.50(B))

Submitter: Thomas Guida, TJG Services, Inc. / Rep. Champion Fiberglass, Inc.
Comment on Proposal No: 3-106
Recommendation: Accept the Panel Action with the additional revision to 300.5(D)(4) as shown:

300.5(D)(4) Enclosure or Raceway Damage. Where the enclosure or raceway is subject to physical damage, the conductors shall be installed in rigid metal conduit, intermediate metal conduit, RTRC-XW, Schedule 80 PVC conduit, or equivalent.
Substantiation: The revision to 300.5(D)(4) was intended in the text of the original proposal although not specifically mentioned in the proposal as noted in the Panel Statement.
Panel Meeting Action: Hold
Panel Statement: Hold the comment for the 2014 NEC since it is new material that has not had public review.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 310 — CONDUCTORS FOR GENERAL WIRING

6-3 Log #2353 NEC-P06 **Final Action: Accept in Principle**
(310)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 6-8
Recommendation: Please explain the panel action.
Substantiation: The panel action was to accept in principal, yet the panel statement doesn't address what parts of the proposal were accepted and which were not. The statement also refers to other proposals modifying "this section". Which section does the panel refer to?
Panel Meeting Action: Accept in Principle
Panel Statement: The panel agrees that the action on the proposal was to accept in principle to make it clear to NFPA staff and others that this was a non technical reorganization only, and not intended to negate any other acceptance action on other proposals. The word "Section" should have been "Article", meaning Article 310 which was the subject of the reorganization.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-4 Log #2571 NEC-P06 **Final Action: Accept in Principle in Part**
(310)

TCC Action: The Technical Correlating Committee directs that the text be revised as follows to comply with 2.2.2 and 2.4.1 of the NEC Style Manual:
"310.2. Definition.
Electrical Ducts. Electrical conduits, or other raceways round in cross section, that are suitable for use underground or embedded in concrete.
310.10. Uses Permitted. The conductors described in 310.100 shall be permitted for use in any of the wiring methods covered in Chapter 3 and as specified in their respective tables or as permitted elsewhere in this Code."
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-8
Recommendation: Accept the proposal in principle. Make the following changes:

I. In 310.2, the "Electrical Duct" definition, rewrite as a definition without mandatory text as follows: "As used in this Article 310, electrical ducts ~~shall include~~ are any of the electrical conduits recognized in Chapter 3 as suitable for use underground and other raceways round in cross section, if listed for underground use and where embedded in earth or concrete.

II. Revise 310.10 as follows: 310.10. Applications. The conductors described in 310. 100 are recognized for use in any of the wiring methods covered in Chapter 3 and as specified their respective tables or as permitted elsewhere in this Code. (Insert the informational note regarding thermoplastic insulation following this text, as in the proposal.)

Ill. Reconfigure the proposed 310.10(A) through 310.10(D) as 310.12, Location. (Then insert each lettered subsection as in the proposal, so the appearance is comparable the existing 310.8.)

IV. Reconfigure 310.10(E) as 310.14, Shielding.

V. Reconfigure 310.10(F) as 310.16, Direct-Burial Conductors. For correlation, change the 310.14 Exception No. 2 reference [310.10(E) Exception No. 2 in the proposal] to 310.16 Exception No. 2.

VI. Reconfigure 310.10(G) as 310.18, Corrosive Conditions. VII. Reconfigure 310.10(H) as 310.20, Conductors in Parallel. The numbered subdivisions (1) through
(5) revert to their lettered designations in the current Code (A) through (E). Delete 31 0.84(H) from the proposal

VlII. Reconfigure 310.106(C) as 310.22, Stranded Conductors, and 310.106(D) as 310.24, Insulated Conductors. IX. Insert a new "Part Ill, Ampacity Calculation and Allowances for Conductors Rated 0-2000 Volts", at the end of the paralleled conductor section.

X. Insert, as the first section in Part III, the following:
310.40. General. Ampacities for conductors shall be permitted to be determined by tables as provided in 310.50 or under engineering supervision as provided in 310.70. Any ampacity determination shall be subject to the requirements in 310.44.

Informational Note No. 1: Ampacities provided by this part do not take voltage drop into consideration. See 210.19(A), Informational Note No. 4, for branch circuits and 2IS.2(A), Informational Note No. 2, for feeders.

Informational Note No. 2: For allowable Ampacities of Type MTW wire, see Table 13.5.1 in NFPA 79-2007, Electrical Standard/or Industrial Machinery.

Informational Note No. 3: See 110.14(C) for conductor temperature limitations due to termination provisions.

XI. Reconfigure 310.80(8) and its exception as 310.42, Selection of Ampacity.

XII. Reconfigure 310.80(C) and its informational note as 310.44, Temperature Limitation of Conductors.

XIII. Reconfigure 310.82 as 310.50, Tables, modified to read as follows:

310.50. Tables. Ampacities for conductors rated 0 to 2000 volts shall be as specified in the Allowable Ampacity Table 310.116 through Table 310.119, and Ampacity Table 310.120 and 310.121 as modified by 310.52 through 310.60. Revise the Informational Note references to read "Table 310.116 through Table 310.119."

ALTERNATIVE, Part 1: Retain the tables in this location by using the numbering protocol set by CMP 6 through their action on Proposal 6-52, so the tables become numbered "310.50(16)," "310.50(17)," etc.

XIV. Insert a new 310.52 using the text accepted as part of Proposal 6-53, with all appurtenant tables and notes.

XV. Reconfigure 310.84(A) through (C) including the table and all exceptions and informational notes as 310.54(A) through 310.54(C) with the same tables, exceptions and informational notes.

XVI. Reconfigure 310.84(D) as 310.56.

XVII. Reconfigure 310.84(E) with three numbered paragraphs as 310.58 with three lettered paragraphs. Convert the reference from 310.84(A) to 310.54(A) in two places.

XVIII. Reconfigure 310. 84(F) as 310.60. Convert the reference from 310.84(A) to 31 0.54(A).

XIX. Reconfigure 310.84(G) including its table as 310.62, with the internal table reference numbering changed accordingly.

XX. Reconfigure 310.86 as 314.70.

XXI. Insert a new Part IV as follows:

IV. Ampacities of Conductors Rated 2001 to 35,000 Volts

XXII. Insert, as the first section in Part IV, the following:

310.80. General. Ampacities for solid dielectric-insulated conductors rated 2001 to 35,000 volts shall be permitted to be determined by tables as provided in 310.90 or under engineering supervision as provided in 310.96.

Informational Note: See 110.40 for conductor temperature limitations due to termination provisions.

XXIII. Configure 310.60(B)(1) in the current NEC and its exception (part of 310.90 in the rewrite) as 310.82.

XXIV. Reconfigure 310.92 as 310.90, Tables, modified to read as follows:

310.90. Tables. Ampacities for conductors rated 2001 to 35,000 volts shall be as specified in the Ampacity Table 310.167 through Table 310.186, adjusted in accordance with 310.92(A) through (C). Where ambient temperatures differ from those shown in the tables, 310.92(D) shall apply. ALTERNATIVE, Part 2: Retain the tables in this location by using the numbering protocol set by CMP 6 through their action on Proposal 6-123, so the tables become numbered "310.90(67)," "310.90(68)," etc.

XXV. Reconfigure 310.94 as 310.92, changing all internal references accordingly.

XXVI. 310.96, as a coincidence, will remain 310.96 as in the proposal.

XXVII. Renumber Part III as Part V. Re-title and renumber the first section (310.104 in the proposal) as

310.100. Conductor Constructions.

XXVIII. Delete the note on thermoplastic insulation following this section.

XXIX. Renumber the construction tables as 310.100(A) through 310.100(E) For correlation, change the references to these tables in Section 6 from 310.104 to 310.100, and in 310.14 Exception No. 1(c) [310.10(E) Exception No. 1(c) in the proposal, erroneously stated as 310.106(D)] to 310.100(D). Also, renumber the reference in 310.20(E) [310.10(H)(5) in the proposal, erroneously pointing to 310.106 in the proposal] as 310.100. In addition, renumber the references in 310.44 Informational Note from 310.104(A) and 310.104(C) to 310.100(A) and 310.100(C) [in the proposal at 310.80(C) FPN].

XXX. Reconfigure 310.106(A) and (B), and the internal table accordingly, as 31 0.192(A) and (B).

XXXI. Delete 310.106(C) and (D).

XXXII. Reconfigure 310.110 as 310.104. In 310.1 04(C) change the reference to 310.1 06(B)(I).

XXXIII. Reconfigure 310.120 as 310.106. In 310.106(B)(2) Exception No. 3 and No. 4, change the reference to 310.106(A), and in 310.106(B)(4) change the reference to 310.106(A)(4).

XXXIV. Designate the ampacity tables that follow, as their own part, Part VI ("VI. Ampacity Tables").

XXV. Reconfigure Tables 310.82(A) through 310.82(F) as Tables 310.116 through 310.121 respectively.

XXVI. Reconfigure Tables 310.92(A) through 310.92(T) as Tables 310.167 through 310.186 respectively. To correlate, correct the table references in 310.92(A) [310.94(A) in the proposal] from 310.92(C), (D), (O), and (P) to 310.169, 310.170, 310.181, and 310.182 respectively.

ALTERNATIVE, Part 3: Retain the tables in their current relative location. Do not create this part. To correlate, correct the table references in 310.92(A) [310.94(A) in the proposal] from 310.92(C), (D), (O), and (P) to 310.90(69), 310.90(70), 310.90(81), and 310.90(82) respectively.

Substantiation: The fundamental problem with this reorganization is that it attempts to take an article that does not address any particular wiring method and force it into the standardized formats for wiring method articles. The NEC Style Manual does not require this and should not be used as justification for this proposal. The succeeding Articles 312 and 314 are also examples of articles that do not require this type of formatting, and there have never been any serious attempts to force them into the wiring methods straightjacket. Nevertheless, the reorganization is an excellent starting point, particularly in the creation of a construction part of the article. The other major benefit in the proposal is the elimination of excessively long citation strings that drill down to frequently referenced provisions. This submitter will be happy to see "310.15(B)(2)(a)" become a simple section and a lettered paragraph

There are significant problems, however, such as an excessively long and difficult "Uses Permitted" section, even though what follows are application rules and not permitted uses, no "Uses Not Permitted" section, a number gap from 10 to 80. In the proposal, this was presumably selected only because 80 is the usual wiring method ampacity section, and an article dealing with conductors has no need to cover supports and all the other provisions that wiring methods articles must address. The most important concern, however, is moving the ampacity tables in such a way that their location will be unfamiliar to all existing users. They have been in their current position since they moved out of Chapter 9 in the 1959 NEC. CMP 6 did a good job of protecting this concept in its actions outside this proposal on Proposals 6-52 and 6-123. This proposal presents two alternatives for the panel to consider, one that incorporates those actions and leaves the Tables in the same relative position and the other that creates a separate end part of the article similar to the table part (XIV) in Article 430. In both cases the use of creative numbering preserves user familiarity based on a half century of consistent usage.

This comment builds on the proposal in a constructive effort to overcome these deficiencies, and other actual NEC Style Manual deficiencies, as follows:

I. This change looks more like a definition instead of a group of rules. The listing specification could be relocated into a listing section within Part I if necessary. Note that if done, it should occupy Section 6 and so the proposal Section 6 would become a different number.

II. The revised title is based on the relevant part of the existing 310.13 title. "Uses Permitted" is appropriate for a wiring method article but not for this one. Section 310.100 is the new home [310.104 in the proposal] of this material.

III through VII. Since this material becomes full sections, titles are required. The deletion of 310.84(H) in the proposal is necessary because it erroneously duplicates the provisions of 310.20(D) here [in the proposal as 310.10(H)(4)].

VIII. This material involves field application provisions as well as construction provisions, and it seemed more user friendly to locate it with other field application rules. The title of the insulated conductor rule was modified to make sense in a stand-alone section instead of how it now appears in the NEC.

IX. Dividing this article into additional parts helps keep pertinent concepts well organized; this is the first example of an additional part.

X, XI, and XII. This is essentially 310.80(A) through (C) of the proposal. These topics are correctly ordered in the proposal because they are general ampacity rules that apply whether tables or Neher-McGrath calculations are used. The informational note on terminations is grouped with the others because it is not related to the ampacity transition rule.

XIII. The table numbering uses numbers that will be very friendly to the existing user base. Table 310.16 becomes Table 310.116, for example, and all other ampacity tables follow the same procedure.

XIV. This preserves the organizational sequence that follows from Proposal 6-53.

XV through XIX. These are the adjustment rules, formatted as full sections to avoid long citation strings. One of the strengths of the original proposal was to open the article up to this possibility, and these renumberings take the concept slightly further. Remember when we could cite the mutual conductor heating rule as "Note 8"? Now it would simply be 310.54(A) as opposed to the current 310.15(8)(2)(a).

XX. This is the Neher-Mcgrath rule, set off using the decade numbering principle.

XXI. This begins the medium-voltage provisions, set off as a separate part for organizational simplicity.

XXII. This the counterpart to Section 40 for 600 volts and below. The termination note is relocated to here because it is unrelated to the transition rule.

XXIII. The weak link and transition exception provisions now have their own section.

XXIV. This is 310.92 in the proposal with some editorial modification to avoid a virtual complete restatement of 310.92(0) [310.94(D) in the proposal] within a section that is only supposed to be pointing at the referenced provision. The cross reference in the informational note is coincidentally correct.

XXV. Simple renumbering to leave space from the Neher-McGrath calculation formula.

XXVI. As in the proposal.

XXVII. This is the construction part. Unlike the proposal, the first part of this (and other) parts in this comment begins with a decade number, as required in 2.4.2.1 of the NEC Style Manual.

XXVIII. This note has been retained in 310.10; it was duplicated here in the proposal.

XXIX. These tables contain extensive text and it seemed wise to follow the lead of the proposal and keep them with their implementation rules. However, there is room in Part VI (presumably as Tables 110 through 114 or as Tables 190 through 194; the part would need to be re-titled from "Ampacity Tables" to "Tables" if this happens) if CMP 6 wants to keep all tables in that part.

XXX and XXXI. This is 310.106 in the proposal; subsections (A) and (B) are retained and (C) is relocated to Part II, as noted earlier.

XXXII and XXXIII. These are the final section numbers, in logical order.

XXXIV, XXXV and XXXVI. The tables get their own part. This is an appropriate strategy where a number of tables end up by necessity occupying a block of code space. A good example of this principle at work in the current NEC is Part XIV of Article 430. The tables, as noted, are numbered to retain continuity of recognition for present code users.

Note: If the Alternative approach (parts 1, 2, and 3 as set forth in the action text of this comment) is followed by CMP 6, then these actions become moot, and the highest section number in Article 310 will be 310.106 in Part V of the article.

Panel Meeting Action: Accept in Principle in Part

The actions that follow apply to the 2011 ROP draft renumbering. Accept the proposal in principle in part. Revise the text as follows:

310.2. Electrical Ducts. As used in this Article 310, electrical ducts shall include are any of the electrical conduits recognized in Chapter 3 as suitable for use underground, and other raceways round in cross section, if listed for underground use and where embedded in earth or concrete.

310.10. Uses permitted Applications. The conductors described in 310. 100104 are recognized shall be permitted for use in any of the wiring methods covered in Chapter 3 and as specified in their respective tables or as permitted elsewhere in this Code. (Insert the informational note regarding thermoplastic insulation following this text, as in the proposal.)

The remaining portions of the comment, Parts III through XIII and the alternatives submitted are rejected.

Panel Statement: The panel accepts in principle Part I and Part II of the recommendations as revised text in the action. The panel agrees that the change of the definition from mandatory language is appropriate. The panel accepted the term "includes" vs. the proposed "are" and editorially adjusted the remaining text so as to not change the meaning of the definition, as publicly commented upon. In Part II, the panel understands that the conductors are described in Section 310.104. The panel accepted the heading change from "Uses Permitted" to "Applications" and agreed with the substantiation to do so. Finally, the panel changed the words "are recognized" to "shall be permitted".

The remaining portions of the comment, Parts III through XIII and the alternatives submitted were rejected because the panel agreed that the flow of the article was being sacrificed with no apparent gain.

The argument to readjust the numbering of the tables to be closer to the previous tables was not accepted, however a similar Comment 6-21 was accepted in principle and the submitter is referred to that action for further explanation.

Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-5 Log #1676 NEC-P06 **Final Action: Reject**
(310.3)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 6-13
Recommendation: Accept the proposal with the following revisions:

Where connected to equipment where conditions require flexibility of the wiring method after installation, circuit conductors and grounding and bonding conductors shall be a stranded type for that portion of the wiring method and installed in a manner to prevent strain on the terminations.

Substantiation: Where flexing is required after installation, conductors should be stranded and installed to prevent strain on terminations.
Panel Meeting Action: Reject
Panel Statement: The decision to use stranded conductors where flexibility of the wiring method is needed is a design issue. The Submitter has not identified recommended revisions to the original proposal. The comment does not clarify existing text or substantiate that there is a problem that needs to be addressed and contains unenforceable language. Additionally, the submitter has not provided technical data to substantiate that stranded conductors are required.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-6 Log #2572 NEC-P06 **Final Action: Accept**
(310.4(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-20
Recommendation: Accept the panel actions on this proposal in part. Do not change "Where" to "When" at the section beginning.
Substantiation: The panel was correct in rejecting the use of the word "if". The word "if" is a generic conjunction that in usual code applications means "in the event that." In this sense, virtually any usage of "where" can be replaced by "if", as is equally the case of "when". The reason that these other words, particularly "where" have been generally applied throughout the NEC is that they more precisely define the event. The word "where" has been (and continues to be) used because it is limited to being a condition of place, and "when" has been (and continues to be) used in instances describing a condition of time.

The NEC is an installation document, and most of its provisions provide direction regarding installation practice in concrete locations, that being the nature of the trade. The subject of this proposal leads off with "Where an ac system operating at less than 1000 volts …" Although it is not grammatically incorrect to begin the sentence with "if", the word "where" is preferred because this rule describes a condition of place. Over the past decade, the word "where" has become the usual term for such usage throughout the NEC.

In this instance, "where" is the appropriate word, because what is described is indeed a condition of place and not time.
Panel Meeting Action: Accept
Panel Statement:
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-7 Log #95 NEC-P06 **Final Action: Accept**
(310.6)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-21b
Recommendation: The Technical Correlating Committee directs that the action on this proposal be rewritten to comply with 3.1.3 of the NEC Style Manual related to Fine Print Notes.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise the first sentence as follows: "…to replace existing nonshielded conductors on existing equipment in industrial establishments…"

Delete the first sentence in the FPN. Revise the text in the second sentence from "may not meet" to "may not comply with".
Panel Statement: The phrase "on existing equipment" was relocated from the FPN to positive text in the first sentence.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:

ZIMNOCH, J.: Cables rated above 2400 v are unsafe. The problem lies in the voltage present on the insulations surface, especially at the terminations.
Comment on Affirmative:

WALL, C.: I commend the panel for realizing the need for and permitting the use of non-shielded cables up to 5000 volts on existing equipment in industrial establishments.

6-8 Log #1389 NEC-P06 **Final Action: Reject**
(310.6)

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 6-24
Recommendation: Please reconsider this proposal and accept it.
Substantiation: The current NEMA – MG-1 Motor Standard does not provide adequate space in medium voltage motor terminal enclosures to install terminations on shielded medium voltage cables and maintain minimum cable bending radius required by 300.34.

The negative ballots have also implied that non-shielded cables installed in metal raceways are unsafe. Non-shielded cables in metal raceways are safe; it is unsafe work practices that put personnel at risk.
Panel Meeting Action: Reject
Panel Statement: The referenced proposal was accepted in part during the 2011 ROP. The panel does not agree with the use of non-shielded conductors within metal raceways. The inconsistencies of conductors in conduit installations do not assure a lack of insulation damage and do not assure a concentric lay orientation of the cables. The panel has accepted the use of non-shielded cables for existing installations. Product standards can be changed to provide adequate space in medium voltage motor terminal enclosures.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:

THOMPSON, J.: UL is unaware of specific problems associated with the qualified use of 5KV cable. If data indicates otherwise, this data should be made available for review. 5KV was Listed in the past and is now Recognized (QACA2) and remains as a UL certified product. The proper supervision and installation by qualified persons is a requirement for all wiring.

WALL, C.: I commend the panel for permitting the use of non-shielded cables up to 5000 volts on existing equipment and permitting the use of non-shielded metal clad cables up to 5000 volts; however, there is still a need to allow the use of other non-shielded cables on new installations up to 5000 volts because NEMA has not revised the MG-1 standard to require larger terminal boxes on motors that will accommodate the longer terminations and allow installing the shielded cables without bending to a lesser radius than permitted by 300.34. Bending the cables to a smaller radius than stated in 300.34 will cause separation of the insulation shield and early failure of the cable.

ZIMNOCH, J.: See My Explanation of Negative on 6-7.

6-9 Log #1790 NEC-P06 **Final Action: Accept in Principle**
(310.6)

TCC Action: The Technical Correlating Committee directs that the text be revised to read as follows to comply with the NEC Style Manual:
"Non-shielded, ozone-resistant insulated conductors with a maximum phase-to-phase voltage of 5000 volts shall be permitted in Type MC cables...".
Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 6-24
Recommendation: Accept the proposal as accepted by the panel, and add the words or armor at the end of the sentence after the word "sheath".
Substantiation: Armored cable is what is being allowed by this proposal, so the final wording should include the word "armor" as allowed cable types.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
Non-shielded, ozone-resistant insulated conductors with a maximum phase-to-phase voltage of 5000 volts shall be permitted in Type MC metal clad cables in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation. For other establishments, solid dielectric insulated conductors operated above 2000 volts in permanent installations shall have ozone-resistant insulation and shall be shielded.
Panel Statement: The panel chose the term "metal clad cable" as defined in the code in Section 330.2 and revised the text.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
FRIEDMAN, S.: The panel has changed its position on use of armored non-shielded 5 kV cable without any additional information establishing why the panel position should be changed. The panel for two code cycles has agreed that 5 kV non-shielded armored or not armored cable is not safe and has now decided to change. Although conditions of installation was included, NEMA does not agree to modify position without better substantiation for doing so.
KENT, G.: For existing installations, the panel has addressed the original submitter's concerns. In new installations, the use of shielded cable should remain a requirement over 2.4KV for safer installations.
ZIMNOCH, J.: See My Explanation of Negative on 6-7.
Comment on Affirmative:
CLINE, S.: I believe that the technical information presented at the meeting stated that the construction of metal-clad cables reduced risk in two ways: 1) That the consistently symmetric concentric lay of the cables yielded a significantly balanced electrical field, and 2) that the metallic cladding then acted to protect against remaining hazards of normal operation or of damage to the cable. The reduction in risk was not perceived as perfect, and so the limitation to especially qualified installations was required as a balance.
HUNTER, R.: No evidence was produced to show that cables installed in metallic raceways is an unsafe condition. It appears to be an assumption by the panel.
WALL, C.: I commend the panel for recognizing the importance of permitting the use of non-shielded metal clad cables up to 5000 volts in qualified industrial establishments.

6-10 Log #2573 NEC-P06 **Final Action: Accept in Principle in Part**
(310.6)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-21b
Recommendation: I. Accept the proposal in principle. Revise item "(a)" to read "(a) The conditions of maintenance and supervision shall ensure …"
II. Convert the informational note to mandatory text, as follows: "(e) The equipment to which the existing nonshielded cable is connected shall not be relocated or replaced."
Substantiation: The first change makes the wording parallel with the other conditions, as required by 3.3.5 in the NEC Style Manual. The second change responds to the TCC note by making the note an actual rule, as apparently intended.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel rejects the recommendation in Part I of the comment. The removal of the word "where" is not needed and does not add clarity to the requirement.
The panel accepts the concept of changing part of the FPN to mandatory text, see action on Comment 6-7. In Part II of the recommendation leaving the second sentence as an Informational Note (FPN) allows the user and the AHJ to make a judgment regarding relocation.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:
ZIMNOCH, J.: See My Explanation of Negative on 6-7.

6-11 Log #448 NEC-P06 **Final Action: Reject**
(310.7 Exception No. 1)

TCC Actions: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 6-28
Recommendation: Add text to read as follows:
Continue to Accept in Principle the Proposal but list the text the Panel revised for Section 310.6 in Proposal 6-24. This text is included here for reference.
Non-shielded, ozone-resistant insulated conductors with a maximum phase-to-phase voltage of 5000 volts shall be permitted in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation and the cables have an overall metallic sheath. For other establishments, solid dielectric insulated conductors operated above 2000 volts in permanent installations shall have ozone-resistant insulation and shall be shielded.
Substantiation: The Proposal was Accepted In Principle but the text required was referred to Proposal 6-24. Proposal 6-24 was recorded as Reject by the TCC for failing to meet the required 2/3 affirmative vote required. The result is that although Proposal 6-28 passed by a 9-2 vote, the text was not included because the referenced Proposal (6-24) did not pass. This Comment is intended to allow the Panel to revisit both actions.
Panel Meeting Action: Accept in Principle
In Section 310.7 delete "Cables rated above 2000 volts shall be shielded".
Panel Statement: The basic rules of shielding are covered in Section 310.6. This action eliminates the conflict between 310.6 and 310.7.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 7 Negative: 4
Explanation of Negative:
CLINE, S.: All references are to the 2008 Code numbering:
I believe that Tim Wall has brought up important and valid points, although I might suggest detail differences. However, I do not believe that the rules would allow the changes to be made at this point. The Comment 6-11 deletion of the phrase should not cause an application problem since 310.6 also applies to direct-burial situations, however, I do believe that the deletion may be a style manual violation.
Perhaps the TCC can "Hold" this Comment due to the style manual violation. To not muddy the water, perhaps we should "Hold" this Comment ourselves, and not delete the phrase this cycle, then simplify the text, without changing the requirements, next cycle.
The 310.7 Exceptions apply to the shielding requirement which would only be in 310.6, but the Exceptions only apply to direct-burial situations.
I would: Add the words "For direct-burial installations " at the beginning of Exception #2, and move it to 310.6 to replace the current Exception #2.
310.7 Exception #1 presents more problems due to it currently only applying to 2001-2400 volts. While it belongs in 310.6, its placement and wording will be critical to not change installation requirements without substantiation.
The grounding paragraph could be deleted as it is covered in 310.6.
FRIEDMAN, S.: The panel should have voted to reject. The panel has changed its position on use of armored non-shielded 5 kV cable without any additional information establishing why the panel position should be changed. The panel for two code cycles has agreed that 5 kV non-shielded armored or not armored cable is not safe and has now decided to change. Although conditions of installation was included, NEMA does not agree to modify position without better substantiation for doing so. In addition, the sentence "Cables rated above 2000 volts shall be shielded" should not have been removed from section 310.7 because both exceptions in this section refer to that sentence.
KENT, G.: The text deletions proposed by the panel would create substantial conflict with 310.6 due to exceptions in 310.7. This comment should be held over for discussion and balloting in the next cycle.
ZIMNOCH, J.: See My Explanation of Negative on 6-7.
Comment on Affirmative:
WALL, C.: I agree with the resultant panel action; however, the exceptions 1 and 2 that remain are exceptions to the phrase deleted by the panel action. Since Article 310.6 addresses shielding requirements, I recommend that Exceptions 1 and 2 be moved to 310.6. Also, the paragraph between the two exceptions, requiring that the metallic shield be grounded, is a duplication of this requirement in 310.6 and should be deleted.

6-12 Log #2347 NEC-P06 **Final Action: Reject**
(310.10)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 6-8
Recommendation: Revise text to read as follows:
310.10 Uses Permitted. Only ~~T~~these conductors shall be permitted for use in any of the wiring methods recognized in Chapter 3 and as specified in their respective tables or as permitted elsewhere in this *Code*.
Informational Note: Unchanged.
Substantiation: By adding the word "only" this section becomes mandatory text, as opposed to the permissive text that the accepted text provides.
Panel Meeting Action: Reject
Panel Statement: The panel understands that the submitter's reference to 310.10 is from the ROP draft. The addition of the word "only" is too restrictive. Multiconductor cables containing conductors other than those included in Article 310 may be listed by a testing laboratory if they comply with the appropriate product standard.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:
ZIMNOCH, J.: See My Explanation of Negative on 6-7.

6-13 Log #1791 NEC-P06 **Final Action: Accept**
(310.11(B)(2), FPN)

TCC Action: The Technical Correlating Committee directs that the final text in this section be revised to change the words "lead shielded" to the words "lead sheathed".
Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 6-35
Recommendation: Reject proposal and leave wording as is with and lead shielded cable as part of the text.
Substantiation: As pointed out in the proposals by Mr. Laidler and Mr. Zimnoch, lead-shielded cable is still used by some industrial customers and thus needs to be included in the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
CLINE, S.: For editorial confirmation: The term "-shielded" is incorrect, it should be "-sheathed" as it is now. The intent of the Panel is (as stated by the Submitter: "...leave wording as is...") to leave the wording as it is in the 2008 Code.
My thanks to Mr. Robert Huddleston for noting my error as Chair.
HUDDLESTON, JR., R.: There is incorrect wording on the comment - should read "lead sheathed cable" instead of "lead shielded cable" as the original proposal stated (Proposal 6-35). Correction needs to be made to ensure that "lead sheathed cable" is the wording used.

6-14 Log #740 NEC-P06 **Final Action: Accept**
(310.13)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 6-37
Recommendation: Continue to Accept the Proposal.
Substantiation: The Panel Action to Accept the Proposal is correct since Panel 5 Accepted Proposal 5-285 to relocate the text to 250.122(A).
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-15 Log #1286 NEC-P06 **Final Action: Reject**
(310.X)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 3-17
Recommendation: Recommendation: This proposal should be accepted in principal and placed in the appropriate position in Article 310.
Add new paragraph as follows:
310.XX Fire-Rated Cable and Conductors. Fire-rated cable and conductors used for survivability of critical circuits to ensure continued operation during a specified time under fire conditions shall be listed as part of an electrical circuit protective system. The installation of the electrical circuit protective system shall comply with any restrictions provided in the listing. Cables and conductors shall also be listed for use in accordance with the wiring methods described in this code.
FPN No. 1: One method of defining the fire rating of electrical circuit protective systems is by testing the system in accordance with UL 2196-2006, *Standard for Tests of Fire Resistive Cables*.
FPN No. 2: UL guide information for electrical circuit protective systems (FHIT) contains information on proper installation requirements to maintain the fire rating.
Marking. In addition to the marking required in 310.11, cable and conductors shall be surface marked with the suffix –CIR (Circuit Integrity Rating), along with the circuit integrity duration in hours and system identifier.
Substantiation: There has been confusion between fire-rated and non-fire-rated conductors and cables used for general wiring. As an example, a specially constructed Type RHW conductor may be fire-rated as part of an electrical circuit protective system. The proposed standardized marking would distinguish these specially insulated conductors from those that meet only the standard requirements. There are particular installation requirements defined by the listing organization in order to maintain a fire rating. The need to comply with these requirements is not identified in the current code.
Panel Meeting Action: Reject
Panel Statement: The panel agrees that adding a new section in Article 310 dealing with Fire rated cables and conductors is not appropriate. Article 310 deals with conductors and cables for general wiring and not conductors and cables for special applications. Type RHW conductors are already included in Table 310.104(A) when used for general wiring. Special characteristics of the conductor or cable can be addressed as an optional marking on the conductor as permitted in 310.120(D).
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-15a Log #CC601 NEC-P06 **Final Action: Accept**
(Table 310.13(D))

Submitter: Code-Making Panel 6,
Comment on Proposal No: 6-44
Recommendation: Revise the action on Proposal 6-44 as follows:
1) Reject the submitter's recommended table.
2) Revise Table 310.13(D) in the 2008 NEC per the panel meeting action on Proposal 6-44.
Substantiation: The panel rejects the new table in Proposal 6-44 and notes that item (2) in the panel meeting action should have been made to Table 310.13(D) in the 2008 NEC. The table values from the 2002 NEC in the recommendation of Proposal 6-44 are incorrect.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-16 Log #2854 NEC-P06 **Final Action: Reject**
(Table 310.13(E))

Submitter: Paul Guidry, Fluor Enterprises, Inc
Comment on Proposal No: 6-45
Recommendation: Add 133% and 173% insulation levels to Table 310.13(E) for the 2001-5000V category to read:
Substantiation: 133% and 173% insulation levels are valid insulation levels for 2001-5000V and need to be included.
Panel Meeting Action: Reject
Panel Statement: The panel has not received the information required to complete the table.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-17 Log #96 NEC-P06 **Final Action: Accept**
(310.15(A)(2))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-46
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal and on Proposal 6-47 to comply with 3.1.4 of the NEC Style Manual.
See the Technical Correlating Committee action on Proposal 6-47.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel agrees that an exception is appropriate. The panel agrees that they should have removed the last sentence of the panel statement on Proposal 6-47. The panel reaffirms the action on Proposal 6-47; there is no connection to Proposal 6-46. The ROP draft is correct.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-18 Log #97 NEC-P06 **Final Action: Accept**
(310.15(A)(2))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-47
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 6-46.
See the Technical Correlating Committee action on Proposal 6-46.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel agrees that an exception is appropriate. The panel agrees that they should have removed the last sentence of the panel statement on Proposal 6-47. The panel reaffirms the action on Proposal 6-47; there is no connection to Proposal 6-46. The ROP draft is correct.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-19 Log #2574 NEC-P06 **Final Action: Accept**
(310.15(A)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-46
Recommendation: Continue to reject the proposal.
Substantiation: The existing format of this particular provision is correct. The exception describes a comparatively unusual condition that varies from the usual design-to-the-weakest-link-in-the-chain principle. It is clear and there is no evidence of field confusion.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-20 Log #1047 NEC-P06 **Final Action: Reject**
(310.15(A)(2) Exception)

Submitter: Gregory P. Bierals, Samaritan's Purse World Medical Mission
Comment on Proposal No: 6-49
Recommendation: Accept this proposal to revise the exception to read as follows: Where different ampacities apply to adjacent portions of a circuit the higher ampacity shall be permitted to be used beyond the point of transition. A distance equal to 3.0 m (10 ft) or 10 percent of the circuit length figured at the higher ampacity, whichever is left.
Substantiation: The reference to the word "two", as is presently used, is irrelevant and unnecessary. The mere fact that there are differing ampacities is sufficient, without specifying their number.
Panel Meeting Action: Reject
Panel Statement: The panel agrees that the text is clear as written and does not accept the deletion of the word "two".
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-21 Log #2352 NEC-P06 **Final Action: Accept in Principle**
(310.15(B) and Table 310.16 through Table 310.21)

TCC Action: The Technical Correlating Committee notes the request of Code-Making Panel 6 to provide an article cross-reference.
In Addition, the Technical Correlating Committee notes that NEC Handbook material is outside the scope of Code-Making Panel 6.
Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 6-52
Recommendation: Reject this proposal in its entirety.
Substantiation: The changes proposed in 6-52 do not add any value whatsoever to the Code.
While I applaud the efforts of the submitter and the panel, and feel the manual of style should typically be followed, I believe this to be an exception. Please consider the pros and cons of this change.
The pros:
It meets the style manual.
The cons:
Everyone has to relearn the table numbers, including the most commonly used table in the Code (310.16).
Manufacturers have to revise their labels, at their own expense (or that of the customer), in order to be accurate.
Code users have to familiarize themselves with the new numbering system.
Confusion will ensue between Code users that are used to the numbering system and those who are not.
Writers must revise their work to address the change.
Other sections of the Code have to be correlated.
This change seems to be "change for the sake of change", considering that it addresses no real safety concern.
Panel Meeting Action: Accept in Principle
The panel accepts the comment in principle and includes a parenthetical reference to the former table number adjacent to the new table number in the Table title for a 2 cycle period to assist in locating the new table. Such an example would be:
"Table 310.15(B)(16) (formerly Table 310.16)."
The panel further recommends to staff that a complete article cross reference between the old section numbers and the new section numbers be included in the Annex of both the handbook and the NEC 2011.
Panel Statement: The panel confirms that the reorganization is in the best interest of the article and remains consistent with NEC style manual recommendations.
While the panel agrees that there is a substantial transition period necessary as a result of the extensive rewrite, the panel has included a parenthetical reference to the former table number, adjacent to the new table number in the Table title, for a proposed 2 cycle period to assist in locating the new table. Such an example would be:
"Table 310.15(B)(16) (formerly Table 310.16)." This action will allow the user to readily confirm they are using the correct table and will assist in the transition.
The panel further recommends to staff that a complete article cross reference between the old section numbers and the new section numbers be included in the Annex of both the handbook and the NEC 2011 to assist users in finding the corresponding sections in Article 310.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:
ZIMNOCH, J.: Changing the references to these tables would cause much confusion in the field.

6-22 Log #2348 NEC-P06 **Final Action: Accept**
(310.15(B)(2)(1))

TCC Action: In accordance with 4.3.4 of the NFPA Regulations Governing Committee Projects, the Technical Correlating Committee notes that proposals cannot be withdrawn after the proposal closing date.
The Technical Correlating Committee notes that Proposal 6-59 remains "Rejected".
Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 6-59
Recommendation: Please withdraw my Proposal.
Substantiation: The panel statement on proposal 6-59 is correct.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-23 Log #98 NEC-P06 **Final Action: Accept**
(310.15(B)(2)(a))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-59
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered by the panel relative to the actions taken on Proposals 8-155, 8-194, and 8-204.
The Technical Correlating Committee directs the Chairs of Code-Making Panels 6 and 8 form a Task Group to correlate Proposals 6-59, 8-155, 8-194 and 8-204, and submit comments, if deemed appropriate.
This action will considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 6-22. Comment 6-22 was received from the submitter of the proposal and requested the withdrawal of his proposal. The panel's action to accept Comment 6-22 resolves this issue.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-24 Log #471 NEC-P06 **Final Action: Accept in Part**
(Table 310.15(B)(2)(a))

Submitter: Steven R. Terry, Electronic Theatre Controls Inc.
Comment on Proposal No: 6-57
Recommendation: 1. Revise Table Heading Column 1 of the proposal to: Number of Current-Carrying Conductors (See Note 1).
2. Continue to add Note below the table as per the proposal.
Substantiation: Whether or not the change of this table heading in 1993 from "Number of Conductors" to "Number of Current-Carrying Conductors" was accompanied by an associated Proposal or Panel Action does not alter the fact that the change made the table clearer! CMP 6 did us a favor in 1993 with this editorial change! Previous to this change, there was always confusion between the number of physical conductors, and those conductors that are to be used in this Ampacity Adjustment Factor calculation. This proposal further improves the situation by the addition of Note 1 to remind the reader how to arrive at

the number of current carrying conductors. However, the revision of the table heading is obfuscating and confusing, because it conflicts with the section title and requires the reader to follow Note 1 to determine that this particular "Number of Conductors" is not simply that, but rather a "special definition" arrived at by applying the recommendation of Note 1, not what the heading actually says.

This is very confusing, and the Code would be much better with the original column heading, but with the parenthetical reference to the new note.

Note: I have made an accompanying comment to Proposal 6-199 for Table B.310.11.

Panel Meeting Action: Accept in Part

The panel rejects part 1. With the mandatory note below the table, it is clear that all conductors, except in accordance with 310.15(B)(4) and (5), are to be included. The panel accepts Part 2 of the submitters comment.

Panel Statement: The panel supports removing the words "Current -Carrying" from the first Column Heading and adding the note at the bottom of the table which reads: "Number of Conductors is the total number of conductors in the raceway or cable adjusted in accordance with 310.15(B)(4) and (5)" does add clarity to this section. The previous Column Heading that contained the words "Current-Carrying" often caused confusion because grounded conductors and grounding and bonding conductors sometimes do carry current. The new note at the bottom of the table makes it clear that the user takes the total number of conductors in the cable or raceway and subtracts the neutral conductors not required to be counted under 310.15(B)(4) and the grounding or bonding conductors not required to be counted under 310.15(B)(5).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-25 Log #2349 NEC-P06 **Final Action: Reject**

(Table 310.15(B)(2)(a))

Submitter: Mike Holt, Mike Holt Enterprises

Comment on Proposal No: 6-57

Recommendation: This proposal should be rejected altogether.

Substantiation: This proposed change does not solve any real problem. There is no history of widespread misunderstanding of this rule, so there should be no reason to change it. Furthermore, the number of conductors in the raceway is not the issue addressed by this subsection. The issue is the number of *current-carrying conductors*. Previous editions of the Code have addressed this quite clearly, so there is no reason to change it. Furthermore, the fact that the informational note is a necessary part of this proposal only proves that the change makes the Code *less clear,* not *more* clear.

Panel Meeting Action: Reject

Panel Statement: This is a change that will benefit the usability of the Code in the long term. See the panel action and statement on Comment 6-24.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-26 Log #2575 NEC-P06 **Final Action: Accept**

(310.15(B)(2)(a))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 6-59

Recommendation: Continue to reject the proposal.

Substantiation: The proposal is unnecessary and creates a direct conflict with 725.51(B), which adequately addresses the same topic in a more comprehensive and technically appropriate manner. The CMP 8 locations referenced in the substantiation differ, as appropriate based on the differing wiring methods involved, from the one-size-fits-all approach in this proposal. Companion comments are being drafted by this submitter to oppose the changes in the raceway articles.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-27 Log #2809 NEC-P06 **Final Action: Accept**

(310.15(B)(2)(a))

Submitter: Carl Timothy Wall, Alabama Power Company

Comment on Proposal No: 6-60

Recommendation: Revise text to read as follows:

(2) Adjustment Factors.

(a) More than Three Current-Carrying Conductors in a Raceway or *Cable*. Where the number of current-carrying conductors in a raceway or cable exceeds three, or where single conductors or multiconductor cables are installed without maintaining spacing for a continuous length longer than 600 mm (24 in.) and are not installed in raceways, the allowable ampacity of each conductor shall be reduced as shown in Table 310.15(B)(2)(a). Each current carrying conductor of a paralleled set of conductors shall be counted as a current-carrying conductor.

~~Exception No. 1:~~ Where conductors of different systems, as provided in 300.3, are installed in a common raceway or cable, the ~~derating~~ adjustment factors shown in Table 310.15(B)(2)(a) shall apply only to the number of power and lighting conductors (Articles 210, 215, 220, and 230).

Table 310.15(B)(2)(a) is unchanged

FPN No. 1: See Annex B, Table B.310.11, for adjustment factors for more than three current-carrying conductors in a raceway or cable with load diversity.

FPN No. 2: See 366.23(A) for adjustment factors for conductors in sheet metal auxiliary gutters and 376.22(B) for adjustment factors for conductors in metal wireways.

~~Exception No. 2:~~ (1) Where ~~For~~ conductors are installed in cable trays, the provisions of 392.11 shall apply.

~~Exception No. 3:~~ (2) ~~Derating~~ Adjustment factors shall not apply to conductors in ~~nipples~~ raceways having a length not exceeding 600 mm (24 in.).

~~Exception No. 4:~~ (3) ~~Derating~~ Adjustment factors shall not apply to underground conductors entering or leaving an outdoor trench if those conductors have physical protection in the form of rigid metal conduit, intermediate metal conduit, or rigid nonmetallic conduit having a length not exceeding 3.05 m (10 ft) and if the number of conductors does not exceed four.

~~Exception No. 5:~~ (4) Adjustment factors shall not apply to Type AC cable or to Type MC cable ~~without an overall outer jacket~~ under the following conditions:

(a) The cables do not have an overall outer jacket.

~~(1)~~ (b) Each cable has not more than three current-carrying conductors.

~~(2)~~ (c) The conductors are 12 AWG copper.

~~(3)~~(d) Not more than 20 current-carrying conductors are bundled, stacked, or supported on "bridle rings."

~~A 60 percent adjustment factor shall be applied where the current carrying conductors in these cables that are stacked or bundled longer than 600 mm (24 in.) without maintaining spacing exceeds 20.~~

(5) An adjustment factor of 60 percent shall be applied to Type AC cable or Type MC cable under the following conditions:

(a) The cables do not have an overall outer jacket.

(b) The number of current carrying conductors exceeds 20.

(c) The cables are stacked or bundled longer that 600 mm (24 in) without spacing being maintained.

Substantiation: The inclusion of the sentence **"The following adjustments shall be permitted for the conductors and installation methods listed in (1) through (4):"** followed by four items that are either **"shall apply"** or **"shall not apply"** is confusing. Additionally, the fourth item, previously exception 4, is also confusing because it is not clear that the last part of this exception is not clearly identified as part of new item 4 and would be better separated and reworded as a new item 5. For consistency, it would be better to itemize the requirements for this new item 5.

This recommendation is not intended to change any of the present requirements but only to more clearly state the present requirements. Additionally, for clarity, the word changes made in proposal 6-62 and 6-63 are included in this recommendation.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-28 Log #99 NEC-P06 **Final Action: Accept**

(Table 310.15(B)(2)(c))

TCC Action: The Technical Correlating Committee directs that the title of Table 310.15(B)(3)(c) be changed to correlate with the action taken on Proposal 6-66 and this comment.

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 6-68

Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered relative to the use of the terms "conduit" and "raceway" and correlated with the action taken on Proposal 6-66.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel's action on Proposal 6-68 should have been to accept in principle in part. While the panel did replace "conduits" with "circular raceways", the use of "raceway" alone would include types which were not part of the submitted technical substantiation.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-29 Log #100 NEC-P06 **Final Action: Accept**
(310.15(B)(2)(c))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-69
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered relative to the use of the terms "conduit" and "raceway" and correlated with the action taken on Proposal 6-66.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel's action on Proposal 6-69 should have been to accept in principle in part. While the panel did replace "conduits" with "circular raceways", the use of "raceway" alone would include types which were not part of the submitted technical substantiation.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-30 Log #491 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 6-67
Recommendation: The panel should reconsider the negative voting and accept the proposal.
Substantiation: All substantiation for accepting the Table and text was performed by the proponent of this proposal.

The panel accepted the testing presented by Copper Development Association (CDA) performed by Mr. Lindsey at his home in Las Vegas, NV. Adding "cables" completes the concerns that were found in the testing. As stated in Proposal 6-67 the tests were performed on four products; PVC schedule 40 conduit, Rigid metal conduit, Electrical Metallic tubing and Type MC Cable. All of these exhibited similar temperature rise.

While the testing was done on only four products, it is apparent that the heat rise results would be similar in all types of conduit, tubing and cable types which can be located outside on rooftops in accordance with the NEC. Testing each type and size individually is neither necessary nor needed. The effects of the radiant heat from the sun coupled with the heat generated in the conductor from current flow is essentially the same regardless of the enclosure type.

If the committee continues to reject ROP 6-67, then they should delete the entire requirement from the code.
Panel Meeting Action: Reject
Panel Statement: The panel rejects use of the term "conduit" alone using "circular raceways" instead. The panel rejects the addition of cables due to insufficient data to support the change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 9 Negative: 1 Abstain: 1
Explanation of Negative:

ZIMNOCH, J.: Sufficient data was presented for metal-clad, Type MC cables, just as when data was presented for the conduits.
Explanation of Abstention:

PICARD, P.: The Aluminum Association could not reach consensus on this issue.
Comment on Affirmative:

CLINE, S.: While there is certainly intuitive connection between MC and/or other cables and the conduit testing data, I have not seen data which would convince me in a scientific analysis. Yes, it's the same cable which, if in a conduit, would have the rules apply. Now it's directly in the sun - does that mean it gets as hot or hotter? Or does the airflow now available directly on the outer surface provide more cooling than the radiant heat applies? The physics of cable inside conduit is significantly different from exposed cable.

HUNTER, R.: The fact that this research was performed by a trade organization, with no evidence of insulation failure or verification by an independent third party throughout the entire process,makes this submitter's suggestion in his last sentence the appropriate action.

6-31 Log #568 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Travis Lindsey, Travis Lindsey Consulting Services
Comment on Proposal No: 6-67
Recommendation: Revise text to read as follows:

310.15(B)(2)(c) Conduits and MC Cables Exposed to Sunlight on Rooftops. Where conductors in conduits and MC cables are installed ~~or cables are installed in conduits~~ exposed to direct sunlight on or above rooftops, the adjustments shown in Table 310.15(B)(2)(e) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.16 and Table 310.18.
Substantiation: This proposal should have been accepted in principal. Type MC cable was thoroughly researched and substantiation for this was submitted. Panel 6 requested that the previous research for conduits be enhanced by additional research to allow for cables to be added to this section. MC cable constitutes over 95 percent of the market share for all cables installed above rooftops. The subject of this research was published in a peer reviewed IEEE paper and has had national attention. This research was established to provide specific conductor temperature data enabling the user of the code to apply long standing provisions in table 310.16 and others for proper temperature correction and adjustment.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel rejects use of the term "conduit" alone using "circular raceways" instead. The panel rejects the addition of type mc cable due to insufficient data to support the change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 6 Negative: 4 Abstain: 1
Explanation of Negative:

FRIEDMAN, S.: Although the panel has stated that sufficient data was not provided for inclusion of MC cable in section 310.15(B)(2)(c), testing was conducted by Copper Development Association and data was provided to the panel members. The data supported the fact that the heat rise in MC Cable on rooftop in direct sunlight was equivalent to that in circular raceways. There does not appear to be a reason for rejecting this comment based on "insufficient data". The data should have been accepted and the need to increase ambient temperature when installing MC cable on rooftops should be included in section 310.15(B)(2)(c).

KENT, G.: The submitter addressed the panel statement on "cables" and identified only "MC Cables" for which testing is submitted. No information was provided in the ROP to indicate added testing was needed for "MC Cables, actually, reading the panel statement, acceptance of the data is clear.

LAIDLER, W.: This comment should have been Accepted in Part. We agree with the panel's action to reject the term "conduit "and use "circular raceways" instead. We do not agree with the panel's action not to add type MC cable. The panel rejected the proposal to add the term "cables" based on the fact that the submitter only provided data based on research done on MC Cable. The submitter has provided all the substantiation that the panel asked for, including a third party review. Test results provided by the submitter have shown that conductors installed in circular raceways and MC Cable are subjected to a higher ambient temperature when installed in direct sunlight above rooftops.

ZIMNOCH, J.: This Comment should have been Accepted. On Proposal 6-67 the Panel Statement specifically stated "The term "cables" is too general for this requirement. The testing described in the substantiation was performed using MC cable only, and not other types of cable. Testing on MC cables is not representative of all cables. In order for the term "cables" to be added at this stage, testing would have to be completed on all types of cables. Otherwise, the proposal would need to be more specific." The Comment addresses the Panel Statement that the Proposal would need to be more specific and the Comment limits adding only Type MC to the rule for which the Panel admitted in Proposal 6-67 that the data submitted was for MC Cable only.

The Panel stated that sufficient data was not provided for inclusion of MC cable in section 310.15(B)(2)(c), even though testing was conducted by the Copper Development Association and the data was provided to the Panel members with Proposal 6-67. The data supported the fact that the heat rise in MC Cable on a rooftop in direct sunlight was equivalent to that in circular metal raceways. There does not appear to be a valid reason for rejecting this comment based on "insufficient data". The data should have been accepted and the need to increase the ambient temperature when installing MC cable on rooftops should be included in Section 310.15(B)(2)(c).
Explanation of Abstention:

PICARD, P.: The Aluminum Association could not reach consensus on this issue.
Comment on Affirmative:

CLINE, S.: While there is certainly intuitive connection between MC and/or other cables and the conduit testing data, I have not seen data which would convince me in a scientific analysis. Yes, it's the same cable which, if in a conduit, would have the rules apply. Now it's directly in the sun - does that mean it gets as hot or hotter? Or does the airflow now available directly on the outer surface provide more cooling than the radiant heat applies? The physics of cable inside conduit is significantly different from exposed cable.

HUNTER, R.: There are different types of MC cables, which are unique in design, which were not tested. Also see my comments on 6-30.

THOMPSON, J.: Initial data suggests the need for a comprehensive research project to determine the affects of sunlight/rooftops on conduit, MC cable, and cable in general.

6-32 Log #687 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: David Brender, Copper Development Association, Inc.
Comment on Proposal No: 6-67
Recommendation: Section should read:

(c) Conduits and MC Cables exposed to Sunlight on Rooftops. Where conductors in conduits and MC cables are installed ~~or cables are installed in conduits~~ exposed to direct sunlight on or above rooftops, the adjustments shown in Table 310.15(B)(2)(c) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.16 and 310.18.

Substantiation: This proposal should have been Accept in Principle. Type MC cable was extensively studied in response to a request from the Panel. Temperature data was submitted that showed MC cables exhibited similar temperature rise to cables in conduits. The research was published in a peer-reviewed IEEE Transaction Paper. It has received positive comments from inspectors and government officials for making temperature correction an enforceable part of the NEC. The Code already requires application of ambient temperature correction factors. This experiment determined the appropriate ambient temperatures to which the insulation is subjected. In the experiments in question, the conductors were not loaded (carrying current); the purpose of the research was to establish ambient temperatures only, for purposes of applying the correction factors in Tables 310.16 and 310.18.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The panel rejects use of the term "conduit" alone using "circular raceways" instead. The panel rejects the addition of type mc cable due to insufficient data to support the change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 6 Negative: 4 Abstain: 1
Explanation of Negative:

FRIEDMAN, S.: Although the panel has stated that sufficient data was not provided for inclusion of MC cable in section 310.15(B)(2)(c), testing was conducted by Copper Development Association and data was provided to the panel members. The data supported the fact that the heat rise in MC Cable on rooftop in direct sunlight was equivalent to that in circular raceways. There does not appear to be a reason for rejecting this comment based on "insufficient data". The data should have been accepted and the need to increase ambient temperature when installing MC cable on rooftops should be included in section 310.15(B)(2)(c).

KENT, G.: The submitter addressed the panel statement on "cables" and identified only "MC Cables" for which testing is submitted. No information was provided in the ROP to indicate added testing was needed for "MC Cables, actually, reading the panel statement, acceptance of the data is clear.

LAIDLER, W.: See my Explanation of negative Vote on Comment 6-31.

ZIMNOCH, J.: See Reason for Negative on Comment 6-31.

Explanation of Abstention:

PICARD, P.: The Aluminum Association could not reach consensus on this issue.

Comment on Affirmative:

CLINE, S.: While there is certainly intuitive connection between MC and/or other cables and the conduit testing data, I have not seen data which would convince me in a scientific analysis. Yes, it's the same cable which, if in a conduit, would have the rules apply. Now it's directly in the sun - does that mean it gets as hot or hotter? Or does the airflow now available directly on the outer surface provide more cooling than the radiant heat applies? The physics of cable inside conduit is significantly different from exposed cable.

HUNTER, R.: See my comments on 6-30.

THOMPSON, J.: Initial data suggests the need for a comprehensive research project to determine the affects of sunlight/rooftops on conduit, MC cable, and cable in general.

6-33 Log #1216 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Larry Cross, BCIT
Comment on Proposal No: 6-67
Recommendation: Revise text to read as follows:

310.15(B)(2)(c) Conduits and Metal Clad Cables Exposed to Sunlight on Rooftops. Where conductors in conduits or MC Cables are installed exposed to direct sunlight on or above rooftops, the adjustments shown in Table 310.15(B)(2)(2) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.16 and Table 310.18.

Substantiation: I agree with Mr. Friedman and Mr. Zimnoch. This should have been an Accept or Accept in Principle. The submitter's substantiation states that "temperature inside" RNC raceways tend to be hotter than in EMT raceways and that black MC cables are comparable to RNC, except directly on the roof where metal clad cables is hotter.
Panel Meeting Action: Reject
Panel Statement: The panel rejects use of the term "conduit" alone using "circular raceways" instead. The panel rejects the addition of metal clad cable due to insufficient data to support the change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 6 Negative: 4 Abstain: 1
Explanation of Negative:

FRIEDMAN, S.: Although the panel has stated that sufficient data was not provided for inclusion of MC cable in section 310.15(B)(2)(c), testing was conducted by Copper Development Association and data was provided to the panel members. The data supported the fact that the heat rise in MC Cable on rooftop in direct sunlight was equivalent to that in circular raceways. There does not appear to be a reason for rejecting this comment based on "insufficient data". The data should have been accepted and the need to increase ambient temperature when installing MC cable on rooftops should be included in section 310.15(B)(2)(c).

KENT, G.: This should have been Accept in Part and Principal. The panels change to 'circular raceways' should have been included, and "MC Cables" accepted. The submitter addressed the panel statement on "cables" and identified only "MC Cables" for which testing is submitted. No information was provided in the ROP to indicate added testing was needed for "MC Cables, actually, reading the panel statement, acceptance of the data is clear.

LAIDLER, W.: See my Explanation of negative Vote on Comment 6-31.

ZIMNOCH, J.: See Reason for Negative on Comment 6-31.

Explanation of Abstention:

PICARD, P.: The Aluminum Association could not reach consensus on this issue.

Comment on Affirmative:

CLINE, S.: While there is certainly intuitive connection between MC and/or other cables and the conduit testing data, I have not seen data which would convince me in a scientific analysis. Yes, it's the same cable which, if in a conduit, would have the rules apply. Now it's directly in the sun - does that mean it gets as hot or hotter? Or does the airflow now available directly on the outer surface provide more cooling than the radiant heat applies? The physics of cable inside conduit is significantly different from exposed cable.

THOMPSON, J.: Initial data suggests the need for a comprehensive research project to determine the affects of sunlight/rooftops on conduit, MC cable, and cable in general.

6-34 Log #1232 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 6-67
Recommendation: Reject the Panel Action. Accept the proposal as submitted.
Substantiation: As indicated in the negative vote and comment submitted by NEMA's representative Sam Friedman, this proposal should have been accepted. The submitter of this proposal is the same person that submitted the 2008 proposal to require ambient temperature correction for conductors in *conduit*s on rooftops. The Panel accepted that proposal although not all conduits were tested. This cycle, the Panel rejected this proposal to include cables because not all cables were tested. The submitter's substantiation states that *"temperatures inside RNC raceways tend to be hotter than in EMT raceways and that black MC cables are comparable to RNC, except directly on the roof where the MC is hotter"*. These two contrary actions improperly impose different restrictions on different types of wiring methods, which according to the substantiation, are subject to the same need for ambient temperature correction.
Panel Meeting Action: Reject
Panel Statement: The panel rejects use of the term "conduit" alone using "circular raceways" instead. The panel rejects the addition of cables due to insufficient data to support the change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 9 Negative: 1 Abstain: 1
Explanation of Negative:

LAIDLER, W.: See my Explanation of negative Vote on Comment 6-31.

Explanation of Abstention:

PICARD, P.: The Aluminum Association could not reach consensus on this issue.

Comment on Affirmative:

CLINE, S.: While there is certainly intuitive connection between MC and/or other cables and the conduit testing data, I have not seen data which would convince me in a scientific analysis. Yes, it's the same cable which, if in a conduit, would have the rules apply. Now it's directly in the sun - does that mean it gets as hot or hotter? Or does the airflow now available directly on the outer surface provide more cooling than the radiant heat applies? The physics of cable inside conduit is significantly different from exposed cable.

6-35 Log #1401 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 6-67
Recommendation: Accept the proposal and add "MC" in front of "Cables" so that the text reads:

Conduits and MC Cables Exposed to Sunlight on Rooftops. Where conductors in conduits or MC cables are installed exposed to direct sunlight on or above rooftops,...".

Substantiation: While we entirely agree with the negative comment of Mr. Friedman, we can support the negative comment of Mr. Zimnoch as an alternative. The panel rejected this proposal since not all cables were tested, although during the last NEC cycle, the Panel added "conduits" to the text even though all conduits were not tested. Since MC cables were tested and were found to "run hotter" than raceways that were tested, MC cables should be added to this requirement.
Panel Meeting Action: Reject
Panel Statement: The panel rejects use of the term "conduit" alone using "circular raceways" instead. The panel rejects the addition of cables including type mc cable due to insufficient data to support the change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 6 Negative: 4 Abstain: 1
Explanation of Negative:

FRIEDMAN, S.: Although the panel has stated that sufficient data was not provided for inclusion of MC cable in section 310.15(B)(2)(c), testing was conducted by Copper Development Association and data was provided to the panel members. The data supported the fact that the heat rise in MC Cable on rooftop in direct sunlight was equivalent to that in circular raceways. There does not appear to be a reason for rejecting this comment based on "insufficient data". The data should have been accepted and the need to increase ambient temperature when installing MC cable on rooftops should be included in section 310.15(B)(2)(c).

KENT, G.: This should have been Accept in Part and Principal. The panels change to 'circular raceways' should have been included, and "MC Cables" accepted. The submitter addressed the panel statement on "cables" and identified only "MC Cables" for which testing is submitted. No information was provided in the ROP to indicate added testing was needed for "MC Cables, actually, reading the panel statement, acceptance of the data is clear.

LAIDLER, W.: See my Explanation of negative Vote on Comment 6-31.

ZIMNOCH, J.: See Reason for Negative on Comment 6-31.

Explanation of Abstention:

PICARD, P.: The Aluminum Association could not reach consensus on this issue.

Comment on Affirmative:

CLINE, S.: While there is certainly intuitive connection between MC and/or other cables and the conduit testing data, I have not seen data which would convince me in a scientific analysis. Yes, it's the same cable which, if in a conduit, would have the rules apply. Now it's directly in the sun - does that mean it gets as hot or hotter? Or does the airflow now available directly on the outer surface provide more cooling than the radiant heat applies? The physics of cable inside conduit is significantly different from exposed cable.

THOMPSON, J.: Initial data suggests the need for a comprehensive research project to determine the affects of sunlight/rooftops on conduit, MC cable, and cable in general.

6-36 Log #1671 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 6-66
Recommendation: Reject the proposal and substitute the following:

Raceways and Cables Exposed to Direct Sunlight on Roofs. Where cable wiring methods, raceways, and auxiliary gutters are installed on or directly above rooftops and exposed to direct sunlight, the adjustment factors shown in Table 310.15(B)(2)(c) shall be in addition to the adjustment factors in Table 310.15(B)(2)(a) and the outdoor temperature to determine the applicable ambient temperature for application of the correction factors for insulated conductors in Table 310.16 and Table 310.18.

Exception No. 1: Only the adjustment factors in Table 310.15(B)(2)(a) shall apply to conductors in an above-the-roof raceway mast.

Exception No. 2: Busway conductors.

Substantiation: Cable wiring method conductors are heated the same as conductors in raceways, perhaps more since there is less air circulation. Auxiliary gutters are noted since they are not listed in the definition of raceway. All applicable adjustment factors should be included in determining conductor ampacity. The adjustment factor for direct sunlight does not seem appropriate for raceway masts or busways.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the addition of cable and does not extrapolate the data to include other raceways or auxiliary gutters, as the data is insufficient to do so.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-37 Log #1792 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 6-66
Recommendation: Reject the proposal and leave wording as is with Conduits instead of ~~Circular Raceways~~ at the start of the sentence.
Substantiation: Most in the electrical trade understand what "conduit" is. Using terminology that does not increase understanding is counter productive to the intention of the NEC. The concern of EMT not being officially conduit is totally unfounded—EMT is commonly referred to as "thin-wall conduit" and all appear to understand this. In the experience of ACC member companies, no electrician has ever asked a helper to hand him a "5 ft length of 1in. circular raceway!" A better option is to define EMT as "think-wall conduit" in Article 358.
Panel Meeting Action: Reject
Panel Statement: The Panel agrees that the term "circular raceway" is the appropriate term to use in this section. The submitter is correct that EMT is sometimes referred to as "thin wall conduit" but the NEC defines it as a "thin wall raceway of circular design".
Number Eligible to Vote: 11
Ballot Results: Affirmative: 9 Negative: 1 Abstain: 1
Explanation of Negative:

WALL, C.: I agree with the submitter that the term "conduits" is recognized and the term "circular raceways" is not. If the term conduit is not understood then it needs to be defined for clarity rather than introducing a less recognized term.

Explanation of Abstention:

PICARD, P.: The Aluminum Association could not reach consensus on this issue.

6-38 Log #2576 NEC-P06 **Final Action: Accept**
(310.15(B)(2)(c))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-71
Recommendation: The proposal should have been fully rejected.
Substantiation: The use of the word "Where" in this case is the appropriate wording. The word "where" is limited to being a condition of place, and "when" is used in instances describing a condition of time. The NEC is a document governing electrical installations that will remain in place, and as such "where" is the usual term, and does apply in this instance.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-39 Log #2746 NEC-P06 **Final Action: Hold**
(310.15(B)(2)(c))

Submitter: Randal Hunter, City of Las Vegas
Comment on Proposal No: 6-70
Recommendation: Revise text to read as follows:

Conduits Exposed to Sunlight on Rooftops. Where conductors or cables are installed in conduits exposed to direct sunlight on or above rooftops, the ~~adjustments shown in Table 310.15(B)(2)(c) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.16 and Table 310.18~~ conductors shall be 90ºC and the wiring method shall be installed a minimum of 3½" above the rooftop.

Substantiation: The code as currently written is requiring our design professional and electricians to perform up to four different calculations in order to install any wiring method above a rooftop, and we also are referencing them to another standard(ASHRAE) which won't be available to the electricians, they barely have code books.

Table 310.16 is losing its validity when we continue to add more factoring issues that have to be taken into account. Another suggestion that has come up is to install the wiring methods thru the attic. This presents an even worse condition because we don't have free air in this environment and the starting temps in the attic are the maximum temps reached on the roof when installed less that 1" on the rooftop.

The data provided by CDA has shown that above 3 1/2" the temps reached are approximately 30ºF above the ambient temperature. If starting with a worst case of 120ºF that would lead us to a combined temp of 150ºF. This is well below the insulation rating of 194ºF of the conductors called out in the above revision. The conductors will only experience these elevated temperatures for a few hours a day a few days a year, and it is my understanding that commercially available conductors are rated to handle this type of condition without loss of life.

This is a compromise which should make it much easier on the contractors and inspectors in the field. The CDA testing which has been proceeding for the last few years has not had a witnessed failure of the insulation of the conductors. This fact, along with a lack of a valid third party certification of the testing methods, will just continue to lead to a foregone conclusion at every future code meeting due to a lack of information. By making the changes as outlined above, we are able to have a final, simple solution and further testing of other wiring methods and applications should not be required as we will have addressed the fact that temperature does increase on a rooftop and have a solution that allows us to make an installation which should not cause damage to the conductors based on the data provided by the CDA.

Panel Meeting Action: Hold

Panel Statement: The panel agrees to hold the comment based on Section 4.4.6.2.3 of the Regulations Governing Committee Projects. The basis for hold is the presentation of new material.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-40 Log #2808 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: George A. Straniero, AFC Cable Systems, Inc.

Comment on Proposal No: 6-67

Recommendation: Accept the proposal in principle by revising the proposed text to be more specific:

(c) Conduits and MC Cables Exposed to Sunlight on Rooftops. Where conductors in conduits and MC cables are installed ~~or cables are installed in conduits~~ exposed to direct sunlight on or above rooftops, the adjustments shown in Table 310.15 (B)(2)(c) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.16 and 310.18.

Substantiation: The revised text offered by this comment is consistent with the direction suggested by the panel statement on proposal 6-67. The panel statement offered that the testing described in the substantiation was performed using MC cable only and that the proposal would need to be more specific. The revised wording of this comment provides more specific text that reflects the substantiation submitted with the proposal.

Panel Meeting Action: Reject

Panel Statement: The panel rejects use of the word "conduit" alone using "circular raceways" instead. The panel rejects the addition of type mc cable due to insufficient data to support the change.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 7 Negative: 3 Abstain: 1

Explanation of Negative:

FRIEDMAN, S.: Although the panel has stated that sufficient data was not provided for inclusion of MC cable in section 310.15(B)(2)(c), testing was conducted by Copper Development Association and data was provided to the panel members. The data supported the fact that the heat rise in MC Cable on rooftop in direct sunlight was equivalent to that in circular raceways. There does not appear to be a reason for rejecting this comment based on "insufficient data". The data should have been accepted and the need to increase ambient temperature when installing MC cable on rooftops should be included in section 310.15(B)(2)(c).

KENT, G.: This should have been Accept in Part and Principal. The panels change to 'circular raceways' should have been included, and "MC Cables" accepted. The submitter addressed the panel statement on "cables" and identified only "MC Cables" for which testing is submitted. No information was provided in the ROP to indicate added testing was needed for "MC Cables, actually, reading the panel statement, acceptance of the data is clear.

ZIMNOCH, J.: See Reason for Negative on Comment 6-31.

Explanation of Abstention:

PICARD, P.: The Aluminum Association could not reach consensus on this issue.

Comment on Affirmative:

CLINE, S.: While there is certainly intuitive connection between MC and/ or other cables and the conduit testing data, I have not seen data which would convince me in a scientific analysis. Yes, it's the same cable which, if in a conduit, would have the rules apply. Now it's directly in the sun - does that mean it gets as hot or hotter? Or does the airflow now available directly on the outer surface provide more cooling than the radiant heat applies? The physics of cable inside conduit is significantly different from exposed cable.

THOMPSON, J.: Initial data suggests the need for a comprehensive research project to determine the affects of sunlight/rooftops on conduit, MC cable, and cable in general.

6-41 Log #1793 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c) and FPN, and Table 310.15(B)(2)(c) and FPN)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

Submitter: Michael P. Walls, American Chemistry Council

Comment on Proposal No: 6-70

Recommendation: The proposal should have been accepted as written, which would delete 310.15(B)(2)(c) and associated FPN and also delete Table 310.15(B)(2)(c) and FPN.

Substantiation: This requirement to temperature correct the ampacity of conductors on rooftops appears to have been submitted by a single testing agency. The panel should only accept testing that is independently verified.

Panel Meeting Action: Reject

Panel Statement: The submitter did not provide technical data sufficient to support the comments recommendation.

Technical substantiation was provided during the 2008 code cycle to support the ambient adjustment factors to conduit exposed on rooftops. This testing proved to the panel's satisfaction that the adjustments are required. The testing was based on the temperature readings, not on the location. The adjustment factors noted are based on raised ambient temperatures based on the tables. It is the elevated ambient temperature that affects the long-term aging of the conductor.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 7 Negative: 4

Explanation of Negative:

HUDDLESTON, JR., R.: I am voting to not support the Panel Action to reject this proposal, as I believe that field data does not support the inclusion of this ampacity deration for roof-top conductors. There have been no documented cases of conductor failures due to insulation damage on conductors installed on roof-tops, and there were many examples given of successful installations that had been in existence for many years without problems and without ampacity deration. The Panel should always take raw data and apply it properly to real world situations. Because there was no evidence of issues from the long-term use of conductors on roof-tops presented, the Panel should have rejected the data during the 2008 Code-making cycle.

HUNTER, R.: After years of data produced without verification by a third party organization during the entire project, this proposal and comment is the right thing to do.

MCCLUNG, L.: Code Panel 6 has now addressed the issue of solar radiation effects on the ampacity of wire in conduit (i.e. circular raceway) and Type MC Cable for rooftop applications since the 2005 cycle. The action of the Panel was to insert Table 310.15(B)(2)(c) "Ambient Temperature Adjustment for Conduits Exposed to Sunlight On or Above Rooftops" to address this issue. Over this period, the data submitted to the Panel to support this issue was developed from one site specific application where it was recognized that the intense sunlight had immediate effect on the temperature rise in the conduit and Type MC Cable. It should be noted that this testing was done on non-energized conductors in conduit and in Type MC Cable and that the data submitted did not address any long term aging effects. Yes, it gets hot inside the conduit or cable but to this point there has been no data presented showing any detrimental effects. Also, at no point during this period has the data submitted to the Panel been independently (i.e. third-party) verified.

To this point the Panel has excluded Type MC Cable from Table 310.15(B)(2)(c) as it recognized that there was insufficient data submitted for inclusion. The Panel should continue to do so.

For many years now, the electrical industry has safely used the allowable ampacity found in Table 310-16 including all adjustment factors, especially temperature, to size conductors in conduit and Type MC Cable for rooftop applications. Over this period, there has been no reported evidence of conductor or cable degradation due to the increased temperature rise inside the conduit or Type MC Cable. If there was a problem, you would think failure data would have been included in the many reports submitted to the Panel. Therefore, the present method of sizing conductors in conduit or Type MC Cable for rooftop applications using the time honored allowable ampacity values in Table 310-16 with appropriate adjustments is considered adequate.

Rather than relying on experimental data to size conductors in conduit and Type MC Cable for rooftop applications or using the time honored allowable ampacity values found in Table 310-16, the ampacity values can be calculated using the electrical/ thermal circuit found in the IEEE 835-1994(R2006) "*IEEE Standard Power Cable Ampacity Tables*" which includes the air space inside the conduit and cable. The ampacity values contained in this standard are based on the Neher-McGrath calculation method (which is recognized by the present code in Article 310-15) For conductors in horizontal conduit or cable in free air as would be found on rooftops, the ampacity calculation in this Standard includes the effect of sun (solar radiation) and wind. The following table contains some representative ampacity values from IEEE 835, Table 29 for three (3), 600V copper conductors in horizontal conduit in free air based on a conductor temperature of 90°C and an ambient temperature of 40°C. For comparison, the allowable ampacity values from Table 310-16, adjusted to a 40°C ambient, and adjusted per Table 310.15(B)(2)(c) at the 1/2 inch value above the roof have been included.

With such a wide variation in parameters and ampacity as shown in the above Table, the Panel should reconsider their position on this issue and render their judgment based on scientific methods versus experimental data from a single test site.

WALL, C.: There have not been documented real world failures. I would like to see peer review and documentation of real world failures that justify the use of the temperature adjustment factors for conductors in conduit on roof tops.

Comment on Affirmative:

CLINE, S.: I affirm the Action of the Panel during the 2008 cycle, which include specific majority rules regarding adoption. An opinion regarding the data is not valid. Please document a failure of the testing methods used.

6-42 Log #2735 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c) and FPN, and Table 310.15(B)(2)(c) and FPN)

Submitter: Christel K. Hunter, Alcan Cable
Comment on Proposal No: 6-67
Recommendation: Delete 310.15(B)(2)(c) and FPN, and Table 310.15(B)(2)(c) and FPN.
Substantiation: The submitter's substantiation is valid. Unless evidence is submitted that conductor insulation is failing in rooftop applications, including this requirement is unjustified. The data submitted shows that it gets hot in a conduit on a rooftop, but does not show that there is a safety risk. No evidence of insulation degradation was included and no third-party data was included. A comparison of insulation types would also be necessary, as different insulation types have differing threshold failure temperatures, differing emergency overload characteristics, and differing chemical, physical and electrical performance in elevated temperatures.
For this proposal, the submitter wishes to include the general term "cables" when only a small sample of cables were tested. This term is too general, and once again there has been no evidence submitted that cables on rooftops are failing or present a safety risk due to elevated temperatures. Even for MC cables, the submitter has not shown any failures in rooftop applications. We have inspected cables that have been in service for decades on rooftops and found that the insulation was not compromised.
Panel Meeting Action: Reject
Panel Statement: The submitters recommendation does not correlate with Proposal 6-67.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-43 Log #2736 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c) and FPN, and Table 310.15(B)(2)(c) and FPN)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmativSubmitter: Christel K. Hunter, Alcan Cable
Comment on Proposal No: 6-70
Recommendation: Delete 310.15(B)(2)(c) and FPN, and Table 310.15(B)(2)(c) and FPN.
Substantiation: The submitter's substantiation is valid. Unless evidence is submitted that conductor insulation is failing in rooftop applications, including this requirement is unjustified. The data submitted shows that it gets hot in a conduit on a rooftop, but does not show that there is a safety risk. No evidence of insulation degradation was included and no third-party data was included. A comparison of insulation types would also be necessary, as different insulation types have differing threshold failure temperatures, differing emergency overload characteristics, and differing chemical, physical and electrical performance in elevated temperatures.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide technical data sufficient to support the comments recommendation.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 7 Negative: 4
Explanation of Negative:

HUDDLESTON, JR., R.: See comment on 6-41.

HUNTER, R.: See Explanation of Negative on my comment 6-41.

MCCLUNG, L.: See my reason for negative ballot on Comment 6-41.

WALL, C.: The original data presented was not independently verified nor have failures been documented.

Comment on Affirmative:

CLINE, S.: Degradation of the insulating materials due to heat/temperature is the reason for de-rating conductor ampacity. This process in the Code has a very long history. Anecdotal statements regarding insulation damage are not sufficient - on the other side I have personally witnessed multiple rooftop conductor insulation failures. The assumption by evidence, is that insulations now in use, degrade with heat - at differing rates to be sure, but degrade over time. Derating is certainly meant to balance the relative risks of differing installations.

6-44 Log #2796 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c) and FPN, and Table 310.15(B)(2)(c) and FPN)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Marty Brett, Steel Tube Institute of North America
Comment on Proposal No: 6-70
Recommendation: This proposal should be "accept".
Substantiation: We agree with the submitter's substantiation that there was no actual field data provided to indicate a problem, that the study was based on a limited range of conduits and conduit sizes with individual conductors, and that there was no independent verification of the study. The panel has rejected proposals to add "cables" to the ambient temperature correction requirements because only certain types of cables were tested. The panel should have rejected the 2008 proposal for conduits for the same reason: only certain conduits where tested. The appropriate action for this issue would be to reinstate the FPN that appeared in the 2005 NEC advising of a possible need for ambient temperature correction in these types of installations and to add "cables" to the FPN.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide technical data sufficient to support the comments recommendation.

Technical substantiation was provided during the 2008 code cycle to support the ambient adjustment factors to conduit exposed on rooftops. This testing proved to the panel's satisfaction that the adjustments are required. The testing was based on the temperature readings, not on the location. The adjustment factors noted are based on raised ambient temperatures based on the tables. It is the elevated ambient temperature that affects the long-term aging of the conductor.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 7 Negative: 4
Explanation of Negative:

HUDDLESTON, JR., R.: See comment on 6-41.

HUNTER, R.: This comment adds to the original proposal. Deleting this section would resolve the outstanding issues of no demonstrated insulation failures during testing and real world installations and the fact that this testing has been performed by a trade organization without independent third party verification and monitoring from the beginning of the project.

Additionally, TUV Rheinland visited the site for 2 days in November of 2009 and from this brief visit tried to validate the years of data produced, even though it was noted that there was "the absence of a Quality Manual and written test procedures".

This helps to confirm that this concept should only be an FPN, as noted by the submitter.

MCCLUNG, L.: See my reason for negative ballot on Comment 6-41.

WALL, C.: The original data presented was not independently verified nor have failures been documented.

Comment on Affirmative:

CLINE, S.: Degradation of the insulating materials due to heat/temperature is the reason for de-rating conductor ampacity. This process in the Code has a very long history. Anecdotal statements regarding insulation damage are not sufficient - on the other side I have personally witnessed multiple rooftop conductor insulation failures. The assumption by evidence, is that insulations now in use, degrade with heat - at differing rates to be sure, but degrade over time. Derating is certainly meant to balance the relative risks of differing installations.

Ampacity Comparison Table For Not More Than Three Single Conductors in Circular Raceway or Cable Based on a 90°C Conductor Temperature, 40°C Ambient Temperature

Conductor Size	IEEE-835-1994 (R2006), Table 29				Table 310.16 Adjusted to a 40°C Ambient	Table 310.15(B)(2)(c) at 1/2 in. above Rooftop
	No Sun No Wind	No Sun 2ft/s Wind	Full Sun No Wind	Full Sun 2ft/s Wind		
#12	28A	29A	21A	24A	27A	17A
#10	37A	38A	27A	31A	36A	23 A

6-45 Log #101 NEC-P06 **Final Action: Accept**
(310.15(B)(2)(c) and Table 310.15(B)(2)(c))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-71
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 6-66.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel's action on Proposal 6-71 should have acknowledged panel's replacement of "conduits" with "circular raceways", the use of "raceway" alone would include types which were not part of the submitted technical substantiation. The panel intends to correlate with the action on Comment 6-38 returning the use of the word "where".
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-46 Log #102 NEC-P06 **Final Action: Accept**
(310.15(B)(2)(c) and Table 310.15(B)(2)(c))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-72
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 6-66.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel's action on Proposal 6-72 should have acknowledged the panel's replacement of "conduits" with "circular raceways", the use of "raceway" alone would include types which were not part of the submitted technical substantiation. The panel intends to correlate with the action on Comment 6-38 returning the use of the word "where".
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-47 Log #1959 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c) and Table 310.15(B)(2)(c))

Submitter: Joseph A. Ross, Ross Electrical Assessments
Comment on Proposal No: 6-66
Recommendation: Revise text to read as follows:

(c) Raceways and Cables Exposed to Sunlight on Rooftops. Where conductors ~~or cables~~ are installed in ~~conduits~~ raceways or cables exposed to direct sunlight on or above rooftops, the adjustments shown in Table 310.15(B)(2)(c) shall be added...

Revise table as follows: Table 310.15(B)(2)(c) Ambient Temperature Adjustment for Raceways and Cables Exposed to Sunlight On or Above Rooftops
Substantiation: "Distance Above Roof to Bottom of Raceway or Cable."

This requirement was adequately covered in previous editions of the NEC in 310.10 and the Ampacity Tables Correction Factors, however the inclusion of 310.15(B)(2)(c) has served as a wake-up call to commence enforcement. The required ampacity adjustment applies to the circuit conductors regardless of whether they are enclosed in a conduit, tubing, or cable; hence the revision for the all inclusive "racways and cables."
Panel Meeting Action: Reject
Panel Statement: The panel rejects the addition of "cables" and does not extrapolate the data to include other raceways, as the data is insufficient to do so. Additionally, no data was provided by the submitter to support the change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:

ZIMNOCH, J.: The Comment should have been Accepted in Principle by replacing "cables" with "Type MC Cables" in the title and the rule in 310.15(B)(2)(c) and in the title of Table 310.15(B)(2)(c). See Reason for Negative on Comment 6-33.
Comment on Affirmative:

LAIDLER, W.: We are voting along with the panel's action to reject this comment because sufficient substantiation has not been provided to warrant the inclusion of all types of raceways and cables at this time. We do agree with the submitter that 310.15(B)(2)(c) has served as a wake-call as far as enforcement of 310.10 goes and needs to be researched further to include other wiring methods that are installed above rooftops.

6-48 Log #2537 NEC-P06 **Final Action: Accept in Part**
(310.15(B)(2) Exception No. 4)

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 6-79
Recommendation: Revise text to read as follows:

Exception No. 4: Derating factors shall not apply to underground conductors entering or leaving an outdoor trench if those conductors have physical protection in the form of rigid metal conduit, intermediate metal conduit or rigid polyvinyl chloride ~~non-metallic~~ conduit (PVC), high density polyethylene conduit (HDPE) or reinforced thermosetting resin conduit (RTRC) having a length not exceeding 3.05M (10 ft) and if the number of conductors does not exceed four.
Substantiation: I would request that the panel reconsider their rejection of the original proposal 6-79 submitted. The changes proposed by the panel leave reference to "rigid" nonmetallic conduit, the only "rigid" nonmetallic conduit is PVC. This appears to be overly restrictive as HDPE or RTRC are not identified as a rigid nonmetallic conduit. Is it the intent of the panel to limit the use of this exception to PVC only? There is a RTRC raceway with identification as "XW," that is similar to schedule 80 PVC and has been accepted by some of the other code making panels and is listed as a raceway acceptable for use like PVC.

Additionally, the panel's statement "this section does not determine the type of conduits that are to be used," but within the current language rigid and intermediate metallic raceways are specifically allowed, the only metallic raceway types allowed. The CMP has the opportunity to determine the nonmetallic raceway types allowed to be installed where no derating for 4 or less current carrying conductors are used, whether it is PVC, HDPE, or RTRC. It is necessary to be specific to the nonmetallic raceway types or inconsistency and enforcement may be difficult. Without limitations any nonmetallic conduit could be installed and not have to apply any derating factors. Thank You!
Panel Meeting Action: Accept in Part

Revise text to read as follows:

Exception No. 4: Derating factors shall not apply to underground conductors entering or leaving an outdoor trench if those conductors have physical protection in the form of rigid metal conduit, intermediate metal conduit or rigid polyvinyl chloride ~~non-metallic~~ conduit (PVC) or reinforced thermosetting resin conduit (RTRC) having a length not exceeding 3.05M (10 ft), and if the number of conductors does not exceed four.
Panel Statement: The panel accepts the Submitter's recommendation to include Reinforced Thermosetting Resin Conduit (RTRC) and rejects including High Density Polyethylene Conduit (HDPE). High Density Polyethylene Conduit (HDPE) is not permitted to be used where exposed. Both RTRC and PVC conduits are defined as rigid nonmetallic conduits in their respective articles.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-49 Log #1678 NEC-P06 **Final Action: Reject**
(310.15(B)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 6-81
Recommendation: Accept the proposal with the following revisions:

Where bare or covered circuit conductors are installed in a raceway, cable, or enclosure with insulated conductors, the temperature rating of the bare or covered conductors shall be considered equal to the lowest insulation temperature rating of the insulated conductors for the purpose of determining ampacity.
Substantiation: This provision should not apply where the conductors are part of open wiring on insulators, knob-and-tube wiring, open overhead aerial conductors, or direct-burial conductors. Circuit conductors should be specified as grounding and bonding conductors and usually don't have their ampacity determined, but are sized by other rules, other enclosures should be specified, since, for example, auxiliary gutters are not classified as a raceway per the definition in Article 100. This provision does not exclude open aerial conductors where a bare conductor may be installed with insulated conductors.
Panel Meeting Action: Reject

Panel Statement: The present rule covers all situations where bare or covered conductors are installed with insulated conductors. The comment attempts to detail specific applications by adding "raceways, cable, or enclosure" to the text. The panel prefers to leave this rule more generic as it is presently stated.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-50 Log #1858 NEC-P06 **Final Action: Reject**
(310.15(B)(3)(c))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 6-67
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:

(c) *Circular Raceways* *or Type MC Cables Exposed to Sunlight on Rooftops.* If ~~When~~ conductors or cables ~~are installed~~ in circular raceways or Type MC cables are installed exposed to direct sunlight on or above rooftops, the adjustments shown in Table 310.15(B)(3)(c) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.15(B)(2)(a) or Table 310.15(B)(2)(b).
Informational Note: One source for the average ambient temperatures in various locations is the ASHRAE Handbook — *Fundamentals*.

Table 310.15(B)(3)(c) Ambient Temperature Adjustment for Conduits or Cables Exposed to Sunlight On or Above Rooftops

	Temperature Adder	
Distance Above Roof to Bottom of Conduit or Cable	**°C**	**°F**
0 – 13 mm (1⁄2 in.)	33	60
Above 13 mm (1⁄2 in.) – 90 mm (3 1⁄2 in.)	22	40
Above 90 mm (3 1⁄2 in.) – 300 mm(12 in.)	17	30
Above 300 mm (12 in.) – 900 mm (36 in.)	14	25

Substantiation: This comment is intended to address the concerns of the Panel as included in the Panel Statement. The Panel is correct that the results of the testing as included in the substantiation for the proposal was for Type MC cables. The documentation proved conclusively that Type MC cables exposed to sunlight on rooftops experience nearly identical heat rise to conductors installed in circular raceways.

Extensive documentation on the heat rise experienced in the Type MC cables that were tested was submitted with the proposal. It is interesting to note the Panel apparently accepted the documentation (science) since no objection was raised in the Panel Statement.
Panel Meeting Action: Accept in Part
Panel Statement: The panel accepts the part in (c)

Circular Raceways. The panel rejects the addition of type mc cable due to insufficient data to support the change. The panel rejects the change to the word "If".
Number Eligible to Vote: 11
Ballot Results: Affirmative: 6 Negative: 4 Abstain: 1
Explanation of Negative:

FRIEDMAN, S.: Although the panel has stated that sufficient data was not provided for inclusion of MC cable in section 310.15(B)(2)(c), testing was conducted by Copper Development Association and data was provided to the panel members. The data supported the fact that the heat rise in MC Cable on rooftop in direct sunlight was equivalent to that in circular raceways. There does not appear to be a reason for rejecting this comment based on "insufficient data". The data should have been accepted and the need to increase ambient temperature when installing MC cable on rooftops should be included in section 310.15(B)(2)(c).

KENT, G.: This should have been Accept in Part and Principal. The panel was correct to accept the change to 'circular raceways' and correct in rejecting 'if', but should have also accepted "and MC Cables". The submitter addressed the panel statement on "cables" and identified only "MC Cables" for which testing is submitted. No information was provided in the ROP to indicate added testing was needed for "MC Cables, actually, reading the panel statement, acceptance of the data is clear.

LAIDLER, W.: This comment should have been accepted. The submitter is correct in his substantiation when he states "Extensive documentation on the heat rise experienced in the Type MC cables that were tested was submitted with the proposal. It is interesting to note the Panel apparently accepted the documentation (science) since no objection was raised in the Panel Statement."

ZIMNOCH, J.: The Comment should have been Accepted in Principle by replacing "cables" with "Type MC Cables" in the title and the rule in 310.15(B)(2)(c) and in the title of Table 310.15(B)(2)(c). See Reason for Negative on Comment 6-33.
Explanation of Abstention:

PICARD, P.: The Aluminum Association could not reach consensus on this issue.
Comment on Affirmative:

CLINE, S.: While we did agree with the use of the term "circular raceways" instead of "conduits", our position on the balance of the changes is as it was for other Proposal 6-67 Comments. While there is certainly intuitive connection between MC and/or other cables and the conduit testing data, I have not seen data which would convince me in a scientific analysis. Yes, it's the same cable which, if in a conduit, would have the rules apply. Now it's directly in the sun - does that mean it gets as hot or hotter? Or does the airflow now available directly on the outer surface provide more cooling than the radiant heat applies? The physics of cable inside conduit is significantly different from exposed cable.

HUNTER, R.: It is difficult to understand the panel statement, but the intention is to accept only the use of the words "circular raceways" as in other panel actions.

THOMPSON, J.: Initial data suggests the need for a comprehensive research project to determine the affects of sunlight/rooftops on conduit, MC cable, and cable in general.

6-51 Log #103 NEC-P06 **Final Action: Accept**
(310.15(B)(6))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-83a
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 6-85.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel intended to accept in principle in part Proposal 6-85 and its statement should have referred to "see action on Proposal 6-83a". The ROP draft correctly interpreted the proposals actions.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-52 Log #104 NEC-P06 **Final Action: Accept**
(Table 310.15(B)(6))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-85
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 6-83a.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel intended to accept in principle in part Proposal 6-85 and its statement should have referred to "see action on Proposal 6-83a". The ROP draft correctly interpreted the proposals actions.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-53 Log #1651 NEC-P06 **Final Action: Reject**
(310.15(B)(6))

Submitter: John W. Young, Siemens Industry
Comment on Proposal No: 6-83a
Recommendation: Correct the reference to Table 310.15(B)(16) in (b) to Table 310.15(B)(6).
Substantiation: Table 310.15(B)(16) does not exist.
Panel Meeting Action: Reject
Panel Statement: The panel action on proposal 6-83a referred to the table numbering resulting proposals that were acted upon. This table was formerly table 310.16 as intended. See panel action on Comment 6-55.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-54 Log #2215 NEC-P06 **Final Action: Reject**
(310.15(B)(6))

Submitter: Ron B. Chilton, Raleigh, NC
Comment on Proposal No: 6-87
Recommendation: This proposal should have been accepted.
Substantiation: There have been few sections of the National Electrical Code more misunderstood, confusing, and abused than Table 310.15(B)(6) of this Code. There was no exact formula leading to the diversity that has been considered for the last 50 years that led to allowing this Table to be used and, therefore, overload conductors greater than their known ampacities listed in Table 310.16, 30 years ago this Table may have seemed to work, it has outlived its usefulness. With the optional calculation for dwellings used in conjunction with the allowed ampacities of that Table, based on that theoretical diversity derived many years ago, we calculate circuits with the 3 watts per square foot rule, use 10,000 volt-amperes at 100 percent, then reduce the remaining total calculated figure by 60 percent. Then, we may supply that load with a service cable that could have an ampacity as much as 50 amps lower than what is permitted by Table 310.15(B)(6). We ultimately allow service and feeder conductors and equipment to be overloaded betting on diversity that may no longer exist due to the extended number of electrical appliance and household electronics now used daily in our homes. Homeowners never complain about too much service, too many receptacles, too much lighting, or too many circuit breakers yet in their new home when their lights dim due to the A/C compressor starting up they ask why the electrical code allows this to happen. The explanation that meeting the minimum requirements of the National Electrical Code is all that is required doesn't ease their concern. Many sections of the National Electrical Code have been changed when we realize we have allowed unfavorable conditions, for this reason and these issues we must progress with minimum standards for dwellings to meet what is actually demanded for our current situations.
Panel Meeting Action: Reject
Panel Statement: The panel rejects accepting Proposal 6-87 and the deletion of the subsection. No technical substantiation was provided to warrant the deletion, but the panel recognizes the concerns of the submitter. See panel action on Comment 6-55.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-55 Log #2261 NEC-P06 **Final Action: Reject**
(310.15(B)(6))

TCC Action: The Technical Correlating Committee directs that Proposals 6-83a, 6-88, 6-90, 6-91, and 6-92 and Comment 6-55 be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative on this comment.

After a review of all of the proposals and all of the associated comments on this particular issue, the Technical Correlating Committee has determined that neither correlation nor consensus were achieved as directed by the Technical Correlating Committee Notes on Proposals 6-83a and 6-85 and directs that the text of 310.15(B)(6) revert to the 2008 code language.

Submitter: Scott Cline, Monterey Park, CA
Comment on Proposal No: 6-83a
Recommendation: The following uses the numbering from the ROP Draft with renumbered 2008 NEC 310.15(B)(6), as 310.15(B)(7).
(7) 120/240-Volt, Single-Phase Dwelling Services and Feeders.
The provisions of (a), (b), and (c) below shall be applicable for 120/240-volt, single-phase systems, for individual dwelling units of one-family, two-family, and multifamily dwellings.
(a) ~~For individual dwelling units of one family, two family, and multifamily dwellings, c~~Conductors, as listed in Table 310.15(B)(7), shall be permitted as ~~120/240-volt, single-phase~~ service-entrance conductors and service lateral conductors.
(b) Feeder conductors of a type listed in Table 310.15(B)(7), with an overcurrent rating matching the service rating, and installed in raceway or cable ~~for a dwelling unit~~, after adjustments and corrections, shall not be required to have an ampacity rating greater than the Table 310.15(B)(16) unadjusted 75degreeC allowable ampacity of the Table 310.15(B)(7) service conductors.
(c) The grounded conductor shall be permitted to be smaller than the ungrounded conductors, provided the requirements of 215.2, 220.61, and 230.42 are met.
In addition, delete the words "and Feeders" in the title of Table 310.15(B)(7), and delete the words (or Feeder" in the Table heading.
As the Section would read:
(7) 120/240-Volt, Single-Phase Dwelling Services and Feeders.
The provisions of(a), (b), and (c) below shall be applicable for 120/240-volt, single-phase systems, for individual dwelling units of one-family, two-family, and multifamily dwellings.
(a) Conductors, as listed in Table 310.15(B)(7), shall be permitted as service-entrance conductors and service-lateral conductors.
(b) Feeder conductors of a type listed in Table 310.15(B)(7), with an overcurrent rating matching the service rating, and installed in raceway or cable, after adjustments and corrections, shall not be required to have an ampacity rating greater than the Table 310.15(B)(16) unadjusted 75°C allowable ampacity of the Table 310.15(B)(7) service conductors.
(c) The grounded conductor shall be permitted to be smaller than the ungrounded conductors, provided the requirements of 215.2, 220.61, and 230.42 are met.
Substantiation: This Comment recognizes that it has never been the intention of the Panel to allow ignoring the rules of installation-condition-required adjustment (deration)—It is not expected to be allowed to supply a 200 amp feeder using 2/0 copper conductors in a conduit traveling across and close to the roof: then into a 45 degree C ambient, surrounded by insulation, and along with 12 other current-carrying conductors.
The original instance is in the 1975 NEC, as a Note 3 to the tables. All allowed types are 75 or 90 degree-C insulation types. The data of this Table was in text-sentence form as part of the "Notes to Tables 310-16 through 310-19" and has been expanded in scope (higher amperages and added types) since. The Panel's actual reasons could not be found, but the Note was certainly intended to recognize that the dwelling demand has a great diversity to it, and rarely, if ever, reaches a significant percentage of the overcurrent device's rating for any extended period of time, and that requiring the higher temperature insulations led to a practical installation. The accepted conductors have 75 degree-C ampacity ratings ranging from 83.75 to 92 percent of the Service Rating, with an average of about 87.5 percent.
Originally limited to three-wire service conductor runs only, the movement and modifications to the text, from an original Table Note - into its own Sub-section - and into a Table of its own, have created a condition where there appear to be ambiguous interpretations.
The purpose of this section is:
to apply only to the listed dwellings,
to apply only to 120/240-vo1t single-phase systems,
to apply to service-entrance or service-lateral conductors,
to apply to feeders with Service Rating-size-overcurrent-protection,
to require feeder conductors to be in raceway or cable,
to require the use of 75 or 90 degree-C minimum conductors,
to recognize that the 3-wires are: 2 ungrounded and 1 grounded (neutral),
to allow an equipment grounding conductor,
to allow reduction of the grounded conductor meeting other requirements.
It recognizes that there is no reason to require an adjusted-ampacity conductor for a feeder to have a higher amperage rating than the service conductor supplying it, since it can only carry the same or less current than the service conductors do. By clarifying that other adjustments still apply, the necessity to consider the feeder's status as a "main power feeder" is moot.
Proposal 2011-6-83a succeeded in:
defining the application to the listed dwellings,
defining the application to service conductors which must be 120/240-volt,
providing for requirement of the Table's conductor types for service conductors,
recognizing that the 3-wires are: 2 ungrounded and 1 grounded (neutral),
allowing an equipment grounding conductor to be installed,
allowing reduction of the grounded conductor meeting other requirements
Proposal 2011-6-83a failed to:
apply only to 120/240-volt single-phase feeders,
provide unambigouous limitation to feeders with Service Rating-size-overcurrent-protection,
provide for requirement of the Table's conductor types for feeders,
require feeder conductors to be in raceway or cable.
The Comment action on page 2 is intended to solve the deficiencies.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
The following uses the numbering from the ROP Draft with renumbered 2008 NEC 310.15(B)(6), as 310.15(B)(7).
(7) 120/240-Volt, Single-Phase Dwelling Services and Feeders
The provisions of (a), (b), and (c) below shall be applicable for 120/240-volt, single-phase systems, for individual dwelling units of one-family, two-family, and multifamily dwellings that supply a single service disconnect for each unit.
(a) Service Entrance and Underground Service Conductors. Conductors, as listed in Table 310.15(B)(7), shall be permitted as service-entrance conductors and underground service conductors.

(b) Feeder Conductors. Feeder conductors listed in table 310.15(B)(7) installed in conduit or as part of a listed cable assembly that do not require adjustments or corrections shall be determined using Table 310.15(B)(7). If adjustments or corrections are required, first determine the ampacity of the service conductors or laterals by utilizing Table 310.15(B)(16), using the 75 degrees C column values. After adjustments or corrections, the feeder conductors shall not be required to have an ampacity greater than the corrected value determined from the table.

(c) Grounded Conductor. The grounded conductor shall be permitted to be smaller than the ungrounded conductors, provided the requirements of 215.2, 220.61, and 230.42 are met.

Panel Statement: The term service lateral was changed to underground service to agree with language by CMP 4. In the charging statement the panel clarified that the use of this method is intended for a single panel. The panel clarified in Section 310.15(B)(7)(b) the method to make adjustments in a step by step fashion.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 7 Negative: 4

Explanation of Negative:

FRIEDMAN, S.: The comment and the panel action should be rejected. The text created by the panel creates numerous issues and are outlined as follows:

1) The text in the main paragraph that states "shall be applicable" implies that the table must be used for the dwelling unit applications. In fact, the provision is an alternative to using the normal ampacity tables.

2) The provision applies to "multi family dwellings that supply a single service disconnect to each unit". This wording eliminates the application of the table in the most common multi-family applications where the entire dwelling unit is supplied by a feeder overcurrent device because the overall metering installation is protected by a single service disconnect.

3) The text, because of the removal of the wording associated with carrying the total load of the dwelling unit, can be applied to feeder conductors within a single dwelling unit that has multiple service disconnects supplying separate panelboards which is not intended by the original section.

4) The wording of item (b) in the panel action is very confusing and unclear as to what values are being adjusted or corrected. In addition, the final sentence of (b) implies that the values in the table are feeder ampacities, when in reality they are actually the rating of the service or feeder for the application and they do not represent the ampacity of the conductor size listed in the table.

HUNTER, R.: The language in (7)(b) leaves us in a situation of when and how to apply this. When the panel uses the word "if", it provides enforcement issues. Also, the multiple interpretations of diversity, as applied to this issue, proves that the material which was originally submitted in the 70's should be updated to better address today's construction practices.

Due to the confusion this new language will cause, we should revert to the 2008 NEC language for this cycle.

PICARD, P.: This language does not add clarity to application of this code provision. The language will create even more confusion. The Panel should have worked with the language in Comment 6-61. As noted in that Panel statement for Comment 6-61, the Panel action in Comment 6-55 may create anomalies in conductor sizing with no technical substantiation for the changes.

THOMPSON, J.: I agree with the position stated by members Mr. Friedman, Mr. Hunter and Mr. Picard. This language does not add clarity to the existing requirements in the 2008 Code. Consideration should be given to forming a Task Group to develop a proposal for the 2014 Code.

The current language in the 2008 Code should be retained.

Comment on Affirmative:

CLINE, S.: I was hesitant to comment on an item which I happened to submit, even though its only intent was editorial for clarification of existing 2008 requirements. I want to address the many good comments made during balloting.

Wording more clearly permissive than "shall be applicable" would be good, but "applicable" and "applied" are certainly different and there should be no question as to the non-mandatory nature of "shall be applicable." I do not know if the TCC or NFPA staff have the editorial latitude to make this "may be applied" or some less questionable wording.

I am unable to understand point 2 about the case where there is also a disconnect for the whole multi-meter setup. Where there is also a service disconnect for the individual unit, the Section may be applied.

It is true that this Section could be applied to multiple feeders, however, the sizing of every one of these feeders would have to be in accordance with the service rating/conductors. For example, a 200 amp rated service could indeed have two 200 amp feeders, each sized in accordance with the Table (possibly 2/0 copper); it could not have two 100 amp feeders sized by the Table.

It is correct that this whole Section applies only to the rating of the service; the whole purpose of the Section is not to change the ampacity of the conductors, but only to allow application of them under a circumstance normally requiring a conductor of higher ampacity.

If this Comment fails ballot resulting in a Reject of the Comment, I highly recommend to the TCC (if possible under its rules) that the Comment and the Proposal, be placed on Hold due to the failures of the Proposal's wording (see Comment 6-55 Substantiation).

HUDDLESTON, JR., R.: The Panel should be commended for its action on this comment.

6-56 Log #2350 NEC-P06 **Final Action: Reject**
(310.15(B)(6))

TCC Action: See the Technical Correlating Committee Note on Comment 6-55.

Submitter: Mike Holt, Mike Holt Enterprises

Comment on Proposal No: 6-83a

Recommendation: This proposal should be rejected altogether.

Substantiation: While I applaud panel 6 for trying to fix this section, I don't believe this is the correct approach. A simpler fix would be to simply revert back to the 2005 text—text that everyone understood and text that had a long standing track record of safe installations. As currently proposed, there is much, much confusion as to what this section does and does not apply to.

A comment will also be made to proposal 6-88 to reiterate this concept.

Panel Meeting Action: Reject

Panel Statement: No technical substantiation was provided by the submitter, but the panel recognizes the concerns of the submitter. See panel action on Comment 6-55.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

PICARD, P.: See comment on Comment 6-55.

6-57 Log #2351 NEC-P06 **Final Action: Reject**
(310.15(B)(6))

Submitter: Mike Holt, Mike Holt Enterprises

Comment on Proposal No: 6-88

Recommendation: This proposal should have been accepted outright.

Substantiation: In Proposal 6-83a, the panel did an admirable thing in trying to fix this broken rule. In that proposal, Mr. Thompson recognizes that, while the intent of the panel was sound, the text didn't really work. A simple solution is to revert back to the well tested and well understood language of the 2005 text. There was no real substantiation justifying the change in the first place, so changing back to previous language seems to be a logical approach in fixing the problem pointed out in so many proposals this cycle.

Panel Meeting Action: Reject

Panel Statement: No technical substantiation was provided by the submitter, but the panel recognizes the concerns of the submitter. See panel action on Comment 6-55.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

PICARD, P.: See comment on Comment 6-55.

6-58 Log #2577 NEC-P06 **Final Action: Accept in Principle**
(310.15(B)(6))

TCC Action: See the Technical Correlating Committee Note on Comment 6-55.

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 6-83a

Recommendation: The proposal should be accepted in principle and in part. Accept the concept of reformatting the section into three parts. Reject the elimination of the text [shown in the proposal as the struck-through text in the parent language of (6)] that requires the conductors to see the entire load of the dwelling unit.

Substantiation: This change, apparently based on the reasoning in Proposal 6-88, is based on fallacious reasoning. Removing an air-conditioner from a load profile obviously reduces the load. It also increases the intensity of the load that remains on the feeder, and thereby works to undermine the validity of the ampacity values allowed in this section. The load that remains on those conductors will be the subject of a new load calculation reflecting the actual connected load that remains. This process of load shedding could continue until there was only a single load left, that might even run continuously. Under the panel action, these special ampacities will apply even to this single load, provided the installation is residential. The panel statement on Proposal 6-61 in the 2008 code cycle was completely correct, namely: "It is the panel's intent that this allowance apply only to conductors carrying 100% of the dwelling unit's diversified load."

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 6-55.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 9 Negative: 2

Explanation of Negative:

HUNTER, R.: See my Explanation of Negative on comment 6-55.

PICARD, P.: See comment on Comment 6-55.

6-59 Log #2737 NEC-P06 **Final Action: Reject**
(310.15(B)(6)(b) and (c))

TCC Action: See the Technical Correlating Committee Note on Comment 6-55.
Submitter: Christel K. Hunter, Alcan Cable
Comment on Proposal No: 6-83a
Recommendation: Revise the panel's recommendation and delete the feeder conductor language as follows:
~~(b) The fFeeder conductors to for a dwelling unit, after adjustments and corrections, shall not be required to have an allowable ampacity rating greater than the Table 310.15(B)(16) allowable ampacity of their the service-entrance conductors.~~
(~~e~~b) The grounded conductor shall be permitted to be smaller than the ungrounded conductors, provided the requirements of 215.2, 220.61, and 230.42 are met.
Substantiation: As the Chair pointed out in his comment, the language no longer has a direct connection for sizing feeders. If the panel deletes the language about feeder conductor sizing in this section, users of the Code could simply use the language in 215.2(A)(3) to determine feeder sizing for dwelling units.
Panel Meeting Action: Reject
Panel Statement: The panel modified the language upon which the comment was based and therefore rejected this comment. The panel recognizes the concerns of the submitter. See panel action on Comment 6-55.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:
PICARD, P.: See comment on Comment 6-55.

6-60 Log #2234 NEC-P06 **Final Action: Reject**
(310.15(B)(6), FPN)

Submitter: Charles E. Beck, Affiliated Engineers NW, Inc.
Comment on Proposal No: 6-86
Recommendation: Add the following Fine Print Note at the bottom of Table 310.15(B)(6):
FPN: The "Service or Feeder Ratings" shown in the above table shall be permitted to be considered the ampacities of the associated conductors only for the specific conditions of use that are addressed in this article.
Substantiation: The "Panel Statement" describing the reason for rejecting this proposal describes the values in the table with the following words, "The conductor ampacities listed in 310.15(B)(6)...". But nothing in the table itself, and nothing in the text that refers to the table, includes the word "ampacities." All the table presently permits is certain conductors to be used for certain service or feeder ratings. That is not the same thing. If the CMP wishes to permit the table to be used as an ampacity table, then the fact should be stated in the table itself, or in the article that refers to the table.
Panel Meeting Action: Reject
Panel Statement: The Rule Governing Committee projects does not permit mandatory language in Informational Notes (FPN). See the panel action and statement on Comment 6-55.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
PICARD, P.: See comment on Comment 6-55.

6-61 Log #1592 NEC-P06 **Final Action: Accept in Principle in Part**
(310.15(B)(7))

TCC Action: See the Technical Correlating Committee Note on Comment 6-55.
Submitter: Jim Pauley, Schneider Electric
Comment on Proposal No: 6-83a
Recommendation: Revise the proposed 310.15(B)(7) as follows:
(7) 120/240-Volt, Single-Phase Dwelling Services and Feeders
(a) For individual dwelling units of one-family, two-family, and multifamily dwellings, conductors, as listed in Table 310.15(B)(7), shall be permitted in the following ~~as~~ 120/240-volt, single-phase applications where the conductors carry the total load of the dwelling unit:
__1. service-entrance conductors
__~~2. and~~ service lateral conductors
__3. feeder conductors
__(b) Feeder conductors for ~~a~~ individual dwelling units shall not be required to be larger than the service entrance or service lateral conductors. Where the service entrance conductor or service lateral is copper and feeder conductor is aluminum, the feeder conductor shall be sized using Table 310.15(B)(7) based on the service rating for the copper service entrance or service lateral conductors. ~~after adjustments and corrections, shall not be required to have an ampacity rating greater than the Table 310.15(B)(16) allowable ampacity of the service conductors.~~
(c) The grounded conductor shall be permitted to be smaller than the ungrounded conductors, provided the requirements of 215.2, 220.61, and 230.42 are met.
Substantiation: The continual changes to this section are resulting in significant misunderstandings and resulting in major cost increases for the cables needed for dwelling units. The changes in this comment actually resolve two issues. First, it takes the basic rule back to what was originally intended when it went into the NEC. Second, it more generically addresses the issue of feeder conductors being larger than the service conductors.
Here is the specific substantiation:
Item (a) of the section is revised to put feeder conductors back into the language. It also splits the text up with a list to avoid misapplying the various limitations to different conductors. Note the addition of the language that regardless of whether it is a feeder, service entrance conductor or service lateral conductor – it must always carry the total load to the dwelling unit. This was the original substantiation for having the rule in the code in the first place. What was shown was that when you looked at the total loading of a dwelling unit (total was the only thing measured), you could safely use conductors sized as shown in the table. It was never substantiated to allow the use of the table when the total load was not being carried.
The panel's removal of feeder conductors creates significant issues in multi-family applications. The feeders do carry the total load to the individual dwelling unit and as such the table should apply. The panel has removed this application completely.
The ROP wording (and the 2008 NEC wording) actually permits the table to be used for service entrance conductors that do not carry the total load. This is a misapplication from the original intent. Why would I be able to use the table for service conductors from a meter socket to two separate 200A panels when neither of the panels carries the total load? The panel was correct in its effort in the 2008 NEC to put back in the total load to the dwelling unit wording, but they didn't apply the words to all of the applications as it should have been.
I understand the panel's intent to try to word item (b) to equate the allowable ampacities between the feeder and the installed service conductor. However, this will still create some fairly significant anomalies in the conductor sizing without substantiation. For example, take a single family dwelling service rated 200A. It has an outside main disconnect. Feeder conductors then continue inside to a 200A panel. Under the proposal wording, I could use a 4/0 Al SE cable for the service entrance conductors to the 200A disconnect. However, for a 200A SER feeder (assuming it goes through some type of thermal insulation) going into the dwelling I will need to install a 300 kcmil Al SER cable (195A at 60C). Is there any evidence that has been presented to the panel that would show conductors simply sized out of the table are problematic in these applications?
The proposed revision to (b) actually attempts to solve that problem by using the language from 215.2(A)(4) which states that a feeder conductor need not be larger than the service conductor. This takes the ampacity language out of play. Basically, if I have a 4/0 Al service entrance conductor, I am not required to install a 250kcmil Al or 300 kcmil Al feeder conductor for that dwelling unit. There is a rare instance where the sizing in this manner can result in an incorrect result. This is when the service entrance conductors are copper and the feeder is aluminum. The proposed wording takes this into account by requiring that the aluminum conductor be selected from Table 310.15(B)(7) based on the service rating for the copper service entrance conductor. So if I used a 2/0 copper service entrance conductor for a 200A dwelling unit service under 310.15(B)(7), the aluminum feeder to the dwelling unit would have to be at least 4/0 Al.
Here is a summary of the applications that would be permitted under the ROP wording and under this new proposed rewording:

Application (120/240V single phase dwelling)	2011 ROP Wording	This Comment wording
Service entrance conductors carrying total load	Table applies	Table applies
Service entrance conductors that do not carry the total load	Table applies	Table does not apply
Feeders that carry the total load	Table does not apply	Table applies
Feeders that do not carry the total load	Table does not apply	Table does not apply[1]

[1] However, the feeder would not have to be larger than the service conductor.

Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel accepts in principle part (a) of the submitters comment.

The panel rejects part (b), because the current NEC terminology "allowable ampacity" was intended to require "adjustments and corrections" where applicable. Deletion of this terminology is not substantiated.

The panel recognizes that the accepted action on Comment 6-55 may create "anomalies" in the conductor sizing. No evidence was presented to the panel that show conducers sized out of the table have presented problems.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
FRIEDMAN, S.: See comment on NEMA negative vote on comment 6-55.
HUNTER, R.: See my Explanation of Negative on comment 6-55.
PICARD, P.: See comment on Comment 6-55.

6-62 Log #105 NEC-P06 **Final Action: Accept**
(Table 310.16)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-99
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting relative to the proposed column headings for (4) and (7).

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action on Comment 6-65.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-63 Log #2331 NEC-P06 **Final Action: Reject**
(Table 310.16)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 6-99
Recommendation: Reject the proposed change.
Substantiation: I agree with Mr. Wall's comments on this matter. There have been no documented cases of the existing table being inadequate or unsafe. It is my opinion that the CMP should keep the track record of these values in mind before revising them. If the existing values are unsafe, where are the fires? The conductors that are being changed are the most commonly used conductor sizes in the country. If this was a real problem, it would have manifested itself long, long ago.
This proposal seems to fix a problem that doesn't exist. Perhaps a better solution would be to change the CEC instead of the NEC? It seems that if these values are in the CEC, the CEC is overly restrictive—the NEC is certainly not overly restrictive or we would be discussing electrical fires in the substantiation.
Panel Meeting Action: Reject
Panel Statement: The panel agrees that the NEC/CEC ampacity harmonization task group performed adequate verification using IEEE 835-1994 IEEE standard power cable ampacity table to validate the ampacities shown in the original proposal.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-64 Log #2578 NEC-P06 **Final Action: Reject**
(Table 310.16)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-99
Recommendation: The proposal should be accepted in part. Reject the modifications to 14 and 12 AWG copper wires, and to the 12 AWG aluminum wires.
Substantiation: As noted in the comments in the voting, these modifications are based on calculations and not real-world experience. Although 240.4(D) makes the impact of these changes moot in many cases, motor circuits are not bound by these limitations, and the 110.14(C)(1)(a)(4) relief only applies at the motor and not to other locations in the circuit. Small motor circuits have used the table ampacities for decades in the context of devices not marked for higher temperature connections with no reported loss experience, and this change should be better substantiated before imposing a significant change on code users.
Panel Meeting Action: Reject
Panel Statement: The panel agrees that the NEC/CEC ampacity harmonization task group performed adequate verification using IEEE 835-1994 IEEE standard power cable ampacity table to validate the ampacities shown in the original proposal.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-65 Log #741 NEC-P06 **Final Action: Accept**
(Table 310.16 [now Table 310.15(B)(16)])

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 6-99
Recommendation: I agree with the Negative vote regarding the two typographical errors in the headings of columns 4 and 7.

The Proposal should have been Accepted in Principle in Part. In Principle by correcting "194°C" to "194°F" in the headings of columns 4 and 7. In Part by accepting the remainder of the Proposal.
Substantiation: The correction to 194°F was done by NFPA staff and the 2011 NEC Draft reflects the correction.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-66 Log #1956 NEC-P06 **Final Action: Reject**
(Table 310.17)

Submitter: Charles M. Trout, Maron Electric Company
Comment on Proposal No: 6-112
Recommendation: Delete Table 310.17 in its entirety.
Substantiation: This proposal should be accepted. Section 110.14(C) requires that ALL equipment termination provisions shall be based on Table 310.16. The panel statement is incorrect in stating this does not apply to busbars or splicing devices. It applies to ALL equipment terminations.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms rejection of Proposal 6-112.

Derating calculations utilize Table 310.17 values, then are limited by termination maximums. Larger conductors based on termination requirements in 110.14(C) are permitted to be spliced to smaller conductors for long runs based on Table 310.17.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-67 Log #106 NEC-P06 **Final Action: Accept**
(Table 310.20)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-118
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal related to the word "allowable".

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel rejects the inclusion of the word "Allowable".
Panel Statement: The panel recognizes that the word "Allowable" was inadvertently added by the panel action on Proposal 6-118 without substantiation due to the word not being underlined in the original proposal. The panel action on Proposal 6-118 should have been Accept in Part rejecting the addition of the word "Allowable".
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-68 Log #1857 NEC-P06 **Final Action: Accept in Principle in Part**
(310.20(H))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 6-16
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(H) Conductors in Parallel.

(1) General. Aluminum, copper-clad aluminum, or copper conductors for each phase, polarity, neutral, or grounded circuit shall be permitted to be connected in parallel (electrically joined at both ends) only in sizes 1/0 AWG and larger ~~Aluminum, copper-clad aluminum, or copper conductors 1 AWG and smaller, comprising each phase, polarity, neutral, or grounded circuit conductor shall not be connected in parallel (electrically joined at both ends). Where conductors of size 1/0 and larger are installed in parallel they shall be~~ if installed in accordance with 310.10(H)(2) through 310.10(H)(6). **[ROP 6-16]**

Exception No. 1: Conductors in sizes smaller than 1/0 AWG shall be permitted to be run in parallel to supply control power to indicating instruments, contactors, relays, solenoids, and similar control devices, or for frequencies of 360 Hz and higher, provided all of the following apply:

(a) They are contained within the same raceway or cable.

(b) The ampacity of each individual conductor is sufficient to carry the entire load current shared by the parallel conductors.

(c) The overcurrent protection is such that the ampacity of each individual conductor will not be exceeded if one or more of the parallel conductors become inadvertently disconnected.

Exception No. 2: Under engineering supervision, 2 AWG and 1 AWG grounded neutral conductors shall be permitted to be installed ~~run~~ in parallel for existing installations. **[ROP 6-19]**

Informational Note to Exception No. 2: Exception No. 2 can be used to alleviate overheating of neutral conductors in existing installations due to high content of triplen harmonic currents.

(2) Conductor Characteristics. The paralleled conductors in each phase, polarity, neutral, grounded circuit conductor, equipment grounding conductor, or equipment bonding jumper shall comply with all of the following: **[ROP 6-17]**

(1) Be the same length
(2) Consist of ~~Have~~ the same conductor material
(3) Be the same size in circular mil area
(4) Have the same insulation type
(5) Be terminated in the same manner

(3) Separate Cables or Raceways. If ~~When~~ run in separate cables or raceways, the cables or raceways with conductors shall have the same number of conductors and shall have the same physical ~~electrical~~ characteristics. Conductors of one phase, polarity, neutral, grounded circuit conductor, or equipment grounding conductor shall not be required to have the same physical characteristics as those of another phase, polarity, neutral, grounded circuit conductor, or equipment grounding conductor. **[ROP 6-20]**

(4) Ampacity Adjustment. Conductors installed in parallel shall comply with the provisions of 310.15(B)(3)(a).

(5) Equipment Grounding Conductors. If ~~Where~~ parallel equipment grounding conductors are used, they shall be sized in accordance with 250.122. Sectioned equipment grounding conductors smaller than 1/0 AWG shall be permitted in multiconductor cables in accordance with 310.104 provided the combined circular mil area of the sectioned equipment grounding conductors in each cable complies with 250.122.

(6) Equipment Bonding Jumpers. If ~~Where~~ parallel equipment bonding jumpers are installed in raceways, they shall be sized and installed in accordance with 250.102. **[ROP6-17]**

Substantiation: The Code Panel is to be applauded for its efforts to improve the clarity of the rules that apply to conductors installed in parallel. The suggestions included in this Comment are intended to assist the Panel in this quest.

The original language CMP-6 has used in (H)(1) for many editions of the Code is rearranged, hopefully, to improve clarity and avoid the multiple rules on sizes of conductors that are generally permitted to be installed in parallel.

In (H)(1) Exception No. 2, the word "run" is to be replaced with "installed" for clarity.

In (H)(2)(2) the words "consist of" are intended to replace "have" as perhaps conductors don't "have conductor material" they "consist of conductor material"!

I will take one more crack of the bat in trying to convince the Panel that "physical" is better than "electrical" in describing the characteristics of raceways or cables installed in parallel. Granted, "electrical characteristics" is technically correct. However, installers and inspectors have, for many years, clearly understood "physical characteristics" to mean the installation is not permitted to consist of one run of EMT and another of IMC or RMC. They are different physically which is easy to determine. With the change to "electrical characteristics," discussion and debate will occur over whether these three metal raceways have the same "electrical characteristics." Or, unfortunately, perhaps the discussion won't take place and people will assume the metal raceways are the same electrically. Add an aluminum conduit to the mix and the discussion can get more confusing. After all, the aluminum conduit is conductive so it must be the same as EMT, IMC and RMC. Right? It seems like a "fix" for something that wasn't broken!

The proposed change to (H)(5) is intended to be editorial and add clarity. This Comment intends to use the word "if" where appropriate. Note that:
the use of the word "when" is to relate to a condition of time;
the use of the word "where" denotes a location; and
the use of the word "if" requires a complying action.
Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if."

Panel Meeting Action: Accept in Principle in Part

The panel accepts in principle in part the recommendation.
The change in principle in 310.10 (H)(1) and 310.10(H)(3) the word "if" is revised to "where".

The panel rejects the changes to the word "if" in 310.10(H)(5) and 310.10(H)(6).

The panel rejects the change to the word "physical" in 310.10(H)(3).

The panel accepts all other changes.

Panel Statement: The panel accepts in principle in part the recommendation. The use of the term "where" is correct. The panel agrees that the term "electrical" is more technically correct for this requirement. The panel accepts the remaining changes as editorial without changing the intent of the section.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-69 Log #340 NEC-P06 **Final Action: Accept**
(310.60(C)(2)(b))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-124
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.

Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-70 Log #341 NEC-P06 **Final Action: Accept**
(Table 310.77)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-130
Recommendation: The proposal should be accepted in part. Accept the second change to from "per" to "in Accordance with" but reject the first change from "per" to "in an".
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the portion of this proposal that corrects such an instance is to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of the first change in this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.

Panel Meeting Action: Accept

Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-71 Log #342 NEC-P06 **Final Action: Accept**
(Table 310.78)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-131
Recommendation: The proposal should be accepted in part. Accept the second change to from "per" to "in Accordance with" but reject the first change from "per" to "in an".
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the portion of this proposal that corrects such an instance is to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of the first change in this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-72 Log #343 NEC-P06 **Final Action: Accept**
(Table 310.79)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-132
Recommendation: The proposal should be accepted in part. Accept the second change to from "per" to "in Accordance with" but reject the first change from "per" to "in an".
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the portion of this proposal that corrects such an instance is to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of the first change in this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-73 Log #344 NEC-P06 **Final Action: Accept**
(Table 310.80)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-133
Recommendation: The proposal should be accepted in part. Accept the second change to from "per" to "in Accordance with" but reject the first change from "per" to "in an".
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the portion of this proposal that corrects such an instance is to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of the first change in this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-74 Log #345 NEC-P06 **Final Action: Accept**
(Table 310.81)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-134
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-75 Log #346 NEC-P06 **Final Action: Accept**
(Table 310.82)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-135
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-76 Log #347 NEC-P06 **Final Action: Accept**
(Table 310.83)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-136
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-77 Log #348 NEC-P06 **Final Action: Accept**
(Table 310.84)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-137
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-78 Log #349 NEC-P06 **Final Action: Accept**
(Table 310.85)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-138
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-79 Log #350 NEC-P06 **Final Action: Accept**
(Table 310.86)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-139
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 312 — CABINETS, CUTOUT BOXES, AND METER SOCKET ENCLOSURES

9-4 Log #351 NEC-P09 **Final Action: Accept**
(312.6 Exception)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-27
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-5 Log #1299 NEC-P09 **Final Action: Reject**
(312.6 Exception)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-27
Recommendation: The Proposal should be Accepted in Principle and "…with provisions for one or two wires per terminal shall comply…" revised to read "…with provisions for one or two wires to be attached to each terminal shall comply…"
Substantiation: The Panel Statement made an excellent point that the number of wires that can be attached to a terminal is decided at the point of manufacture and not at installation. This revision will be more explicit that the number of wires to be attached to a terminal cannot exceed the manufacturer's design.

The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: The elimination of the word "per" in its long-standing use as a preposition makes the language of the NEC more stilted and less readable without adding clarity. CMP 9 reaffirms its action and statement on Proposal 9-27.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-6 Log #352 NEC-P09 **Final Action: Accept**
(Table 312.6(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-28
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-7 Log #1300 NEC-P09 **Final Action: Reject**
(Table 312.6(A))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-28
Recommendation: The Proposal should be Accepted in Principal and the heading within the Table changed from "Wires per Terminal" to "Wires Permitted to be Attached to Terminal".
Substantiation: The Panel Statement on Proposal 9-27 made an excellent point that the number of wires that can be attached to a terminal is decided at the point of manufacture and not at installation. This revision will be more explicit that the number of wires to be attached to a terminal cannot exceed the manufacturer's design.

The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-8 Log #353 NEC-P09 **Final Action: Accept**
(Table 312.6(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-29
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-9 Log #1301 NEC-P09 **Final Action: Reject**
(Table 312.6(B))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-29
Recommendation: The Proposal should be Accepted in Principal and the heading within the Table changed from "Wires per Terminal" to "Wires Permitted to be Attached to Terminal".
Substantiation: The Panel Statement on Proposal 9-27 made an excellent point that the number of wires that can be attached to a terminal is decided at the point of manufacture and not at installation. This revision will be more explicit that the number of wires to be attached to a terminal cannot exceed the manufacturer's design.

The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-10 Log #1677 NEC-P09 **Final Action: Reject**
(312.7)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-30
Recommendation: Accept the proposal with the following revisions:

Cabinets and cutout boxes shall have space in accordance with 110.3(A)(1)(3) and Table 314.16(B).
Substantiation: The reference to 110.3 and Table 314.16(B) provides specifics as opposed to "sufficient" which is subjective and a term to be avoided per the NEC Style Manual.
Panel Meeting Action: Reject
Panel Statement: As covered in the panel statement on Proposal 9-30, 314.16 [including 314.16(B)] does not apply to the majority of these installations. CMP 9 agrees that in determining the compliance with this section an enforcing authority would be evaluating the conditions set out in 110.3(A)(1) and (A)(3), but those provisions offer no greater prescriptive specificity than the current text.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-11 Log #2466 NEC-P09 **Final Action: Reject**
(312.8(3))

Submitter: Alan Manche, Schneider Electric
Comment on Proposal No: 9-34
Recommendation: Revise committee language in 310.8(3) to:

(3) A label shall be applied to the feed-through conductors that identifies them as feed-through conductors within the enclosure.
Substantiation: The committee offered no substantiation for requiring the equipment to be labeled. The committee labeling requirement goes too far to require each disconnect for the feed-through conductors be identified. Such a label requirement is not even required for the feeder serving the equipment itself. The label may not warrant a level of "warning" or even a level of "caution." Consider the parallel of opening a wireway and installing another conductor, are we concerned with the other conductors already contained within being energized? I agree that identification of the feed-through conductor is of value, but the present language proposed by the committee places in question why we required the insulation of taps in wireways and do we need to have extensive labels on them which would seem to be well outside the bounds of electrical industry practice today.
Panel Meeting Action: Reject
Panel Statement: CMP 9 disagrees that giving notice as to the location of the upstream disconnecting means is excessive in these cases. CMP 9 is now, in accordance with the terms of Proposal 9-142, requiring this sort of labeling on panelboards and switchboards. CMP 9 does not have jurisdiction over wireways, but there may be a qualitative difference between the relative number of terminations and splices in cabinets and cutout boxes as opposed to wireways. This would be a decision for CMP 8 to make in a subsequent code cycle. The concept of providing the warning label was accepted in principle by the panel action on Proposal 9-33.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-12 Log #1236 NEC-P09 **Final Action: Accept**
(312.10(B) (New))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 9-36
Recommendation: This Proposal should be rejected.
Substantiation: UL 50 already contains the proposed requirement for the enclosures covered in Article 312. UL 50 states, "An edge on an enclosure shall not be sufficiently sharp to constitute a risk of injury in normal maintenance or use." The proposed language is unenforceable and would lead to non-standard interpretation. The objective of this proposal is already covered in Section 110.3(A)(8) under "Examination" of equipment. It would be nearly impossible to address each and every of such "other factors" separately in the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BELISLE, R.: The panel should have rejected this comment. The proposed language is clear and under "section II. Construction Specifications", the requirement would apply to manufacturers in a production facility that is designed and constructed to build products to very tight specifications. This is clearly the appropriate location for such requirements. Additionally, the current standard does not apply to "areas subject to contact during installation."

FOGARTY, R.: See my Explanation of Negative Vote on Comment 9-15.

HARTWELL, F.: Refer to my explanation of negative vote on Comment 9-15.

9-13 Log #1608 NEC-P09 **Final Action: Accept**
(312.10(B) (New))

Submitter: Thomas A. Domitrovich, Eaton Corp.
Comment on Proposal No: 9-36
Recommendation: Reject this proposal
Substantiation: There are many hazards on the job site that could hurt an individual but not every hazard is that which should be addressed by the National Electrical Code. Safety of those who work with electrical products should be at the top of our list but there are other ways to help those who work with electrical products on issues such as this.

These requirements should be appropriately addressed in the product standards, not in an installation code.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BELISLE, R.: See Ballot comment 9-12.

FOGARTY, R.: See my Explanation of Negative Vote on Comment 9-15.

HARTWELL, F.: Refer to my explanation of negative vote on Comment 9-15.

9-14 Log #1652 NEC-P09 **Final Action: Accept**
(312.10(B))

Submitter: John W. Young, Siemens Industry
Comment on Proposal No: 9-36
Recommendation: Reject the Proposal.
Substantiation: The submitter describes this as a major problem but there is no substantiation and this does not agree with what UL or the manufacturers are seeing.

Mr. Osborne comments that UL encouraged the filing of file field reports of incidents so this could be investigated but that no field reports or complaints have been filed. Mr. Rupp comments that manufacturers are not receiving reports of incidents. If this is a major problem why aren't manufacturers or UL hearing about it.

This is a subject that is dealt with in the product standards and Mr. Osborne comments that an invitation had been extended to participate in the standards activities if there is a view that the standards need to be revised but again no one accepted the invitation to address this.

If there are isolated problems these need to be reported and investigated and dealt with. If something needs to be done it should be in the standards and not in the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BELISLE, R.: See Ballot comment 9-12.

FOGARTY, R.: See my Explanation of Negative Vote on Comment 9-15.

HARTWELL, F.: Refer to my explanation of negative vote on Comment 9-15.

9-15 Log #1770 NEC-P09 **Final Action: Accept**
(312.10(B) (New))

Submitter: Chad Kennedy, Schneider Electric/Square D
Comment on Proposal No: 9-36
Recommendation: This proposal should be rejected.
Substantiation: CMP 9 has created a significant dilemma with this proposal. It raises more questions than it answers and, in fact, places the electrical inspector in an untenable position. Each of the following questions must be addressed before consideration this topic can be appropriately addressed

1. There has been no comprehensive data or statistics provided to demonstrate exactly what problem is being fixed. Scrapes, scratches and cuts occur for many reasons on a construction site. Even plastic edges can take the skin of a knuckle if hit at the right angle. Interestingly, most electrical contractors we talk to focus on luminaire housings as the most significant source of edges - not cabinets or cutout boxes.

2. There is a product standard that covers sharp edges. Is the alleged issue with products that meet the standard or with products that do not meet the standard? If it is with products that meet the standard, then we need to address the product standard directly. If it is with products that do not comply with the standard, then we need to step up enforcement of the standard. Again, with no data we can't develop an action plan.

3. We did a review of our internal processes and products and found compliance with the UL standard. If these same products are the ones in the field that someone says has a sharp edge, how is it expected to be resolved? Interestingly, UL has a significant field reports process that is used by inspectors and installers – we have not seen any reports through this system that would indicate that sharp edges on cabinets are an issue.

4. The panel has provided no performance criteria for a "sharp edge". This simply invites a wide variation in what is acceptable and what is not. If the inspector says that the edge is sharp, but the contractor says it isn't – who is correct (given the fact that the contractor was the one doing the "normal installation")?

5. The words "edges subject to hand contact during normal installation" are confusing. What would be an edge not subject to hand contact?

6. How does an inspector test for a "sharp edge" in the field? Subjective? Opinion? If the contractor was not "cut" during installation was the edge sharp?

7. Given that nobody has submitted a proposal to the product standard to modify the requirements, is the panel assuming too much about where the problem actually exists? Perhaps the issue is with unlisted or field fabricated equipment?

8. The proposal language attempts to provide design requirements by stating that the equipment must be "protected" or "de-burred and rounded". This list of compliance methods is extremely restrictive. Since the panel has no evidence of what products or parts of a product create the actual issue, how could it possibly consider methods of compliance?

This proposal cannot be enforced in the NEC. Concerns with sharp edges must continue to be addressed by performance based standards that can uniformly be applied to the products. If actual field issues exist, they need to be submitted to the certification agency so that appropriate action can be taken.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BELISLE, R.: See Ballot comment 9-12.

FOGARTY, R.: The panel should have rejected Comment 9-15, and thereby accepted Proposal 9-36, which sought to revise the Code to require metal enclosure products to be manufactured with exposed edges either protected or de-burred and rounded to minimize the risk of injury. This would have then resulted in corresponding revisions to the relevant product standards.

The panel's unanimous belief that unprotected burred and sharp edges do present a real safety concern to installers is clearly evident in its statement on Comment 9-19.

Absent a standard or Code revision, this ongoing concern will continue to exist because of the competitive need to make a product that just meets the current product standards. Obviously, no one wants to make an unsafe product. However, in the low bid world, the reward for being the first manufacturer to voluntarily exceed the current standard to make a safer product is the loss of market share to those who continue to meet it.

HARTWELL, F.: The existing product standard is insufficient, and this revision would lead to suitable refinements to that standard. By locating the rule in the construction part of the article, compliance with the requirement would be principally enforced by the testing laboratories, subject to field review in egregious cases under 110.3(A). This is as it should be. For example, no one expects inspectors to routinely run around with calipers and measure the thickness of steel outlet boxes to judge compliance with the 0.0625 in. dimension in 314.40(B). The comment requests clarification as to which edges are subject to hand contact during installation; one could ask any electrician but one example would be an enclosure with riveted ends. The edge at the enclosure opening would be subject to contact, but the others, being flush against other surfaces, would pose no hazard and would also meet the "protected" criterion.

This working electrician is not surprised by the lack of routine injury reports to manufacturers, because the workforce culture among electricians is not one where such complaints will be made. The prevailing ethic is to suck it up and move on. In addition, the funding for field personnel to participate in STPs is extremely problematic. It is certainly true that edges of fluorescent luminaires have become a very significant issue as the gauges of steel employed have decreased leaving cut edges inherently sharper, but CMP 9 does not have jurisdiction over Article 410.

Since the underlying proposal is now to be rejected, the manufacturers and the testing laboratories have opened a window to address these issues through modifications in the product standard and testing protocols. Fair enough. It should be duly noted that that window may begin to close after the first Friday in November, 2011, if no progress ensues. Refer to the last sentence of the panel statement on Comment 9-19.

9-16 Log #1929 NEC-P09 **Final Action: Accept**
(312.10(B) (New))

Submitter: Robert D. Osborne, Underwriters Laboratories Inc.
Comment on Proposal No: 9-36
Recommendation: The Panel should reject this proposal.
Substantiation: Panel members agree that the concern with sharp edges is one to be addressed by the product standards. Requirements exist in the Standards, and members of the panel were encouraged to participate in the Standards process if they believed requirements were in need of revision. As a result of discussions during the last Code cycle, all members were extended an invitation to join Standards Technical Panels, and encouraged to file field complaints so problems could be identified and addressed. No members choose to accept this invitation, and, no field reports related to this issue have been filed. Properly documented field complaints can be used to identify whether a problem is specific to an industry, a manufacturer, or a specific factory. Multiple field complaints for a specific category and/or specific issue can be used to identify a systemic problem and may used to develop proposals to a standard or revisions to a certification program.

What constitutes a sharp edge is subjective, and with any subjective requirement, the code user is placed at a disadvantage when applying the requirements. Additionally, the ability of the AHJ to decide on the approval of equipment is already provided in 90.4. Should inspectors conclude that sufficiently sharp edges exist on equipment, they can reject the installation citing 90.4.

It is suggested that panel members refocus their efforts and address this concern in the proper forum rather than introducing requirements that are misplaced.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:
BELISLE, R.: See Ballot comment 9-12.
FOGARTY, R.: See my Explanation of Negative Vote on Comment 9-15.
HARTWELL, F.: Refer to my explanation of negative vote on Comment 9-15.

9-17 Log #1991 NEC-P09 **Final Action: Accept**
(312.10(B))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 9-36
Recommendation: This proposal should be rejected.
Substantiation: This rule would be more appropriate in a product standard. The installer of the equipment has no control over the manufacturing process.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BELISLE, R.: See Ballot comment 9-12.
FOGARTY, R.: See my Explanation of Negative Vote on Comment 9-15.
HARTWELL, F.: Refer to my explanation of negative vote on Comment 9-15.

9-18 Log #2137 NEC-P09 **Final Action: Accept**
(312.10(B) (New))

Submitter: Mike Wood, General Electric
Comment on Proposal No: 9-36
Recommendation: Reject the new proposal under 312.10(B) (New).
Substantiation: The proposed new subsection is already addressed by respective product standards. Further, it does not define what constitutes a sharp edge, a raises a concern of how this will be applied and evaluated in the field. Product standards, which also define testing and evaluation criteria, currently exist and address the need for de-burring and rounded edges. The definition are evaluation of sharp edges or corners should continue to be addressed by the product standards.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BELISLE, R.: See Ballot comment 9-12.
FOGARTY, R.: See my Explanation of Negative Vote on Comment 9-15.
HARTWELL, F.: Refer to my explanation of negative vote on Comment 9-15.

9-19 Log #653 NEC-P09 **Final Action: Reject**
(312.12(B) (New))

TCC Action: The Technical Correlating Committee understands that Comment 9-19 is directed to Proposal 9-36 dealing with 312.10(B)(New) rather than 312.12(B)(New).
Submitter: Edward G. Kroth, Verona, WI
Comment on Proposal No: 9-36
Recommendation: This proposal should be accepted as is.
Substantiation: I realize that this new rule would be hard for the local AHJ to enforce, however, since the manufacturers and standards seem unwilling to address the problem, the NFPA can take the lead through this rule. I have over thirty years in the trade and have received stitches three times due to sharp edges. There have been numerous other times that I have had minor cuts that only required a band-aid. I presently work for a contractor that employs about 150 electricians. The company's safety director has told me that on average three employees a year get stitches due to sharp edges in equipment. He has no idea how many have received, but not reported, minor cuts that did not require professional medical attention. The de-burring of these edges could most safely be done in the manufacturing process. After all, in the field to de-burr one needs to expose themselves to edges that have not already been de-burred.
Panel Meeting Action: Reject
Panel Statement: CMP 9 understands the importance of worker safety during the installation of these products and has given this issue careful consideration. The proposed requirement is very subjective and would add a substantial burden to the installers and inspection communities. This subject is best handled through the cooperative efforts of installers, manufacturers and approval agencies. CMP 9 recognizes that the concern expressed in this comment and Proposal 9-36 is real and urges the industry stakeholders to proactively address this issue in the product standard development process.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BELISLE, R.: The panel should have accepted this comment. The substantiation to reject is based on an assumed "burden" that would be placed on installers and inspectors? This makes no sense as the proposed requirement would be inserted in the NEC under section II. Construction Specifications. As stated and agreed to during the panel meeting, rarely does an inspector or installer verify that a box thickness is "not less than 1.35 mm (0.053 in.)" per NEC requirements, or that ample spacing of a door from live parts exist, etc.
Only in a clear case of poor construction or obvious reduced safety does the installer/inspector community have to address such a concern. These "II. Construction Specifications." apply to manufacturers in a production facility that is designed and constructed to build products to very tight specifications. This is clearly the appropriate location for such requirements.
The panel unanimously agreed that the concern for safety is real and that action needs to be taken. It is unclear why some members of the panel chose to defer the action to another process that is unfamiliar to most members, while action taken at the NEC level would have prompted action by manufacturers to act, rather than promote further study, discuss, and formulate future actions.
FOGARTY, R.: See my Explanation of Negative Vote on Comment 9-15.
HARTWELL, F.: Refer to my explanation of negative vote on Comment 9-15.

ARTICLE 314 — OUTLET, DEVICE, PULL, AND JUNCTION BOXES; CONDUIT BODIES; FITTINGS; AND MANHOLES

9-20 Log #2877 NEC-P09 **Final Action: Reject**
(314.15)

Submitter: Paul A. Keleher, Paul Keleher Electrical Services
Comment on Proposal No: 9-38
Recommendation: The submitter of the proposal intends to more adequately document the problem and resubmit in the next revision cycle.
Substantiation: None provided.
Panel Meeting Action: Reject
Panel Statement: The comment provides neither recommendation nor substantiation, and cannot be processed, as covered in Section 4.4.5(c) and (d) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-21 Log #354 NEC-P09 **Final Action: Accept**
(314.16(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-40
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-22 Log #1302 NEC-P09 **Final Action: Reject**
(Table 314.16(B))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-40
Recommendation: The Proposal should be Accepted.
Substantiation: Acceptance of the Proposal will provide consistency with the subheading in the Table which stipulates "for Each" rather than "per".
The proposed wording is more appropriate for a standard and is more explicit in describing the installation.
The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).
Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-23 Log #1422 NEC-P09 **Final Action: Reject**
(314.16(B)(4) Exception)

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 9-47
Recommendation: Add an Exception to 314.16(B)(4):
Exception: Listed devices and equipment wider than a single 50 mm (2 in.) device box that are marked with the cubic in. volume that they occupy within device boxes shall have their volume deducted based on their markings.
Substantiation: Somehow, the substantiation to this proposal was not available to the panel at the January meeting. However, the proposal was printed in the ROP, so it has had public review and need not be rejected for consideration out of hand.

There are new lighting control products that require 4-gang device boxes. They sit, for the most part on the surface of the box, with a smaller portion protruding into it. One controller in particular protrudes into the box, for the most part, 0.36 inches - plus a smaller area that extends 0.5 inches into the box. The total area within the box for this device equals 8.8 cubic inches. The change to this subsection in the 2008 NEC requires a deduction of at least 16 cubic inches to account for the device, based on the use of 14 AWG conductors. Other products take up other volumes.

These devices do not seem to fit into the category that was intended when this change was made. But the change has a large impact on their use. The proposal requires that the devices and equipment be listed to make sure that a testing laboratory is involved in the process. It is not a necessary part of the proposal.
Panel Meeting Action: Reject
Panel Statement: The occluded volume is only part of the volume allowance consideration; the rules also take into account the necessary space for wire management. For example, a large industrial grade duplex receptacle wired on 12 AWG conductors might take up about 3.5 cu. in. and residential grade receptacles substantially less, but in any case less than the 4.5 cu. in. that would be required for the volume allowance. The smallest four-gang device box (1.5 in. deep) will have 30 cu. in. available, and more common similarly-ganged device boxes far more. CMP 9 regrets that the original proposal substantiation was lost so this response could not have been addressed in the comment period, but at this time it is unconvinced that there is an actual problem.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-24 Log #2579 NEC-P09 **Final Action: Accept**
(314.16(C)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-48
Recommendation: Accept the proposal in principle. Reformat the new text as a stand-alone enumerated paragraph (3) as follows:

(3) Short-Radius Conduit Bodies. Conduit bodies such as capped elbows … (remainder as in the proposal)."
Substantiation: After further review, this subject matter, covering enclosures that are prohibited from containing splices, taps or devices, is not a good location for a second paragraph of a code rule that allows splices, taps, or devices in certain cases. A separate paragraph with its own title will be less confusing.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-25 Log #2532 NEC-P09 **Final Action: Reject**
(314.17(D) (New))

Submitter: Daniel J. Kissane, Pass & Seymour/Legrand
Comment on Proposal No: 9-51
Recommendation: The panel should accept the proposal as a new section 314.17(E) with the text of the original proposal revised as follows:

(D) Protection During Construction. Where outlet or device boxes are secured in place prior to the application of the surface finish and arranged for flush mounting in drywall, the open fronts shall be covered ~~to prevent conductor damage~~ during ~~the~~ surface application construction activities. ~~with protective plates identified for this purpose and marked "Not for Permanent Installation."~~
Substantiation: As a manufacturer of both flush device boxes and the wiring devices that are installed in the boxes, we are familiar with field reports of both damaged conductors and debris that is left in the box as a result of finishing operations. The devices installed in these boxes are not simply receptacles and mechanical switches, but also receptacle and switch snap in connectors and control and protective devices that are of electronic design, such as, GFCIs, TVSS, dimmers, and occupancy sensors. It is important to be certain that these products are not contaminated due to foreign materials in the enclosure.

The proposal has been revised to provide a less prescriptive requirement. The requirement now states that the open front shall be covered without specifying the specific means for meeting the requirement.
Panel Meeting Action: Reject
Panel Statement: CMP 9 agrees with the importance of keeping the foreign materials out of the boxes during the rough-in phase of construction process. The NEC deals adequately with this issue in 110.12(B). If it becomes necessary to cover the conductors, there are many acceptable methods to accomplish that task including commercial products for the purpose.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-26 Log #681 NEC-P09 **Final Action: Reject**
(314.17(E) or 314.26)

Submitter: Carlo Compagnone, Jr., Compa Covers, Inc.
Comment on Proposal No: 9-52
Recommendation: This proposal should be accepted.
Substantiation: As a Master electrician and having been involved in the electrical field for almost twenty (20) years, I am concerned about home-safety issues and the harm, liabilities and expenses inherent therein. In particular, many home fires arise from faulty premises wiring group equipment[1] resulting from damage to wiring within the electrical outlet box. For instance, according to statistics provided by the National Fire Protection Association ("NFPA"), in 2006, "an estimated 16,380 reported U.S. non-confined home structure fires involving premises wiring group equipment resulted in 145 civilian deaths [and] 458 civilian injuries...".

(Please see "Home Electrical Fires," John R. Hall, Jr., March 2009, National Fire Protection Association.)

According to the NFPA, "The two leading specific factors contributing to ignition were unclassified electrical failure or malfunction (33%) and unspecified short circuit arc (28%). These two leading factors lack details on the nature of the failure. **The leading factors contributing to ignition with details were short circuit arc from defective or worn insulation (12%), arc from faulty contact or broken conductor (6%),** short circuit arc from mechanical damage (4%), and equipment overloaded (3%)." (emphasis added) (See Id.)

The main purpose of the National Electrical Code ("NEC") is the safeguarding of persons and property, which in turn is a primary reason why the NFPA sponsors the code making process and publishes the NEC. According to the NFPA's March 2009 analysis on home electrical fires, "Two-fifths (38%) of the 2003-2006 reported non-confined home structure fires involving premises wiring group equipment involved unclassified or unknown-type wiring. Because such a large share of these fires and associated losses are unclassified or unknown-type, the numbers and percentages for every specific type of equipment are probably severely understated. Comparisons within a group are not a problem. **For example, note that the number of fires declines for wiring as one moves from inside the house along the wiring network toward the connections to the utility poles outside the house.**" (*emphasis added*) (Id.) According to this analysis, the majority of fires begin within the outlet box, which is the one area of premises wiring in which the NEC provides no specific guidelines. This is an issue that has been raised in at least the past two (2) Code cycles, and numerous proposals have been submitted in this cycle in an attempt to address the matter. Clearly, it is necessary for the NEC to provide a specific mandate to electricians, that when implemented, would serve as a safeguard against death, injury and the loss of property due to home electrical fires caused within the house along the wiring network.

Acceptance of Proposal 9-52 would be a definitive step towards this mandate.

It is unclear why the NEC contains provisions for protecting the wiring at almost all points of vulnerability throughout the construction process, but excludes the wiring located within the electrical outlet box. In fact, the NEC's newest provision, Section 406.11, involves a requirement for tamper-resistant receptacles with a built-in shutter system at the outlet plug post-construction. While the NEC has added this provision, it blatantly fails to ensure the integrity of the wiring once it reaches the outlet box. What good is Section 406.11, if the wiring behind the receptacle is damaged? This is certainly a problem that must be addressed by the NEC with specificity which includes a mandatory provision for protecting wiring within the electrical outlet box.

While there are broad provisions contained in the NEC for safeguarding all electrical equipment and connections from damage and contamination, these provisions are not specific enough. For instance, Section 110.12, which provides that the equipment must be installed in a "neat and workmanlike manner," and states that "there shall be no damaged parts that may adversely affect safe operation or mechanical strength of the equipment...". While it is a nice concept that electrical equipment be neat and workmanlike, this phrase is unenforceable, and ultimately meaningless. In addition, despite its use of the word "equipment," Section 110.12 is not broad enough to address the concerns raised in Proposal 9-52. Nowhere in Section 110.12 is there a reference to wiring or the protection of wiring within electrical outlet boxes during the construction phase. The section only refers to equipment, including, "busbars, wiring terminals, insulators, and other surfaces...". It is not enough to assume Section 110.12 requires the protection of wiring in electrical boxes, particularly given the alarming statistics provided by the NFPA.

The concept of providing specific solutions for the protection of wiring is not foreign to the NEC, which mandates prescriptive requirements upon all areas of the wiring, except for wiring within the electrical outlet box. For example, Article 300 provides for very detailed methods of safeguarding cables which are subject to damage during the construction phase. Article 300.4 requires the installation of a nail plate where cable wiring is subject to nail or screw penetration. Article 300.4(B)(1) requires installation of bushings or grommets on all metal edges of punched out or factory-installed holes. If an electrician does not meet these Code requirements, wires are damaged and the inspection is deemed a failure.

Clearly, wiring is damaged during the construction process because wires sit exposed for months, while various tradesmen work, subjecting the wiring in the outlet boxes to damage from plaster, power routers, insulation and paint contamination. Drywall installers no longer cut box openings by marking the location and cutting away from the box. Conductors are damaged by pin routers, since the operator cannot see where the box is located and wires located near the edge of the box can be severely damaged. When spray foam is utilized and sprayed into a box, wiring inside the box may be corroded over time as a result of chemicals contained in the spray foam. When paint is sprayed, the paint covers the colored wiring, including the ground wiring, making it unclear which wire is which and requiring the electrician to make a cut into the paint-covered wire, potentially damaging it. Further, when the ground wiring is covered in paint, the grounding bond is lost, since the paint disrupts the copper wire. Faulty ground wires cause short circuits, sparks and arcs, all of which cause fire.

Since there is no mandate for protecting wiring within the electrical box, electricians may or may not chose to cover the boxes once they have completed their wiring. Given the NFPA's grim statistics, it does not appear that enough electricians are choosing to provide protection for the electrical outlet boxes during construction.

Wiring damaged during the construction process also poses a financial hardship upon electricians since they oftentimes have to remove numerous sheets of drywall to rewire to box if enough additional cable is not available outside the box. Much of the time, the electrician must scrape the spray foam out of the box, or try to remove the paint from covered wires. Wire left exposed, having been contaminated by paint, plaster, power routers or other materials, must be cleaned out or cut, and the requirements of Section 110.12 are not met, since the work is no longer "neat."

What is more, while the Code requires, in Section 300.14, that six (6) inches of "free-flowing" conductor be left in an electrical box, the Code provides no specific provisions requiring protection of this length of wiring. Unfortunately, when wiring is compromised during the construction process, it is nearly impossible for an electrician to comply with this provision of the Code, as they oftentimes must cut portions of the damaged six (6) inches out of the box.

Requiring a cover, which is reusable, is a simple and cost-effective manner of ensuring that wiring is protected once it reaches the electrical outlet box. In fact, it should cost less than $100 to cover electrical boxes in most new construction homes, and these covers will be re-useable, lessening the cost substantially. This is a small expense in comparison to an electrician returning to the construction site and fixing the damage which occurred while other tradesmen did their jobs. In addition, there would be no need for re-inspection, since covers would be placed in boxes upon completion of rough wiring. Thus, boxes would be covered at the time of rough inspection, similar to nail plates having to be on at the time of rough inspection, pursuant to provision 300.4. Given that the electrical boxes would be covered at the completion of rough wiring, the wiring inside the box would not get damaged during construction.

Moreover, and most importantly, Proposal 9-52 offers a specific solution to a significant issue at a minimal expense in comparison to death, injury and property damage. Simply stated, requiring covers in electrical boxes at the time of rough inspection ensures the integrity of the wiring, ensures uniformity in protection of the wiring within electrical boxes, and ensures safety within the premises and conformity and compliance with the provisions and purpose of the National Electrical Code.

I have also submitted this proposal to Code-Making Panel 9 for 314.17(E) or 314.26.

[1]As defined by the National Fire Protection Association, "premises wiring" refers to all installed wiring equipment between power source and outlet. "Premises wiring" includes all electrical distribution equipment except cords, plugs and light fixtures. (Please see "Home Electrical Fires," John R. Hall, Jr., March 2009, National Fire Protection Association.)

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-25.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-27 Log #1672 NEC-P09 **Final Action: Reject**
(314.24)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-57
Recommendation: Accept the proposal with the following revisions:

Size of Boxes. Boxes shall comply with applicable provisions of 110.3(A) and 314.16, and have an internal depth, height, and width to allow conductors and equipment to be installed without damage.. The internal depth, width, and height shall include that provided by extension rings, plaster rings, raised covers, and listed box extenders, and comply with (C).

(A) Boxes Without Enclosed Devices or Equipment. No box shall have an internal depth less than 12.7 mm (1/2 in.).

(B) Boxes With Enclosed Devices. Boxes used to enclose devices shall have an internal depth not less than 23.8 mm (15/16 in.).

(C) Equipment and Condcutors.

(1) Boxes that enclose equipment shall have an internal depth, width, and height not less than the equipment plus 6 mm (1/4 in.).

(2) Boxes that enclose conductors larger than 4 AWG shall be approved.

FPN: See 314.28.

(3) Boxes that enclose conductors 8, 6, or 4 AWG shall have an internal depth not less than 52.4 mm (2 1/8 in.). Boxes that enclose conductors 12 or 10 AWG shall have an internal depth not less than 30.2 mm (1 3/16 in.).

(4) Boxes that enclose conductors 14 AWG and smaller shall have an internal depth not less than 23.8 mm (15/16 in.).

Exception: No change.

Substantiation: The first paragraph should apply to boxes whatever their particular use, and be noted to comply with 110.3(A) and 314.16. Height and width should be noted in the first paragraph. Proposed (C)(1) covers clearance whether or not there is a rearward projection.

Proposed (C)(2) provides for other applicable NEC provisions, such as 314.28 to apply.

Panel Meeting Action: Reject
Panel Statement: CMP 9 agrees that in determining the compliance with this section an enforcing authority would be evaluating the conditions set out in 110.3(A), but those provisions offer no greater prescriptive specificity than the current text. The width and height of boxes is not within the scope of this section. The remainder of this comment involves concepts that are fully addressed in the panel action on Proposal 9-56a and no substantiation was presented to show why the comment version is superior.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-28 Log #107 NEC-P09 **Final Action: Accept**
(314.27)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-75
Recommendation: The Technical Correlating Committee directs Code-Making Panel 9 to reconsider the proposal and act on its merits.

The Technical Correlating Committee directs that the Chairs of Code-Making Panels 9 and 18 establish a Task Group to review Proposals 9-75 and 18-130 with regard to application within their respective articles.

This action will be considered by Code-Making Panel 9 as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the direction of the Technical Correlating Committee to reconsider the proposal and reaffirms its action to reject the proposal.

Panel Statement: Refer to the panel action and statement on Comment 9-31.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-29 Log #108 NEC-P09 **Final Action: Accept**
(314.27)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-77
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by providing more description of "designed for the purpose."

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

I. Revise the panel action on 314.27(A) from Proposal 9-77 to read:
(A) Boxes at Luminaire or Lampholder Outlets. Outlet boxes or fittings designed for the support of luminaires and lampholders, and installed as required by 314.23, shall be permitted to support a luminaire or lampholder.

(1) Wall Outlets. Boxes used at luminaire or lampholder outlets in a wall shall be marked on the interior of the box to indicate the maximum weight of the luminaire that is permitted to be supported by the box in the wall, if other than 23 kg (50 lb).

Exception: A wall-mounted luminaire or lampholder weighing not more than 3 kg (6 lb) shall be permitted to be supported on other boxes or plaster rings that are secured to other boxes, provided the luminaire or its supporting yoke, or the lampholder is secured to the box with no fewer than two No. 6 or larger screws.

(2) Ceiling Outlets. At every outlet used exclusively for lighting, the box shall be designed or installed so that a luminaire or lampholder may be attached. Boxes shall be required to support a luminaire weighing a minimum of 23 kg (50 lb). A luminaire that weighs more than 23 kg (50 lb) shall be supported independently of the outlet box unless the outlet box is listed and marked for the maximum weight to be supported.

II. Revise 314.27(E) [which is becoming 314.27(D)] by deleting the words "and (B)".
Panel Statement: The panel action addresses the recommendation from the Technical Correlating Committee by removing "designed for the purpose" from (A)(1). This concept is already addressed in the parent text of (A). The panel action also maintains the requirements for support of lampholders as covered in the 2008 edition. The modification to 314.27(E) (2008 edition) correlates with the restructuring of this section.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-30 Log #1680 NEC-P09 **Final Action: Hold**
(314.27)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-77
Recommendation: Accept the proposal with the following revision:

(A) Boxes and fittings identified for the support of luminaires, lampholders, cameras, television sets, electric signs, or other electrical equipment and installed in accordance with 314.23 shall be permitted to support such equipment.

(1) Boxes or Fittings Supported on Vertical Structures. Boxes or fittings supported on vertical structures shall be identified for the purpose and marked on the exterior of the box to indicate the maximum weight to be supported if greater than 23 kg (50 lbs).

Exception: Other boxes, with or without extension rings or plaster rings, and mounted on a vertical support member or surface and supporting equipment specified in (A) shall be permitted to support such equipment weighing not more than 3 kg (6 lbs) if the equipment is secured to the box, extension ring, or plaster ring by not less than two No. 6 or larger machine screws.
Substantiation: Lampholders, TV receivers and cameras, and other equipment should be noted. Support members may not always be a wall or ceiling. Support boxes may not always be an "outlet", e.g., an end-to-end row of fluorescent fixtures suspended by fixture stems from boxes where only one box is an "outlet."
Panel Meeting Action: Hold
This action is on Comment 9-30 only.
Panel Statement: This comment requests that vertical structures be considered in the same way as walls for the purposes of determining the support requirements for boxes used for luminaire support. CMP 9 is aware that there are many applications for which this is entirely legitimate. CMP 9 is also aware that mounting a luminaire to a wall on a recessed box, especially after the mounting screws are tightened, allows the wall to assist the box in the support of the luminaire. The current testing protocol involves a cantilever test that anticipates the presence of a wall surface, in part because this rule specifically covers wall (and ceiling) mounted luminaires. In addition, the current distinctions between wall and ceiling mounting positions for luminaires and the parameters for the exception governing small luminaires were based in part on whether the mounting screws were in shear or in tension.

CMP 9 has been unable to conclusively determine whether, or to what affect, the absence of a wall surface treatment should affect the support parameters for a luminaire mounted on a vertical structure, particularly for boxes that have wall ratings but that lack ceiling ratings. CMP 9 intends to study these applications, both for luminaires and for equipment, in order to write appropriate language for these applications in 314.27, but is unable to complete this work in the time frame available for processing comments in the 2011 NEC cycle.

Therefore, in accordance with 4.4.6.2.2(c) of the Regulations Governing Committee Projects, CMP 9 directs that this comment be reported as "Hold". This action is for Comment 9-30 only, and does not affect the further processing of Comments 9-29 and 9-32 or the underlying Proposal 9-77.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-31 Log #2515 NEC-P09 **Final Action: Reject**
(314.27(A))

Submitter: Patricia Barron, Safety Quick Light
Comment on Proposal No: 9-75
Recommendation: Revise text to read as follows:

314.27(A) At every outlet used exclusively for lighting, the box shall be ~~designed or~~ installed supplied with a receptacle, specifically designed for luminaires, allowing for mechanical support and providing electrical connection to the branch circuit so that a luminaire may be attached.
Substantiation: Statement of Problem - There are a significant number of electrocutions and accidents occurring during luminaire installations, which result in substantial numbers of **injuries and cases of death.**
Substantiation for Comment: The proposed Power Plug for luminaires is based on the same concept of a standard wall receptacle and plug. Replacing the existing mounting method for luminaires, with the power plug and the pre-installation of the receptacle method **will eliminates 100% of all shock hazard risks**, while installing Luminaires. Luminaires will be safely plugged in or out, to the ceiling or wall. (The power plug UL and CSA Certified, has passed a 200 pound load test and can be used for all luminaries up to 50 pounds).The plug **makes luminaire installations as safe as plugging in a table lamp to the wall**. Luminaries can be plugged or unplugged for bulb replacement, painting, or other, free of risk and **without touching any energized circuits**. An outlet box, without a fixture, but with the receptacle is completely enclosed and safe - exactly like a standard wall receptacle. **When using the proposed power plug and receptacle, all luminaire associated wiring risks are completely eliminated.**
For a video demonstration go to: www.safetypowerplug.com

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The principal impact of this product is on luminaire construction, governed by Article 410. The impact on boxes and their requirements in Article 314 is essentially nonexistent. The receptacle mounted on the box as covered in this application is a device mounted to a yoke and positioned in the box. As such, it is simply and completely covered within the provisions of 314.16(B)(4) for volume allowances, 314.25 for covers and canopies, and 314.27 for luminaire support. None of these provisions require any modifications to accommodate these products, which can be used under current requirements within the location, weight, and voltage limitations of the products, and the occupancy limitations described by the submitter at the ROC meeting. CMP 9 continues to conclude that the jurisdiction over this product belongs with CMP 18. As stated in the panel statement on Proposal 9-75, there is no provision in Article 314 that precludes the use of this device.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

MCCULLOUGH, R.: The panel statement should also have included the fact that a task group comprised of members of Code-Making panels 9 and 18 determined that CMP -9 was correct in its determination during the ROP stage that CMP-18 should have jurisdiction over this subject matter.

9-32 Log #2580 NEC-P09 **Final Action: Accept in Principle**
(314.27(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-77
Recommendation: Change "designed for the purpose" to "designed for luminaire support" in paragraph (1).
Substantiation: This should address the TCC concerns. Note, however, that "designed for the purpose" in this context is quite clear, and unchanged from the existing text in the current NEC.
Panel Meeting Action: Accept in Principle
Panel Statement: Refer to the panel action and statement on Comment 9-29.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-33 Log #1212 NEC-P09 **Final Action: Accept in Principle**
(314.27(D))

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 9-81
Recommendation: This Proposal should be accepted as revised for section 314.27(D) to require fan rated boxes in single or multi-family homes.
Where two or more separate switched, ungrounded conductors are provided to a ceiling mounted outlet box in the center of the ceiling, in single or multi-family dwellings, the outlet box or outlet box system shall be listed for sole support of a ceiling-suspended (paddle) fan.
Substantiation: Panel 9 made the following statements for their rejection of proposal 9-81:

"The proposal does not take into consideration the physical location of a box where locating a ceiling-suspended (paddle) fan would be impractical." Response: The revised text addresses this issue by requiring fan rated boxes located in the center of the ceiling.

"There are numerous reasons to install multiple switched conductors to the outlet box location that would not involve the installation of a ceiling-suspended (paddle) fan." Response: This statement was addressed in the original proposal. It is acceptable for a chandelier and other "multiple reasons" to be supported by a box listed for ceiling fan support. Ceiling fan boxes are also required to be tested and listed for luminaire support per UL514A and UL514C. On the rare occasion that a multiple switched conductors to the outlet box would be utilized in a residential home, such as for a chandelier, a fan rated box would be acceptable for this application. All Fan Rated ceiling boxes are listed for both fan support and luminaire support. This additional feature enhances the safety of the installation with insignificant additional cost.

"There are also other acceptable methods of installing a ceiling-suspended (paddle) fan that does not utilize a fan brace box." Response: The panel's statement is correct and these methods are inspected per 314.27(D) during construction. However the homeowner does not know this when he/she decides to add a ceiling-suspended paddle fan. Such retrofit installations are seldom inspected.

Listed Fan Rated Outlet Boxes are approved for the sole support of ceiling-suspended (paddle) fan per 314.27(D) or a luminaire per 314.27(B). It is disturbing that Panel 9 continues to oppose this proposal, the focus of which is to protect homeowners from possible injury or property damage.
Panel Meeting Action: Accept in Principle
Panel Statement: Refer to the action on Comment 9-34 that generally meets the submitter's intent.
CMP 9 disagrees that all ceiling outlet applications can be accomplished with boxes listed for fan support. For example, consider a large outlet box that includes extension boxes or plaster rings or both; such a combination will not be available as a listed box for fan support and yet with suitable framing the fan bracket can be secured directly to structure. The wording in Comment 9-34, which uses the key word "spare", correctly focuses on probable fraudulent intent. If an installer wishes to avoid the fan box requirement in particular instances, all that is necessary is to not run a spare conductor. The recommendation to apply this to only boxes located in the center of the room does not completely address the salient issue.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-34 Log #1237 NEC-P09 **Final Action: Accept**
(314.27(D))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 9-81
Recommendation: This proposal should be accepted in principle, with the following modified new second paragraph:

Where spare, separately switched, ungrounded conductors are provided to a ceiling mounted outlet box, in a location acceptable for a ceiling-suspended (paddle) fan in single or multi-family dwellings, the outlet box or outlet box system shall be listed for sole support of a ceiling-suspended (paddle) fan.
Substantiation: Many new homes are built with multiple wired switches that accommodate future installation of fans with luminaire kits. Since standard luminaire are installed in standard boxes, the homeowner, when replacing the luminaire with a fan, very likely will not know to replace the standard box with a ceiling box rated for support of a fan and luminaire kit.

The modified text in the new requirement addresses the concerns cited by the members of CMP-9. The addition of the term "spare" in the first sentence denotes that the circuit is not used in the current electrical system and leaves open the possibility of use for future paddle fan control. The second addition "in a location acceptable for a ceiling-suspended (paddle) fan" exempts the locations where ceiling-suspended (paddle) fans cannot be used.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-35 Log #355 NEC-P09 **Final Action: Accept**
(314.28(A)(2) Exception)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-84
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-36 Log #1303 NEC-P09 **Final Action: Reject**
(314.28(A)(2) Exception)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-84
Recommendation: The Proposal should be Accepted.
Substantiation: The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-37 Log #109 NEC-P09 **Final Action: Accept**
(314.28(E))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-87
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by providing a title for 314.28(E)(5).

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel accepts the direction of the Technical Correlating Committee and has taken a clarifying action in Comment 9-39.
Panel Statement: Refer to the panel action and statement on Comment 9-39.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-38 Log #1210 NEC-P09 **Final Action: Accept in Principle**
(314.28(E))

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 9-87
Recommendation: This Proposal should have been Accepted in Principle with the following revision:

(E) Power Distribution Block. Power distribution blocks shall be permitted in pull and junction boxes over 1650 cm3 (100 in.3) in size for connections of conductors where installed in metal or nonmetallic boxes and the installation complies with (1) through (5).

Exception: Equipment grounding terminal bars shall be permitted in smaller enclosures.

(1) Installation. Power distribution blocks installed in metal or nonmetallic boxes shall be listed.

(2) Size. In addition to the overall size requirement in the first sentence of 314.28(A)(2), the power distribution block shall be installed in a metal or nonmetallic box with dimensions not smaller than specified in the installation instructions of the power distribution block.

(3) Wire Bending Space. Wire bending space at the terminals of power distribution blocks shall comply with 312.6.

(4) Live Parts. Power distribution blocks shall not have uninsulated live parts exposed within a metal or nonmetallic box, whether or not the box cover is installed.

(5) Through Conductors. Where the pull or junction boxes are used for conductors that do not terminate on the power distribution block(s), the through conductors shall be arranged so the power distribution block terminals are unobstructed following installation.

Substantiation: Nonmetallic boxes should be included in this new section since Power Distribution Blocks are commonly used in these boxes. Also a title was added to 314.28(E)(5) per the TCC instructions.
Panel Meeting Action: Accept in Principle

Delete the word "metal" in each of the four locations where "metal" was specified in the panel action on Proposal 9-87 to modify either "box" or "boxes".

Panel Statement: CMP 9 concludes that the unmodified term "boxes" is simpler and meets the submitter's concerns. The panel action on Comment 9-39 addresses the submitter's recommendation to add a title to 314.28(E)(5).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-39 Log #2581 NEC-P09 **Final Action: Accept in Principle**
(314.28(E))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-87
Recommendation: Accept the Proposal in principle as modified at the ROP meeting. Add a title for (E)(5) as follows:

(5) Through Wiring. Where pull or junction boxes are used … (remainder as in the ROP).

Substantiation: This comment inserts a title as requested, and properly so, by the TCC.
Panel Meeting Action: Accept in Principle

Revise text to read as follows:
(5) Through ~~Wiring~~ Conductors. Where pull or junction boxes are used...". (remainder as in the ROP action on Proposal 8-87).

Panel Statement: The panel revision provides consistency with terminology used elsewhere in this section.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-40 Log #1238 NEC-P09 **Final Action: Accept**
(314.40(D) (New))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 9-90
Recommendation: This Proposal should be rejected.
Substantiation: UL 50 already contains the proposed requirement for metal pull and junction boxes covered in Article 314. UL 50 states, "An edge on an enclosure shall not be sufficiently sharp to constitute a risk of injury in normal maintenance or use." The proposed language is unenforceable and would lead to non-standard interpretation. The objective of this proposal is already covered in Section 110.3(A)(8) under "Examination" of equipment. It would be nearly impossible to address each and every of such "other factors" separately in the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 8 Negative: 4
Explanation of Negative:

BELISLE, R.: See Ballot comment 9-12.

FOGARTY, R.: See my Explanation of Negative Vote on Comment 9-15.

HARTWELL, F.: Refer to my explanation of negative vote on Comment 9-15.

SZENDRE, M.: There is problem with sharp edges, and until the manufacturers address the issue, this issue will continue to get pushed for adoption into the Code.

9-41 Log #1653 NEC-P09 **Final Action: Accept**
(314.40(D))

Submitter: John W. Young, Siemens Industry
Comment on Proposal No: 9-90
Recommendation: Reject the Proposal.
Substantiation: The submitter describes this as a major problem but there is no substantiation and this does not agree with what UL or the manufacturers are seeing.

Mr. Osborne comments that UL encouraged the filing of file field reports of incidents so this could be investigated but that no field reports or complaints have been filed. Mr. Rupp comments that manufacturers are not receiving reports of incidents. If this is a major problem why aren't manufacturers or UL hearing about it.

This is a subject that is dealt with in the product standards and Mr. Osborne comments that an invitation had been extended to participate in the standards activities if there is a view that the standards need to be revised but again no one accepted the invitation to address this.

If there are isolated problems these need to be reported and investigated and dealt with. If something needs to be done it should be in the standards and not in the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 8 Negative: 4
Explanation of Negative:

BELISLE, R.: The panel should have rejected this comment. The panel unanimously agreed that the concern for safety is real and that action needs to be taken. It is unclear why some members of the panel chose to defer the action to another process that is unfamiliar to most members, while action taken at the NEC level would have prompted action by manufacturers to act, rather than promote further study, discuss, and formulate future actions.

FOGARTY, R.: See my Explanation of Negative Vote on Comment 9-15.

HARTWELL, F.: Refer to my explanation of negative vote on Comment 9-15.

SZENDRE, M.: There is problem with sharp edges, and until the manufacturers address the issue, this issue will continue to get pushed for adoption into the Code.

9-42 Log #1679 NEC-P09 **Final Action: Reject**
(314.40(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-89
Recommendation: Accept the proposal with the following revisions:

An approved means shall be provided in each metal box for the connection of an equipment grounding or bonding conductor. For wire-type conductors, the means shall be a tapped hole with at least two machine screw threads or a machine screw and nut used for no other purpose or a listed grounding clip.

Exception: A listed box with a self-tapping grounding screw shall be permitted.

Substantiation: Metal boxes with hubs or knockouts provide grounding means for metal raceways and cables. Where a wire type equipment grounding or bonding conductor is used, a tapped hole or nut and bolt connection can provide a grounding or bonding connection.
Panel Meeting Action: Reject
Panel Statement: The wording adds nothing to the Code. The approved means is covered in 110.2; the two-thread and the nut-and-bolt rules are in 250.8(A)(6); the ground clips are covered in 250.8(A)(8), and the dedicated purpose rule is in 250.148(C).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-43 Log #1930 NEC-P09 **Final Action: Accept**
(314.40(D) (New))

Submitter: Robert D. Osborne, Underwriters Laboratories Inc.
Comment on Proposal No: 9-90
Recommendation: The panel should reject this proposal.
Substantiation: Panel members agree that the concern with sharp edges is one to be addressed by the product standards. Requirements exist in the Standards, and members of the panel were encouraged to participate in the Standards process if they believed requirements were in need of revision. As a result of discussions during the last Code cycle, all members were extended an invitation to join Standards Technical Panels, and encouraged to file field complaints so problems could be identified and addressed. No members choose to accept this invitation, and, no field reports related to this issue have been filed. Properly documented field complaints can be used to identify whether a problem is specific to an industry, a manufacturer, or a specific factory. Multiple field complaints for a specific category and/or specific issue can be used to identify a systemic problem and may used to develop proposals to a standard or revisions to a certification program.

What constitutes a sharp edge is subjective, and with any subjective requirement, the code user is placed at a disadvantage when applying the requirements. Additionally, the ability of the AHJ to decide on the approval of equipment is already provided in 90.4. Should inspectors conclude that sufficiently sharp edges exist on equipment, they can reject the installation citing 90.4.

It is suggested that panel members refocus their efforts and address this concern in the proper forum rather than introducing requirements that are misplaced.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 8 Negative: 4
Explanation of Negative:

BELISLE, R.: The panel should have rejected this comment. The proposed language is clear and under "section II. Construction Specifications", the requirement would apply to manufacturers in a production facility that is designed and constructed to build products to very tight specifications. This is clearly the appropriate location for such requirements. Additionally, the current standard does not apply to "areas subject to contact during installation."

The substantiation to reject is based on an assumed "burden" that would be placed on installers and inspectors? This makes no sense as the proposed requirement would be inserted in the NEC under section II. Construction Specifications. As stated and agreed to during the panel meeting, rarely does an inspector or installer verify that a box thickness is "not less than 1.35 mm (0.053 in.)" per NEC requirements, or that ample spacing of a door from live parts exist, etc.

Only in a clear case of poor construction or obvious reduced safety does the installer/inspector community have to address such a concern. These "II. Construction Specifications." apply to manufacturers in a production facility that is designed and constructed to build products to very tight specifications. This is clearly the appropriate location for such requirements.

The panel unanimously agreed that the concern for safety is real and that action needs to be taken. It is unclear why some members of the panel chose to defer the action to another process that is unfamiliar to most members, while action taken at the NEC level would have prompted action by manufacturers to act, rather than promote further study, discuss, and formulate future actions.

FOGARTY, R.: See my Explanation of Negative Vote on Comment 9-15.

HARTWELL, F.: Refer to my explanation of negative vote on Comment 9-15.

SZENDRE, M.: There is problem with sharp edges, and until the manufacturers address the issue, this issue will continue to get pushed for adoption into the Code.

9-44 Log #450 NEC-P09 **Final Action: Accept**
(314.42)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 9-91
Recommendation: Continue to Reject this proposal.
Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In the Panel Statement, CMP-9 noted that the "AHJ is qualified to determine the suitability of a bushing, and therefore 'approved' is the appropriate standard for product acceptance in this case." This response gets its authority from Section 3.1.2 of the NEC Style Manual regarding Permissive Rules where it expressly states that "The term may shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 320 — ARMORED CABLE: TYPE AC

7-1 Log #1673 NEC-P07 **Final Action: Reject**
(320.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-5
Recommendation: Accept the proposal and delete the FPN.
Substantiation: 230.43 uses the term "limited" re: use and uses are covered by the listed wiring methods. If this is not an all inclusive list, how did the Authority Having Jurisdiction determine what other uses are acceptable? Any other use would be by special permission where the AHJ makes the determination.
Panel Meeting Action: Reject
Panel Statement: The submitter has not indicated how the term "only" will clarify the language presently in Section 320.10. The title of this section is "Uses Permitted" and the term "shall be permitted" is consistent with the language in Section 90.5(B). The use of the term "only" will give finality to the list of permitted uses for Type AC Cable. The FPN is meant to indicate that the list contained in "Uses Permitted" is not an all-inclusive list. The reference to Section 230.43 is irrelevant because that section is intended to be restrictive and provide strict, narrow guidance to which wiring methods are allowed for service conductors.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:

FAHRENTHOLD, C.: During the 2005 ROP meetings, the "Uses Permitted" article was deleted from this article and items were added to the "Uses Not Permitted" to further clarify where this wiring method was not allowed. Due to a large objection by the industry, the "Uses Permitted" was added back in the 2005 ROC. The panel felt that there was no way to identify every acceptable use of this wiring method so the fine print note was added. To add the word "only" and delete the fine print note would go against the panel's intent in the 2005 ROC.

7-2 Log #917 NEC-P07 **Final Action: Reject**
(320.12(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-8
Recommendation: Accept the proposal with the following revisions:

Where likely to be exposed to physical damage.

Substantiation: See Explanation of Negative on Proposal 7-9, 320.12(1).
Panel Meeting Action: Reject
Panel Statement: Not one of the many proposals submitted brought a strong argument that the existing language is lacking. Section 3.2.1 of the NEC Style Manual is not precise in supporting the use of the word "likely"; in fact Table 3.2.1 lists the term "likely" as possibly unenforceable and vague. The existing language is time tested and the use of the word "likely" in this manner does not improve the usability of this section. Although the word "likely" may be used in other sections of the code, it does not improve usability of this requirement.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-3 Log #935 NEC-P07 **Final Action: Reject**
(320.12(1) and (3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-10
Recommendation: Accept the phrase "likely to be".
Substantiation: See explanation of negative for Proposal 7-9 320.12(1)
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 7-2 for sub-part (1). In the case of 320.12 (3) see the panel action and statement to Proposal 7-10 log#1805 of 70A 2010-ROP. The Panel assumes that the comment applies to 320.12(1) and (4) since (3) was renumbered as (4) in Proposal 7-10.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-4 Log #2582 NEC-P07 **Final Action: Reject**
(320.17)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 7-12
Recommendation: Accept the panel action on the proposal in part; change the occurrences of the word "when" as added by CMP 7 to "where".
Substantiation: The word "if" is a generic conjunction that in usual code applications means "in the event that." In this sense, virtually any usage of "where" can be replaced by "if", as is equally the case of "when". The reason that these other words, particularly "where" have been generally applied throughout the NEC is that they more precisely define the event. The word "where" has been (and continues to be) used because it is limited to being a condition of place, and "when" has been (and continues to be) used in instances describing a condition of time.

The NEC is an installation document, and most of its provisions provide direction regarding installation practice in concrete locations, that being the nature of the trade. The subject of this proposal is no different. Although it is not grammatically incorrect to begin the sentence with "if", the word "where" is preferred because this rule describes a condition of place. Over the past decade, the word "where" has become the usual term for such usage throughout the NEC. As noted by the TCC, "when" is a condition of time, inappropriate for these installation requirements.
Panel Meeting Action: Reject
Panel Statement: The comment is moot to Proposal 7-12; the panel took no such action. See panel action and statement on Comment 7-5 and 7-6. The comment is not in compliance with the Rules Governing Committee Projects 4.4.6.2.1(a).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-5 Log #110 NEC-P07 **Final Action: Accept**
(320.23)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-13
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal concerning the use of the word "when" since the NEC Style Manual considers "when" as a condition of time.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The Panel Accepts the change from "When" back to "Where" in the first sentence in 320.23(A) and (B) and changes from "If" back to "Where" in the second sentence of 320.23(A). The remainder of the Panel Action on the Proposal is still Accepted in Principle in Part.
Panel Statement: See committee statement on Comment 7-6. The word "where" has been used because it is limited to being a condition of place, and "when" has been used in instances describing a condition of time.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-6 Log #1416 NEC-P07 **Final Action: Accept**
(320.23)

Submitter: Dennis A. Nielsen, Lawrence Berkeley National Laboratory / Rep. Institute of Electrical & Electronic Engineers, Inc.
Comment on Proposal No: 7-13
Recommendation: Revise text to read as follows:

320.23 In Accessible Attics.

Type AC cables in accessible attics or roof spaces shall be installed as specified in 320.23(A) and (B).

(A) Cables Run Across the Top of Floor Joists.

~~When~~ Where run across the top of floor joists, or within 2.1 m (7 ft) of floor or floor joists across the face of rafters or studding, the cable shall be protected by substantial guard strips that are at least as high as the cable.

~~If~~ Where this space is not accessible by permanent stairs or ladders, protection shall only be required within 1.8 m (6 It) of the nearest edge of the scuttle hole or attic entrance.

(B) Cable Installed Parallel to Framing Members.

~~When~~ Where the cable is installed parallel to the sides of rafters, studs, ceiling or floor joists, neither guard strips nor running boards shall be required, and the installation shall also comply with 300.4(D).
Substantiation: The proposed changes of ''Where'' replaced with "When" or "If" does not increase safety. The present code uses "Where" to indicate location. The change to "If" and ''When'' sets text to be time dependent. ''Where'' subject to physical damage is used throughout the Code. This could be progressive to other parts of the code where "Where" is currently used. This change has potential to allow the opportunity for the user to be subjective in applying "If" and/or ''When'' the situation presents itself and not absolute in every location.
Panel Meeting Action: Accept
Panel Statement: The Panel also changed the word "If" back to "Where" since "where" is preferred because this rule describes a condition of place. The word "if" is a generic conjunction that means "in the event that." An inspector can only evaluate existing conditions and not speculate on what might occur in the future.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-7 Log #1468 NEC-P07 **Final Action: Reject**
(320.30)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-15
Recommendation: Accept the proposal with the following revisions:

Securing and Supporting.

(A) General. Type AC cable shall be secured to supports by staples, cable ties, straps, hangers, clamps, or other means identified for the use, and installed so as not to damage the cable.

Exception: That portion installed in raceways. Cables installed through metal framing members shall be permitted to be secured to such members by tie wires.

(B) Securing. Unless otherwise permitted, Type AC cable shall be secured to supports within 300 mm (12 in) of every termination and at intervals not exceeding 1.4 m (4 1/2 ft).

FPN: See 300.4

(C) Unsupported Cables. Type AC cables shall not be required to comply with 320.30(A) where that portion of the cable complies with any of the following:

(1) is fished between access points through concealed spaces in finished buildings or other structures and supporting is impractical.

(2) If not more than 600 mm (2 ft) in length at terminations where flexibility is necessary after installation.

(3) Is not more than 1.8 m (6 ft) in length from the last point of cable fastening and support to the point of connection to equipment within an accessible above ceiling space, or surface mounted on such ceiling. For the purpose of this section, Type AC cable connectors shall be permitted as the last point of support before the cable connection to equipment.
Substantiation: Securing and supporting are not necessarily the same; a cable laid on the floor is supported; securing should be to the required supports. Support through framing members is not prohibited by the NEC and is covered by the present first paragraph of (C), and (B) requires the cable to be secured.
Panel Meeting Action: Reject
Panel Statement: The proposed change to this section does not improve clarity or consistency. It is logical for the user to assume that Type AC cable installed in a raceway does not need to comply with the securing and supporting requirements of this article. The submitter has not presented technical substantiation indicating present industry practice regarding securing and supporting cables installed in raceways presents a history of failure. Securing and supporting requirements are not the same and they are addressed in Section 320.30 (B) and (C). The panel refers the submitter to the NEIS #120 for standardized cable installations.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-8 Log #1467 NEC-P07 **Final Action: Reject**
(320.30(B) Exception (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-17
Recommendation: Accept the proposal.
Substantiation: Correlation. Section 320.10(B) merely permits installation in cable trays but does not negate or modify 320.30(A).
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that there is a need to correlate Section 320.10 "Uses Permitted", with 320.30 "Securing and Supporting". Cable Tray is a support system for various wiring methods contained within the NEC. The requirements of Article 392 stand alone and provide appropriate language for the use of such wiring methods within the tray.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-9 Log #2694 NEC-P07 **Final Action: Reject**
(320.80(A))

Submitter: Frederic P. Hartwell, Rep. Massachusetts Electrical Code Advisory Committee
Comment on Proposal No: 7-21
Recommendation: Accept the proposal.
Substantiation: This comment is offered for the sake of consistency with comparable material in 334.80. The same technical issues apply. With respect to the research that underlies the wording proposed for 334.80, and provided in a companion comment thereto, note that even wiring in a metal raceway was adversely affected by the embedment in foam thermal insulation, and therefore Type AC cable would easily be at risk.
Panel Meeting Action: Reject
Panel Statement: The panel has reviewed Proposal 4-97 from the A86 TCR which was referenced in Proposal 7-21. That material did not address the installation of Type AC Cable in or on thermal insulation. Section 320.80(A) requires conductors insulated for 90C. Derating from 90C is appropriate.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 324 — FLAT CONDUCTOR CABLE: TYPE FCC

7-10 Log #1695 NEC-P07 **Final Action: Reject**
(324.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-26
Recommendation: Accept the proposal.
Substantiation: "Permitted" per 90.5(B) does not impose a requirement and, therefore, is not enforceable. If "uses permitted" is not a limitation and not intended to be an all-inclusive list it is superfluous and the "not permitted" uses can govern and the cable can be used for anything not covered by the "not permitted" provision. 322.10 and others use the term "only" for uses permitted. Why do those sections not permit other applications as long as the "not permitted use" is not violated?
Panel Meeting Action: Reject
Panel Statement: The list of uses permitted represents the most common uses; it is not an all-inclusive list as noted in the FPN at the end of the section. 324.12 defines the specific uses that are not permitted. The addition of the term "only" is used for those cable types that are only permitted in the specified applications and nowhere else.
The comparison to Article 322 Flat Cable Assemblies and that of Flat Conductor Cable is invalid. FC is specifically designed for field installation in surface metal raceway. Whereas FCC is a branch circuit wiring system for field-installation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 326 — INTEGRATED GAS SPACER CABLE: TYPE IGS

7-11 Log #1694 NEC-P07 **Final Action: Reject**
(326.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-28
Recommendation: Accept the proposal.
Substantiation: "Permitted" does not impose a requirement per 90.5(B) and is not enforceable. If "Uses permitted" is not a limitation and not all inclusive, it is superfluous and "not permitted" uses can govern.
Panel Meeting Action: Reject
Panel Statement: The submitter has not indicated how the term "only" will clarify the language. The title of this section is "Uses Permitted" and the term "shall be permitted " is consistent with the language in Section 90.5(B). Section 326.12 defines the specific uses that are not permitted. The addition of the term "only" is used for those cable types that are only permitted in the specified applications and nowhere else.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 1

7-12 Log #356 NEC-P07 **Final Action: Accept in Principle**
(326.112)

TCC Action: The Technical Correlating Committee notes that the action taken on this comment does not satisfy the recommendation of the submitter.
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 7-31
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.
Panel Meeting Action: Accept in Principle
Revise second sentence as follows:
The nominal gas pressure shall be 138 kPa gauge ~~(20 pounds per square inch gauge)~~ (20 lb/in.^{2} gauge).
Panel Statement: The revised text conforms to the NEC Style Manual Annex B for standard terms for Units of Measurement used in Code text.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 328 — MEDIUM VOLTAGE CABLE: TYPE MC

7-13 Log #111 NEC-P07 **Final Action: Accept**
(328.10)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-33
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal relative to the text of the second sentences in both (3) and (6).
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise text to read as follows:
328.10 Uses Permitted.
Type MV cable shall be permitted for use on power systems rated up to 35,000 volts nominal as follows:
(1) In wet or dry locations
(2) In raceways
(3) In cable trays, where identified for the use, in accordance with 392.3, 392.6(F), 392.8, and 392.12. Type MV cable that has an overall metallic sheath or armor, also complies with the requirements for Type MC cable, and is identified as "MV or MC" shall be permitted to be installed in cable trays in accordance with 392.3(B)(2).
(4) Direct buried in accordance with 300.50
(5) In messenger-supported wiring in accordance with Part II of Article 396
(6) As exposed runs in accordance with 300.37. Type MV cable that has an overall metallic sheath or armor, also complies with the requirements for Type MC cable, and is identified as "MV or MC" shall be permitted to be installed as exposed runs of metal-clad cable in accordance with 300.37.
FPN: The "Uses Permitted" is not an all-inclusive list.
Panel Statement: The panel clarified the TCC's request. See the revised text in the panel action.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 330 — METAL-CLAD CABLE: TYPE MC

7-14 Log #1760 NEC-P07 **Final Action: Accept in Principle**
(328.14 (New))

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 7-36
Recommendation: Accept this proposal.
Substantiation: I agree with the negative comment as written by Mr. La Dart.

Mr. La Dart is correct. The installation and termination of type MV cable needs to be performed by qualified persons. Where this type of cable is not installed or terminated properly, hazards exist for the occupancy in which it is installed and for the men and women who will maintain or renovate theses systems.

The panel statement to reject reads as follows:

"Qualified person" is already defined in Article 100. Workmanship is a requirement of 110.12."

It should be noted that MV cable is not presently required to be installed by "qualified persons". Therefore the definition in Article 100 does not apply to the installation of type MV cable in any manner.

Furthermore the statement that workmanship is covered in 110.12 again has no bearing. 110.12 does not in any way address a requirement for qualified persons.

The panel statement to reject does not address the proposal.

Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 7-15.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-15 Log #1780 NEC-P07 **Final Action: Accept in Principle**
(328.14 (New))

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 7-36
Recommendation: Accept the proposal in principle and revise as follows:

328.14 Installation, Type MV cable shall be installed, terminated and tested only by qualified persons.

Informational Note: IEEE 576-2000 Recommended Practice for Installation, Termination, and Testing of Insulated Power Cables as Used in Industrial and Commercial Applications includes installation information and testing criteria for MV cable.

Substantiation: I highly encourage CMP-7 to reconsider the merits of this proposal. The submitter has identified a need in the NEC for installation criteria for MV cables: it's missing. The panel statement does not provide a reason for rejecting the proposal. Article 328 falls short of including many of the requirements necessary for installing medium voltage cables such as radius of bends, termination methods, acceptance and performance testing criteria of the installation, and so forth. The NEC is an installation Code and defines the term "qualified person" which is definitely necessary for these types of installations. This is specialized work and requires significant training and knowledge. The panel statement only addresses that there is a defined term in article 100 and that workmanship is covered in 110.12. This comment attempts to preserve the points and concepts made by the submitter. The new informational note can be used to ensure that necessary installation criteria (missing in the NEC) from other applicable standards are included in the installation processes, including any applicable performance and acceptance testing to verify the integrity of the installed cables prior to energizing. The NEC should require more specific qualifications for special equipment and systems requiring highly trained and knowledgeable workers. This type of installation qualifies for that type of expertise. The proposed language actually reflects what is happening in the field (or should be) relative to installing these types of cables. The exact wording of the proposed text may need to be adjusted slightly.

Panel Meeting Action: Accept in Principle

Accept the proposal in principle and revise text as follows:

328.14 Installation, Type MV cable shall be installed, terminated and tested ~~only~~ by qualified persons.

Informational Note: IEEE 576-2000 Recommended Practice for Installation, Termination, and Testing of Insulated Power Cables as Used in Industrial and Commercial Applications includes installation information and testing criteria for MV cable.

Panel Statement: The panel agrees that MV cable should be installed by qualified persons, as should all electrical systems. Adding this requirement highlights the technical complexity of installing MV cable, and the Information Note provides direction to an appropriate standard. The panel agrees that the word only is not necessary.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:

FAHRENTHOLD, C.: Qualified person is defined in article 100 so there is no need to add qualified person requirement to this article. There is also no documented problem with unqualified persons performing this work.

7-16 Log #1682 NEC-P07 **Final Action: Reject**
(330.4 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-38
Recommendation: Accept the proposal.
Substantiation: Type MC cables, 600 volts and over 600 volts rated should be listed. As are most other cables conductors, and equipment such as Class 2 and 3 transformers, snap switches, communication wires and grounding conductors of 820.100(A)(1).
Panel Meeting Action: Reject
Panel Statement: The panel rejects the comment because the submitter has not provided the technical substantiation to support the requirement for Type MC cable to be listed.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:

LA DART, S.: The panel should have accepted Proposal 7-38 and Comment 7-16. This is a safety issue. Products are required to be listed throughout the NEC. Product Standards are developed to provide for safer products to be used on electrical installations.

The "uses permitted" section of article 330 allows a multitude of uses for type MC cable, including "hazardous locations". It seems ironic that 330.40 would require MC cable "fittings" to be listed, and not have the same requirement for the cable.

MC cable is currently being manufactured as a "listed product", and we agree with the submitter of the Proposal -----That the code should require it to be installed as a "listed product".

7-17 Log #918 NEC-P07 **Final Action: Reject**
(330.30)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-47
Recommendation: Accept the proposal with the following revisions:

(A) General. Except as permitted in 330.30(B), Type MC cables not installed in a raceway or direct buried shall be secured to supports by staples, cable ties, tie wires, straps, hangers, clamps, or other approved means, installed so as not to damage the cable, at intervals not exceeding 1.8m (6 ft.) except as otherwise permitted in this section.

FPN: See 300.4 where cables are supported by openings in structural members. Cables containing four or less conductors not larger than 10 AWG shall be secured to supports within 300 mm (12 in.) of terminations except as permitted in 330.30(D).

(B) Unsupported Cables. Type MC cables shall not be required to comply with 330.30(A) for that portion that complies with the following:

(1) The cables is fished between access points through concealed spaces in finished buildings or other structures and supporting is not practical.

(2) Type MC cable containing four or less conductors not larger than 10 AWG and not more than 1.8 m (6 ft) in length from the last support shall not be required to be secured to support within 300 mm (12 in.) of termination at equipment within an accessible ceiling space or surface mounted on such ceiling. The last support for such installation shall be permitted to be a cable connector.

Substantiation: (A) should exclude cable installed in a raceway or direct buried. Cables supported by openings in metal framing members should be permitted to be fastened by tie wires (commonly accepted). A FPN reference to 300.4 is appropriate. Proposed (B)(2) specifies a particular cable since other MC cables already have a standard 6 ft requirement and present wording allows a cable fitting for such cables so installed. The provisions of (D)(2) should include equipment surface mounted to suspended ceilings.
Panel Meeting Action: Reject
Panel Statement: The proposed change to this section does not improve the clarity or consistency. It is logical for the user to assume that MC cable installed in a raceway or direct buried does not need to comply with the securing and supporting requirements of this Article. The submitter has not presented technical substantiation indicating present industry practice regarding securing and supporting direct buried cables or cables installed in raceways presents a history of failure. Securing and supporting requirements are not the same and they are addressed in Section 330.30 (B) and (C). The panel refers the submitter to the NEIS # 120 for standardized cable installations.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-18 Log #743 NEC-P07 **Final Action: Accept**
(330.80(B)(2))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 7-54
Recommendation: The Proposal should be Accepted in Principle and revise "Table 310.67 and Table 310.68" to "Table 310.60(C)(67) and Table 310.60(C)(68)".
Substantiation: This revision will correlate with the Panel Action on Proposal 6-123.
Panel Meeting Action: Accept
Revise text to read as follows:
The Proposal should be Accepted in Principle and revise "Table 310.67 and Table 310.68" to "Table 310.60(C)(67) and Table 310.60(C)(68)".
Panel Statement: Subject to action by Panel 6 and any correlation by the TCC.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-19 Log #742 NEC-P07 **Final Action: Accept**
(330.82(B)(1))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 7-53
Recommendation: The Proposal should be Accepted in Principle and "Table 310.20" revised to "Table 310.15(B)(20)".
Substantiation: This revision to the Proposal correlates with the Panel Action on Proposal 6-52.
Panel Meeting Action: Accept
Panel Statement: The panel understands that acceptance of this comment is subject to action by Panel 6 and any correlation by the TCC. The Panel Clarified the table numbering.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 332 — MINERAL-INSULATED, METAL-SHEATHED CABLE

7-20 Log #916 NEC-P07 **Final Action: Reject**
(332.4 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-58
Recommendation: Accept the proposal.
Substantiation: Practically all wiring methods and conductors are required to be listed (for safety and use). This article and Article 490 do not mention voltage rating; the voltage rating is covered in Table 310.13(A), but without listing the AHJ has to determine if the cable is so rated and be the sole enforcer of 310.11(B)(3). It is difficult to perceive why a 600 volt cable is not listed, when listing is required for other cables and 820.100(A)(1) requires listing for a grounding conductor.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the comment because the submitter has not provided the technical substantiation to support the change.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
LA DART, S.: The panel should have accepted Proposal 7-58 and Comment 7-20. This is a safety issue. We agree with the submitter----"That practically all wiring methods and conductors are required to be listed (for safety and use)". Type MI cable should not be an exception. Type MI cable has numerous applications in the field, (including hazardous locations).
Product standards help to provide for safer electrical installations. This fact formulates the basis for the needed "technical substantiation" for accepting the proposal.

7-21 Log #936 NEC-P07 **Final Action: Reject**
(332.12(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-60
Recommendation: Accept the proposal with the following revisions:
In underground runs unless protected where likely to be subject to physical damage.
Substantiation: See explanation of negative for Proposal 7-9 320.12(1).
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 7-2.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-22 Log #937 NEC-P07 **Final Action: Reject**
(332.12(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-62
Recommendation: Accept the proposal.
Substantiation: See explanation of negative for Proposal 7-9 320.12(1).
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 7-2.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-23 Log #915 NEC-P07 **Final Action: Reject**
(332.30)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-64
Recommendation: Accept the proposal with the following revisions:
Except where direct buried, or encased in concrete, or installed in a raceway, Type MI cable shall be secured to supports by staples, cable ties, tie wires, straps, hangers, or other approved means, installed so as not to damage the cable, at intervals not to exceed 1.8 m (6 ft), except as otherwise permitted in this section.
FPN: See 300.4(B) Unsupported Cable. Cable shall not be required for that portion of cable fished between access points through concealed spaces in finished buildings or other structures and supporting is not practical.
Substantiation: Securing to supports should be exempted where cables are embedded in concrete, direct buried, or installed in raceways. Present (A) is superfluous as 300.4 and the first paragraph already apply. A vertical run through holes or notches is supported since it has to be attached to supports the same as a vertical run on the side of a stud.
Panel Meeting Action: Reject
Panel Statement: The proposed change to this section does not improve the clarity or consistency. It is logical for the user to assume that MI cable installed in raceway, direct buried, or encased in concrete does not need to comply with the securing and supporting requirements of this Article. The submitter has not presented technical substantiation indicating present industry practice regarding securing and supporting direct buried cables, cables installed in raceways, or encased in concrete presents a history of failure. Securing and supporting requirements are not the same and they are addressed in Section 332.30. The panel refers the submitter to the NEIS # 120 for standardized cable installations.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-24 Log #744 NEC-P07 **Final Action: Accept**
(332.80(B))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 7-71
Recommendation: The Proposal should be Accepted in Principle and revise "Table 310.17" to "Table 310.15(B)(17)".
Substantiation: This revision will correlate with the Panel Action on Proposal 6-52.
Panel Meeting Action: Accept
Panel Statement: The panel understands that acceptance of this comment is subject to action by Panel 6 and any correlation by the TCC. The Panel Clarified the table numbering.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 334 — NONMETALLIC-SHEATHED CABLE: TYPE NM, NMC, AND NMS

7-25 Log #2882 NEC-P07 **Final Action: Accept in Principle**
(334.10(1))

Submitter: Timothy D. Curry, Curry Electric, Inc.
Comment on Proposal No: 7-77
Recommendation: CONTINUE TO ACCEPT THE PROPOSAL
Substantiation: THIS WILL GIVE CLEAR PERMISSION TO USE THIS WIRING METHOD, BOTH TO THE INSTALLER AND THE AHJ.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 7-26.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-26 Log #1859 NEC-P07 **Final Action: Accept in Principle**
(334.10(1))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 7-77
Recommendation: Accept the proposal in principle and revise 334.10(1) to read as follows:
One- and two- family dwellings and their garage or storage buildings.
Substantiation: The term "Accessory Structure" used in the proposal is defined in the ICC Residential Code as "A structure not greater than 3,000 square feet (279 m2) in floor area, and not over two stories in height, the use of which is customarily accessory to and incidental to that of the dwelling(s) and which is located on the same lot". This term is much too broad and goes beyond garages and storage sheds that were requested in the substantiation for proposal 7-76 and 7-77.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
One- and two-family dwellings and their attached or detached garages, and their storage buildings.
Panel Statement: The panel recognizes that "Accessory Structures" is too broad in scope. The addition of "attached or detached garages, and storage buildings" should be permitted and addresses the submitter's concerns.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-27 Log #2249 NEC-P07 **Final Action: Accept in Principle**
(334.10(1))

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 7-77
Recommendation: Continue to accept Proposal 7-77.
Substantiation: Compared to my laundry list of words in Proposal 7-75 attempting to catch all types of accessory structures, Proposal 7-77 greatly simplifies and clearly articulates that accessory structures need to be initially included in the allowance offered by 334.10(1). Too many authorities having jurisdiction have mistakenly required that the installation of Type NM cable in accessory structures somehow constitutes a greater hazard than the dwelling structure itself, and that Type NM cable needs to be installed behind a rated thermal barrier material. If warranted, and due to special circumstances on a case-by-case basis, the authority having jurisdiction can always invoke rules in Article 90 and Article 110 if the accessory structure actually qualifies as an "Other structure" under 334.10(3). In the Explanation of Negative comment by panel member LaDart, I find it
interesting that some persons believe 334.10(1) is meant to protect the Type NM cable from the occupants of the structure; conversely, the purpose of the rated thermal barrier material is to protect the occupants and to buy some time to escape the structure should the wiring be the source of or contributory to fire or smoke.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 7-26.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-28 Log #2356 NEC-P07 **Final Action: Accept in Principle**
(334.10(1))

Submitter: Marcus R. Sampson, Lysistrata Electric
Comment on Proposal No: 7-77
Recommendation: Mr. Ladart's comment against the panel vote should be noted and the accepted change to this section revised.
Substantiation: Using "dwelling associated garage(s) and storage shed(s)" is a much better choice in this instance. Installers and inspectors need to apply different rules to those dwelling accessory structures that may be Article 501, 513, 547 or other special occupancy buidings.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 7-26.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-29 Log #2259 NEC-P07 **Final Action: Reject**
(334.10(2))

Submitter: William Benard, Gemini Electric Inc.
Comment on Proposal No: 7-77
Recommendation: Revise as follows:
334.10(2) Multifamily dwellings that consist solely of dwelling units, occupancies ancillary to the multifamily dwelling units and their accessory structures and permitted to be of Types III, IV, and V construction except as prohibited in 334.12.
Substantiation: The current definition of "dwelling multifamily" is a common definition used in several other NFPA documents and for consistency sake cannot be edited without affecting other NFPA codes. It appears that the original intention to limit the use of exposed type NM cable to structures that are one family, two family and mutifamily dwellings was with the intention to permit the unconcealed installation of type NM cable within structures that were "solely" one, two or three or more dwelling occupancies. Multiple occupancy structures containing uses, other than dwelling units, can also be comprised of three or more dwelling units; however, the definition of multifamily does not contain the specificity of the word "solely" as one and two family dwellings are described in Article 100. It becomes necessary to detail in 334.10(2) that the Type NM cable will be permitted exposed in multifamily buildings that consist solely of dwelling units. By definition, a multiple occupancy building with three or more dwelling units and mercantile or other occupancy uses is by definition a multi-family dwelling.
Adding the language "occupancies ancillary to the dwelling units and their accessory structures" permits structures with a make up of "solely dwelling units" to have occupancies or rooms intended only to support the existence and use of the dwelling units to be considered as part the building make-up. The inclusion of the language "and their accessory structures" also supports and extends the accepted Proposal 7-77, Section 334.10(1) to be reflected in 334.10(2).
Panel Meeting Action: Reject
Panel Statement: The definition of multifamily dwelling in Article 100 is clear and does not apply to mixed use structures. There is no need to adjust the language of Section 334.10(2). This is new material that has not had public review. The panel action is in accordance with Section 4.4.6.2.1(b) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-30 Log #112 NEC-P07 **Final Action: Accept**
(334.10(5) (New))

TCC Action: The Technical Correlating Committee notes that the panel's action on this comment changes the word "when" to the word "where" in the committee action on Proposal 7-79.
Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-79
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal concerning the use of the word "when" since the NEC Style Manual considers "when" to be a condition of time.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action and statement on Comment 7-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-31 Log #931 NEC-P07 **Final Action: Reject**
(334.12(B)(4))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-88
Recommendation: Accept the proposal with the following revisions:
...in wet or continuously damp locations.
Substantiation: 334.10(A)(1) permits nonmetallic sheathed cable in normally dry locations which doesn't exclude locations that may occasionally be damp or wet. Basement and crawl spaces may be occasionally damp.
Panel Meeting Action: Reject
Panel Statement: Types NM and NMS are only permitted in "normally dry" locations. See 334.12(B)(4), and the definition "Location Damp" in Article 100. The submitter has not presented technical documentation indicating that damp locations do not have a deteriorative effect on these cables. Only Type NMC is permitted in "dry, moist, damp, or corrosive locations". The argument that a location is only damp periodically or the area must be continuously damp in order to restrict a wiring method is false.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-32 Log #113 NEC-P07 **Final Action: Accept**
(334.15(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-97
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal relative to the NEC Style Manual on writing exceptions as positive text.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 7-35.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-33 Log #114 NEC-P07 **Final Action: Accept**
(334.15(C))

TCC Action: The Technical Correlating Committee directs that the text be revised to read as follows:
"Where cable is run at angles with joists in unfinished basements and crawl spaces, it shall be permissible to secure cables not smaller than two 6 AWG or three 8 AWG conductors directly to the lower edges of the joists. Smaller cables shall be run either through bored holes in joists or on running boards. Nonmetallic-sheathed cable installed on the wall of an unfinished basement shall be permitted to be installed in a listed conduit or tubing or shall be protected in accordance with 300.4. Conduit or tubing shall be provided with a suitable insulating bushing or adapter at the point where the cable enters the raceway. The sheath of the nonmetallic-sheathed cable shall extend through the conduit or tubing and into the outlet or device box not less than 6 mm (1⁄4 in.). The cable shall be secured within 300 mm (12 in.) of the point where the cable enters the conduit or tubing. Metal conduit, tubing, and metal outlet boxes shall be connected to an equipment grounding conductor complying with the provisions of 250.86 and 250.148."
Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-99
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal identifying the part of the proposal that was rejected.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Where cable is run at angles with joists in unfinished basements and crawl spaces, it shall be permissible to secure cables not smaller than two 6 AWG or three 8 AWG conductors directly to the lower edges of the joists. Smaller cables shall be run either through bored holes in joists or on running boards. Nonmetallic-sheathed cable installed on the wall of an unfinished basement shall be permitted to be installed in a listed conduit or tubing or shall be protected in accordance with 300.4. Conduit or tubing shall be provided with a suitable insulating bushing or adapter at the point the cable enters the raceway. The nonmetallic-sheathed cable sheath shall extend through the conduit or tubing and into the outlet or device box not less than 6 mm (1⁄4 in.). The cable shall be secured within 300 mm (12 in.) of the point where the cable enters the conduit or tubing. Metal conduit, tubing, and metal outlet boxes shall be connected to an equipment grounding conductor complying with the provisions of 250.86, and 250.148.
Panel Statement: The panel accepted the replacement of "NM" with "nonmetallic-sheathed" and rejected everything else for the reasons stated. The panel rejects the use of the term "shall" in place of "shall be permitted". There are other methods that may be employed to protect the cable. The use of a raceway is only one such method. The panel has chosen to edit the paragraph and reference Sections 250.148, and 250.86 to comply with section 4.1.2 of the NEC Style Manual. The panel rejects the exclusion of the exception to 250.86. Short sections of metal raceway or tubing are permitted to protect cables if so desired.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-34 Log #1962 NEC-P07 **Final Action: Reject**
(334.15(C))

Submitter: Gerald H. Horn, Spencer Research & Development, dba/J-Horn Electric, Inc.
Comment on Proposal No: 7-98
Recommendation: Revise text to read as follows:
Smaller cables shall be run either through bored holes in joist or on a running board or through listed devices designed for the support of NM cable attached to the bottom of ceiling joist. These devices allow NM cable to be run at right angles to the joist and must be installed within 12 in. of the main center support beam.
Substantiation: The listed device would be less expensive for the installer, would put less stress on the cable sheath, and would not compromise the integrity of the wood joist by eliminating the bored holes.
I am submitting this 2011 Report on Comments form to clarify my original submission in the ROP stage. I have added a restriction on the placement of the listed device to satisfy concerns of Panel 7 members that the device could be a hindrance when finishing basement ceilings. Several electrical inspectors I have contact with also expressed the same concerns. The restriction on the placement of the device satisfied their concerns, and I have not had a single negative response with all the AHJs I have contacted with the change. With the problems facing the housing industry, any improvement to installation methods and cost would be helpful to the housing industry.
Underwriters Laboratories has listed the product for which I proposed a change in the wording of 334.15(C) for the 2011 Code.
UL listed the product subject to 334.15(C).
I have provided copies of correspondence from UL regarding the listing. In addition, I have provided some pictures of the listed product in an actual installation.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The substantiation provided with the comment did not address the concerns expressed by the Panel on Proposal 7-98 of the 70-A 2010 ROP.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-35 Log #1076 NEC-P07 **Final Action: Accept**
(334.15(C) Exception No. 1)

Submitter: Charles J. Palmieri, Town of Norwell
Comment on Proposal No: 7-97
Recommendation: Delete the New Exception which was added at the proposal meeting.
~~Exception No. 1: Where the height of a crawl space does not exceed 1.4 m (4 1/2 ft) it shall be permissible to secure NM cables, that run at angles with joist, to the bottom edge of joist. NM cables run within 2.1 m (7 ft) of crawl space access shall comply with 320.23.~~
Substantiation: The submitter did not present a clear argument that the current requirements for physically protecting cables smaller than 6/2 or 8/3 in these exposed areas was impossible nor a safety hazard to installers. The explanation presented was injury to electricians in these confined areas when boring holes through framing members. This proposal never addressed alternative methods to protect said exposed cables. There are several products available to the industry that would provide adequate protection to the wiring method and anyone entering these spaces for maintenance or storage. Furthermore, the panel action accepting a relaxation of the long-standing requirements to protect this wiring method in those areas that are 4-1/2 ft or smaller is excessive. If the occupants are going to utilize the first 7 ft of these areas what makes one think they will not penetrate the space to beyond? Most building codes require crawl spaces to have poured floors. This invites the use of these areas for a variety of applications (I see it daily). Most of the areas I observe usually contain equipment, which requires periodic maintenance and area lighting. The exception invites an installation standard that lacks foresight for the use of such areas exposing the installed cables and personnel that may enter these areas to hazard. Common ties that may occupy such areas include bikecycles (40 in.), lawn furniture (47 in.), desks (32 in.), ladders (24-30 in.). It is unreasonable to expect that a homeowner is going to ignore a dry area that presents such an ample opportunity to store seasonal items. I am convinced that the existing text is adequate needing no further manipulation by the panel. It is reasonable to consider that such installation can and will be evaluated at the time of

installation and the AHJ and installer will come to an agreement as to how best secure the installation and the building's occupants from harm.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
RAY, J.: This comment should have been rejected. This code section needs to provide some differentiation between an unfinished basement and a crawl space. The words "and crawl spaces" were added to the 2008 code with substantiation that the same dangers exist for crawl spaces and unfinished basements. In fact, unfinished basements and crawl spaces do not have the same dangers. Clearly a 24 inch crawl space and a 6 to 8 ft unfinished basement have unique and separate dangers. The substantiation further stated a need to give direction as to the requirements of a crawl space. The exception accepted in the proposal stage provided some direction for crawl spaces and accepting this comment reverses that action of the panel.

7-36 Log #1995 NEC-P07 **Final Action: Reject**
(334.15(C) Exception No. 1)

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 7-97
Recommendation: Add new text to read as follows:
Exception: Where the height of a crawl space does not exceed 1.4 m (4 1/2 ft) it shall be permissible to secure nonmetallic-sheathed cables, installed at angles to the joists, to the bottom edge of joists. Nonmetallic-sheathed cable installed within 2.1 m (7 ft) of crawl space access shall be protected by substantial guard strips that are at least as high as the cable.
Substantiation: I agree with the submitter I have lost my front teeth when I lost control of a right angle drill in a 36 in. crawl space.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the comment because the submitter has not provided technical data to support the change. The panel has reviewed the submitter's substantiation and worker safety is addressed by safe work practices.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
RAY, J.: See statement on comment 7-35.

8-6 Log #325 NEC-P08 **Final Action: Accept**
(334.30(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-106
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 8 for action in Article 342.
This action will be considered by Code-Making Panel 8 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the TCC recommendation to consider and rejects the proposal. The Panel concludes this proposal was intended for 344.30(C).
An identical proposal 8-22 was submitted for 342.30(C) and was rejected by CMP-8 based on the panel action taken on Proposal 8-24a. Proposal 7-106 was incorrectly directed to CMP 7 and should continue to be rejected. There has never been any technical substantiation to support the proposal.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

7-37 Log #2688 NEC-P07 **Final Action: Reject**
(334.80)

Submitter: Frederic P. Hartwell, Rep. Massachusetts Electrical Code Advisory Committee
Comment on Proposal No: 7-111
Recommendation: The proposal should be accepted.
Substantiation: The panel statement refers to research unavailable to the code making panel. The research is documented in the substantiation for Proposal 4-97 in the A86 TCR (the equivalent of today's ROP) for the 1987 NEC cycle, as plainly stated in the substantiation for this proposal. This proposal appears on page 125 of that document. The tests were conducted by Forensic Engineering, Inc. in Marietta, Georgia. We assume that this material is readily available to CMP 7 members, as we have discussed this topic at length with individual members, and we know that it is common knowledge. It is clear from the statements made in the voting that this topic has been reviewed. Surely this information informed the 60°C limitation imposed by CMP 7 on Type SE cable in the 2008 NEC cycle and partially maintained in this cycle (Proposal 7-133). For the benefit of panel members that may not have had access to the cited material, enough copies of the relevant page from the old TCR are being submitted with this comment.
The ampacity limitations for this wiring method are too severe for applications without thermal insulation embedment, and insufficiently severe for applications that are embedded within thermal insulation. The proposal seeks a technically appropriate balance, nothing more.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel has reviewed Proposal 4-97 from the A86 TCR, which was referenced in Proposal 7-111. That material did not address the installation of Type NM Cable in or on thermal insulation. Section 334.112 requires conductors insulated for 90C. Derating from 90C is appropriate. There is no other documentation or study available to this panel indicating the existing language contributes to failure.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 336 — POWER AND CONTROL TRAY CABLE: TYPE TC

7-38 Log #920 NEC-P07 **Final Action: Reject**
(336.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-117
Recommendation: Accept the proposal.
Substantiation: See explanation of negative on Proposal 7-9, 320.12(1).
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 7-2.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-39 Log #934 NEC-P07 **Final Action: Reject**
(336.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-117
Recommendation: Accept the proposal.
Substantiation: This provision is not a requirement and therefore not enforceable. If "uses permitted" is not all inclusive, how are other not prohibited uses to be judged acceptable? 230.43 limits wiring methods and if that is the intent of this provision it should be clear.
Panel Meeting Action: Reject
Panel Statement: The panel understands that the submitter's comment refers to Proposal 7-116. The submitter has not indicated how the term "only" will clarify the language presently in Section 336.10. The title of this section is "Uses Permitted" and the term "shall be permitted" is consistent with the language in Section 90.5(B). The use of the term "only" will give finality to the list of permitted uses for Type TC Cable. The reference to Section 230.43 is irrelevant because that section is intended to be restrictive and provide strict, narrow guidance to which wiring methods are allowed for service conductors
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-40 Log #502 NEC-P07 **Final Action: Reject**
(336.10(7))

Submitter: Robert Alexander, P2S Engineering
Comment on Proposal No: 7-118
Recommendation: Accept the Proposal.
Substantiation: The cable is primarily designed to be installed in cable tray and as permitted in 336.10." The statement is, of course, true. SO WHAT? It's pure sophistry. In all the times this Proposal or ones similar have been made, the Panel HAS NEVER ONCE established a valid technical or safety (valid or not) issue that would reasonably prohibit the alternate use of TC-ER as proposed.
Forget the name - consider the construction. It isn't even a unique or novel concept. Type TC-ER is obviously superior to Type NM (in any form) yet is restricted from uses where Type NM would be readily permitted. Please spare the further sophistry that there are applications where neither would be permitted.
This commenter is aware that, while Type TC-ER "…complies with the crush and impact requirements of Type MC …," Type MC does, in fact, generally perform better under those qualification tests. If safety were a genuine concern, the appropriate response would be to raise the "pass/fail" qualification standard – not arbitrarily prohibit Type TC from a reasonable alternate application.
There is a reasonable safety concern that TC-ER may at some time in the future be proposed as a substitute for Type MC. That is when to reject it – but only if the application warrants a unique feature of Type MC.
Panel Meeting Action: Reject

Panel Statement: Type TC cable was introduced into the Code as a tray cable. As additional substantiation was provided it was permitted to be used as open wiring in limited lengths when it complied with the crush and impact requirements of Type MC Cable. It was never intended to be a universal wiring method outside of cable tray.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
RUNYON, G.: Mr. Alexander raises the same point that many have had for the past several code cycles. The panel continues to reject other uses of this cable without any technical or safety justification. The panel should have accepted Mr. Alexander's recommendation that the panel accept the proposal.
Comment on Affirmative:
FAHRENTHOLD, C.: During the code cycle for the 2002 code, the restriction for limiting the distance of 50 feet that the cable could be installed outside the cable tray between the cable tray and the utilization equipment was deleted in article 336.10 (6). The panel felt that the 50 foot restriction was too arbitrary. However, the panel has never intended for this cable to be installed outside the cable tray for unlimited lengths. In making this change, the panel was allowing the cable to leave the cable tray and be installed along a support structure to the utilization equipment so that either additional cable tray did not have to be installed or that the tray cable did not have to be transitioned to some other wiring method.

7-41 Log #919 NEC-P07 **Final Action: Reject**
(336.10(7))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-117
Recommendation: Accept the proposal.
Substantiation: See Explanation of Negative on Proposal 7-9, 320.12(1).
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 7-2.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-42 Log #932 NEC-P07 **Final Action: Reject**
(336.12(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-121
Recommendation: Accept the proposal.
Substantiation: See explanation of negative for Proposal 7-9 320.12(1)
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 7-2.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-43 Log #2172 NEC-P07 **Final Action: Reject**
(336.100)

Submitter: Robert L. Seitz, Artech Engineering
Comment on Proposal No: 7-125
Recommendation: Add to end of paragraph:
A braided or basket weave metallic armor shall be permitted beneath the outer non metallic jacket
Substantiation: Reconsideration of proposal is requested. Apparently some words were deleted from the substantiation provided. There is a need for a cable construction of the type this change would permit. The: additional durability afforded by a braided metallic sheath or an nor along with the enhanced ability to provide for ground fault detection available because of such metallic layer in the TC construction would provide a very workable solution to many installation problems especially where more flexible connections are necessary. The argument was not intended to justify the new construction permitted for use in shipboard or offshore environments but was meant to encourage the allowance of a cable construction, that is common for offshore installation. for onshore industrial facilities covered by the National Electrical Code. The fact that such a construction is currently available in a cable type very similar to TC seemed a reasonable argument in favor of this metallic sheath, as it would be easy to implement in TC by cable manufacturers. It is presumed that such a cable would he qualified to be marked TC-ER if the requirements for TC-ER are met. This proposer agrees that there should be no confusion allowed between TC and MC cable. The braided or woven construction is so different from the metallic sheath described in 300.116, and could not be confused during installation. Where greater flexibility is required at motors driven by variable speed drives, the metallic sheathed TC cable would provide benefit just as an MC cable docs for such application, again with the greater and better flexibility.
Panel Meeting Action: Reject
Panel Statement: As stated in the Panel Statement on Proposal 7-125, the exclusion of a metallic sheath or armor on the cable was specifically intended to differentiate Type TC Cable from Type MC Cable. The use of metallic tapes or braids for shielding purposes is permitted under the current Code. Shipboard cables are excluded from the Code under 90.2(B)(1).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 338 — SERVICE-ENTRANCE CABLE: TYPES SE AND USE

7-44 Log #2001 NEC-P07 **Final Action: Reject**
(338.10(4)(a))

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 7-133
Recommendation: Revise text to read as follows:
(a) *Interior Installations.* In addition to the provisions of this article, Type SE service-entrance cable used for interior wiring shall comply with the installation requirements of Part II of Article 334, excluding 334.80. Where installed in thermal insulation exceeding 3.0 meters (10 ft) the ampacity shall be in accordance with the 60°C (140°F) conductor temperature rating. The 90°C (194°F) rating shall be permitted to be used for ampacity adjustment and correction purposes, provided the final derated ampacity does not exceed that for a 60°C (140°F) rated conductor.
Substantiation: This will give the AHJ a measurement and the installer a definable limitation to the SE cable.
Panel Meeting Action: Reject
Panel Statement: The submitter has not presented technical documentation to support excluding the 60 degree ampacity limitation for cable installations which comprise of 10 ft or less of a cable run, in contact with thermal insulation.
The submitter has not presented technical documentation to support excluding the 60 degree ampacity limitation for cable installations which comprise of 10 ft or less in contact with thermal insulation. See the panel action and statement on Comment 7-48.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-45 Log #933 NEC-P07 **Final Action: Reject**
(338.10(B)(2) Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-132
Recommendation: Accept the proposal with the following revisions:
Conductor not Insulated. Type SE cable shall be permitted for use where the iunnsulated conductors are used for circuit wiring and the insulated conductor is used for equipment grounding or bonding.
Substantiation: Type SE cable uninsulated conductor should be permitted as a bonding conductor. The uninsulated conductor is not a grounded conductor (defined as a system or circuit conductor) where used as an equipment grounding conductor.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 7-46.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-46 Log #1197 NEC-P07 **Final Action: Reject**
(338.10(B)(2) Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-132
Recommendation: Accept the proposal with the following revisions:
Conductor, Not Insulated. Type SE cable shall be permitted for use where the insulated conductors are used for circuit wiring and the uninsulated conductor is used for equipment grounding or bonding.
Substantiation: Type SE cable uninsulated conductor should be permitted as a bonding conductor. The uninsulated conductor is not a grounded conductor (defined as a system or circuit conductor) where used as an equipment grounding conductor.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the submitter's comment.
The uninsulated conductor contained in SE Cable is allowed as a bonding conductor. See Article 100 definitions Grounding Conductor, Equipment (EGC). FPN No. 1: Which states, It is recognized that the equipment grounding conductor also performs bonding.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-47 Log #115 NEC-P07 **Final Action: Accept**
(338.10(B)(4))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-133
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 7-48.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
DALY, J.: Refer to comment submitted with NEMA Affirmative vote on Comment 7-48.
STRANIERO, G.: See CDA comment on 7-48.

7-48 Log #1824 NEC-P07 **Final Action: Accept in Principle**
(338.10(B)(4))

TCC Action: The Technical Correlating Committee understands that the panel action on this comment is prefaced with the following text "In addition to the provisions of this article," at the beginning of the first sentence in 338.10(B)(4)(a) to correlate with existing text in 338.10(B)(4)(b).

Submitter: Richard W. Likes, L & F Electric
Comment on Proposal No: 7-133
Recommendation: Revise text to read as follows: "Type SE service-entrance cable used for interior wiring shall comply with the installation requirements of Part II of Article 334, excluding 334.80."
Substantiation: There seems to be no information as to why the code was even changed in 2008 without any written proof that SE cable, which is marked to indicate XHHW conductors which are rated for both wet and dry locations. This is one difference from Romex wire. Romex does not say what conductors it contains. Still my question, has the NEC been wrong all these years?
Panel Meeting Action: Accept in Principle
Revise original panel action text on Proposal 7-133 as follows:
Type SE service-entrance cable used for interior wiring shall comply with the installation requirements of Part II of Article 334, excluding 334.80. Where installed in thermal insulation, the ampacity shall be in accordance with the 60°C (140°F) conductor temperature rating. The maximum conductor temperature rating shall be permitted to be used for ampacity adjustment and correction purposes, provided the final derated ampacity does not exceed that for a 60°C (140°F) rated conductor.
Informational Note: For the installation of main power feeder conductors in dwelling units refer to 310.15(B)(7).
Panel Statement: The panel action text and statement to Proposal 7-133 was to accept the submitter's proposal in principle with the addition of panel generated language addressing the several concerns raised regarding the negative effect on such installations when the cable is embedded in thermal insulation. The panel added an informational note for clarity.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
CYBULA, T.: No evidence was submitted to support the idea that a Type SE cable having either 75 or 90 C rated insulated conductors would behave differently than a Type NM with 90 C insulated conductors to warrant excluding the Type SE cable from the requirements of 334.80 when used as internal wiring.
STRANIERO, G.: The panel action should not have included the phrase" excluding 334.80". SE cable installed as a substitute for NM Cable should be subject to the installation requirements for NM. This provision is in place for Type UF where so installed, as referenced in 340.10(4), and should also apply to SE. The Ampacity adjustment rules in 334.80 including those on cables passing through bored holes without maintaining spacing and where installed in thermal insulation without maintaining spacing also apply to SE cable where installed as NM.
Comment on Affirmative:
DALY, J.: When Type SE Cable is used in interior installations, it should conform to the same installation requirements as Type NM cable including 334.80. 334.112 requires conductors in Type NM Cable to be rated at 90C (194F) but the allowable ampacity after adjustments and corrections cannot exceed the ampacity for 60C conductors. Conductors in Type SE Cable containing 90C rated conductors should be adjusted and corrected from the 90C ampacity column and Type SE Cable containing 75C conductors should be adjusted and corrected from the 75C ampacity column however, in either case, the adjusted ampacity cannot exceed that permitted in the 60C ampacity column.
The language proposed by the Panel falls short when SE cables are installed as branch circuits in that it does not require all of the ampacity adjustment and correction requirements found in 334.80.
SMITH, M.: We think there is a need to request a reseach project on the affects of conductors when installed in thermal insulation. CMP-7 will be makeing a formal request for a reseach grant to look into this and give the Panel a clear direction.

7-49 Log #2250 NEC-P07 **Final Action: Accept in Principle**
(338.10(B)(4))

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 7-133
Recommendation: Proposal 7-133 should have been accepted.
Substantiation: Type SE cable is the preferred wiring method of choice among electrical contractors for individual dwelling unit feeders in multifamily buildings, where the 120/240-Volt single-phase feeder carries 100% of the dwelling unit's diversified load. However, the lack of coordination between 338.10(B)(4) and Table 310.15(B)(6) has paralyzed both electrical contractors and electrical inspectors; do we use the 60C rating as per 338.10(B)(4) or do we use Table 310.15(B)(6) for sizing the feeder? Contractors need a straight answer so they can properly bid, plan, and layout their electrical work. And it's more than a routine judgment call for the electrical inspector; the lack of correlation in the NEC forces the electrical inspector to make a very difficult decision – common sense leads one to believe that Table 310.15(B)(6) would result in a safe installation, yet the
typical inspector does not have all of the technical information that causes others to promote a 60C rating for Type SE cable that is used for interior wiring.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 7-48.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
CYBULA, T.: See my Explanation of Negative to 7-48.
STRANIERO, G.: See CDA comment on 7-48.
Comment on Affirmative:
DALY, J.: Refer to comment submitted with NEMA Affirmative vote on Comment 7-48.

7-50 Log #2583 NEC-P07 **Final Action: Reject**
(338.10(B)(4))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 7-133
Recommendation: Reject the proposal.
Substantiation: Although the panel action is an improvement on the 2005 NEC language that was worded the same way as the proposal itself suggested for the 2011 edition, it still does not meet minimum safety requirements, in two areas. First, if the cable is being listed to 75°C, then the derating should be done from that temperature column. (This is not clear in the 2009 edition of the UL White Book, but the panel statement on this proposal seems definitive.)
The more interesting issue is the idea that although cable embedded in insulation must be taken as a 60°C conductor in this case, derating can still apply from a higher design temperature. As clearly shown in the NEMA/UL study used as substantiation for proposals on this topic in the 2008 NEC cycle, the ampacity of cable embedded in thermal insulation is far lower than its nominal value. The panel action recognizes that in part by the 60°C rule, but then, inconsistently, fails to apply the concept to derating. If the ampacity of a cable is based on the 60°C ampacity column, then derating must be applied from the same starting point. Doing anything else would be similar to pulling nine TW conductors into a raceway, explaining that in general the ampacity will be based on the 60°C ampacity column, but allowing the derating for mutual conductor heating to be based on the 90°C ampacity column. The cable would overheat just as surely as the embedded raceway in this example results in a base ampacity lower that the cable insulation would normally predict, and for multiple conductor heating the derating must also be taken from that lower value.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 7-48.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
CYBULA, T.: See my Explanation of Negative to 7-48.
STRANIERO, G.: See CDA comment on 7-48.
Comment on Affirmative:
DALY, J.: Refer to comment submitted with NEMA Affirmative vote on Comment 7-48.

7-51 Log #2738 NEC-P07 **Final Action: Accept in Principle**
(338.10(B)(4))

Submitter: Christel K. Hunter, Alcan Cable
Comment on Proposal No: 7-133
Recommendation: Add new text to the 2008 NEC language to read as follows, without the additional limitation added by the panel:
Type SE service-entrance cable used for interior wiring shall comply with the installation requirements of Part II of Article 334, excluding 334.80.
Substantiation: Several submitters made the obvious and correct statement that there was no substantiation provided to the code panel justifying the change in the 2008 NEC to limit SE cable to 60 degrees C. Mr. Hinrichs comment that information was provided to CMP-7 during the 2008 cycle that SE cable is manufactured the same as NM cable indicates that the CMP was given inaccurate information. NM and SE cable are manufactured to different standards and generally use different insulation types and materials. Additionally, they are manufactured in different sizes and are rarely used for the same applications. It is obvious from the allowed uses that the cables are different, since SE is suitable for wet locations and service entrance, and NM is not allowed for those applications. One of the panel member comments indicated that this subject is a safety issue, yet there has been no showing that SE failed in the previous decades of use when sized using the 75C column. He also stated that the performance of the cable types will be the same when placed in thermal insulation, but no evidence of this was presented to the CMP. Another of the panel members indicated that the insulated conductors in SE cable are typically rated at 75C, and this is also incorrect. The conductors are rated at 90C, and the assembly is rated at 75C. It is obvious that the entire premise of the change to limit SE cable to 60C is based on incorrect information and assumptions. The Code should revert to the time-proven language in the 2005 NEC.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 7-48.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
CYBULA, T.: See my Explanation of Negative to 7-48.
STRANIERO, G.: See CDA comment on 7-48.
Comment on Affirmative:
DALY, J.: Refer to comment submitted with NEMA Affirmative vote on Comment 7-48.

7-52 Log #116 NEC-P07 **Final Action: Accept**
(338.10(B)(4)(a))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-134
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has reviewed the negative and positive comments on Proposal 7-134. See the panel action and statement on Comment 7-48.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
DALY, J.: Refer to comment submitted with NEMA Affirmative vote on Comment 7-48.
STRANIERO, G.: See CDA comment on 7-48.

7-53 Log #117 NEC-P07 **Final Action: Accept**
(338.10(B)(4)(a))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-135
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has reviewed the negative and positive comments on Proposal 7-135. See the panel action and statement on Comment 7-48.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
DALY, J.: Refer to comment submitted with NEMA Affirmative vote on Comment 7-48.
STRANIERO, G.: See CDA comment on 7-48.

7-54 Log #118 NEC-P07 **Final Action: Accept**
(338.10(B)(4)(a))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-136
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has reviewed the negative and positive comments on Proposal 7-136. See the panel action and statement on Comment 7-48.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
DALY, J.: Refer to comment submitted with NEMA Affirmative vote on Comment 7-48.
STRANIERO, G.: See CDA comment on 7-48.

7-55 Log #1077 NEC-P07 **Final Action: Reject**
(338.10(B)(4)(a))

Submitter: Charles J. Palmieri, Town of Norwell
Comment on Proposal No: 7-133
Recommendation: Revise text to read as follows:
(a) Interior Installations. In addition to the provisions of this article, Type SE service-entrance cable used for interior wiring shall comply with the installation requirements of Part II of Article 334. ~~excluding 334.80. [ROP-7-133] Where installed in thermal insulation, the ampacity shall be in accordance with the 60°C (140°F) conductor temperature rating. The 90°C (194°F) rating shall be permitted to be used for ampacity adjustment and correction purposes, provided the final derated ampacity does not exceed that for a 60°C (140°F) rated conductor. [ROP 7-133]~~
Substantiation: The panel should reject this proposal and keep the language currently in the 2008 NEC, at least for one more cycle. If you consider the panel's action on Proposal 7-111 (334.80) which would have adopted similar permissive language for type NM Cable, the panel voted 14 Affirmative to reject. The submitters for Proposals 7-134, 135, and 136 have not presented clear evidence that Type SE Cable is profoundly different from that of Type NM cable. Clearly the panel had reservations concerning heat dissipation for Type SE when installed in thermal insulation, yielding the 75-degree limit, which was adopted. It would be helpful if the Code Panel had scientific evidence to support adoption or rejection of this language but in the absence of documentation the panel should reconsider its vote. It is important to consider that when type SE is installed as interior cable it is most likely used in Type 5 (wood frame) structures. When used in such structures it is predominately used as feeder (beyond the service entrance). Installers incorrectly apply the permissive ampacities listed in the current Table 310.15(B)(6). These (Feeder) cables do not offer the same load diversity that was considered when that table was developed. If such conditions are not detected, there is a probability that the cable will be over fused. Another point to consider concerns the installation of insulation, this occurs after the rough-in electrical inspection. In today's homes quite a bit of the interior vertical partitions are insulated for sound damping purposes. Additionally, many of the unfinished areas that are not temperature controlled have insulation installed per building codes. Inspectors will have a difficult time in determining which interior partitions or framing cavities will compel the 75-degree limitation on these cables. The acceptance of these proposals essentially establishes a hierarchy of installation requirements. Inspectors and installers will be at odds regarding installation requirements. This adopted language establishes two rules, one for Type NM, and one for Type SE. This will undoubtedly lead to enforcement problems. During the 2008 cycle, this panel determined a need to address both of these wiring methods with similar restrictive language. None of the adopted proposals have significantly indicated a need to back track on that decision.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 7-48.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
CYBULA, T.: See my Explanation of Negative to 7-48.
STRANIERO, G.: See CDA comment on 7-48.
Comment on Affirmative:
DALY, J.: Refer to comment submitted with NEMA Affirmative vote on Comment 7-48.

ARTICLE 340 — UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE: TYPE UF

7-56 Log #1473 NEC-P07 **Final Action: Reject**
(340.12(7))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-140
Recommendation: Accept the proposal.
Substantiation: See explanation of Negative Vote on Proposal 7-9, 320.12(1) in the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 7-2.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 342 — INTERMEDIATE METAL CONDUIT: TYPE IMC

8-7 Log #1472 NEC-P08 **Final Action: Reject**
(342.11 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-13
Recommendation: Accept the proposal with the following revisions:
"Uses not permitted. Where likely to be subject to physical damage."
Substantiation: This wiring method is resistant to but not impervious to physical damage. It can be damaged by backhoes, jackhammers, and vehicles. See Explanation of Negative Vote on Proposal 7-9, 320.12(1) in the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: The recommended language is vague and unenforceable. Adding "where likely to be" adds another layer of subjectivity to each electrical installation. The proposed language would do nothing to help clarify the issue of when a given installation is subject to physical damage.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-8 Log #357 NEC-P08 **Final Action: Accept**
(342.28)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-16
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.
The negative comment in the voting is correct. The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-9 Log #1476 NEC-P08 **Final Action: Accept**
(342.30(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-24a
Recommendation: Accept the proposal.
Substantiation: The substantiation is persuasive.
Panel Meeting Action: Accept
Panel Statement: CMP 8 continues to accept Proposal 8-24a. See also panel statement on Comment 8-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-10 Log #1989 NEC-P08 **Final Action: Reject**
(342.30(C))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 8-24a
Recommendation: This proposal should be modified and accepted in principle.
(C) Unsupported Raceways. Where oversized, concentric or eccentric knockouts are not encountered, Type IMC ~~shall be permitted to be unsupported where the raceway is not more than 450 mm (18 in.) and remains in unbroken lengths (without coupling)~~. nipples not more than 900 mm (3') shall be permitted to be support by the conduit terminations. Such raceways shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: The change for the 2008 code was an attempt to make the code match real world and provide relief from a rule that requires support for all raceways, no matter how short they are. While it is rare for an inspector to red tag the installation of a short nipple for lack of a code required support it has happened. The easiest way to fix this is to permit the conduit termination to be used as the means of support as has been done in the field for years. This comment also applies to proposals 8-35, 8-78, 8-105, and 8-125.
Panel Meeting Action: Reject
Panel Statement: This comment does not address the concern for smaller raceways in exposed locations. These raceways may be susceptible to damage or movement where not securely fastened in place. Additionally, the raceway terminations are to terminate the raceway, not to provide support. The number of possible installation scenarios in which a given installation may or may not functionally benefit from being supported within 3' of the termination is infinite. However, a raceway that is supported within 3' of the termination has been demonstrated to provide effective support. Any decision to omit the support required by general rule within 3' of raceway terminations is a decision best made in the field by the AHJ based on the circumstances of the given installation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-11 Log #2103 NEC-P08 **Final Action: Reject**
(342.30(C))

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-24a
Recommendation: Proposal 8-24a should have been rejected and the language retained as in the present NEC.
Substantiation: During the 2008 NEC cycle Panel 8 fully considered the need for adding the section which the submitter of Proposal 8-24a proposes to delete. The Panel determined that the present language was needed to clarify that short nipples do not require additional support and that this was not universally understood by AHJ's, especially in remote & rural areas.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-12 Log #2791 NEC-P08 **Final Action: Reject**
(342.30(C))

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 8-24a
Recommendation: Revise text to read as follows:
342.30(C) Unsupported Raceways. Type IMC shall be permitted to be installed unsupported where the raceway is not more than 900 mm (3 ft) in length and terminates in an outlet box, junction box, device box cabinet or other termination on either end.
Substantiation: I agree with the substantiation in Proposal 8-24a that historically many raceways have been installed between enclosures that are not more than three feet apart and there has been no significant number of failures reported. However, I would recommend accepting the proposal in principle and revising the existing text as I also agree with the original substantiation from the 2008 NEC cycle that the literal wording "within three feet" means that support is required. Revising the text as proposed in this comment will continue to resolve future issues of whether the raceway must be supported where it runs between enclosures that are not more than three feet apart, add clarity to the section, and address the submitter's concerns.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 344 — RIGID METAL CONDUIT: TYPE RMC

8-13 Log #2584 NEC-P08 **Final Action: Reject**
(344.6 Exception (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-26
Recommendation: The proposal should be accepted.
Substantiation: It would certainly be preferable if the listed product were routinely available, but that is certainly not the case as of this writing. That being the case, the NEC should recognize the reality and respond accordingly. It is poor code when one of its provisions routinely send inspectors into 90.4. That section should be reserved for truly unique problems that were unpredictable when that part of the code was being developed. The issue of unlisted brass conduit has been around for at least fifteen years. This new exception is very narrowly written and, should listed products become available, it can be withdrawn in a subsequent code cycle.
Panel Meeting Action: Reject
Panel Statement: The panel continues to reject this proposal and requires RMC, regardless of material, to be Listed. The Panel agrees with submitters statement pertaining to 90.4 and would not support the use of a non-listed plumbing product as a substitute for red brass RMC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-14 Log #358 NEC-P08 **Final Action: Accept**
(344.28)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-30
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.

The negative comment in the voting is correct. The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-15 Log #1470 NEC-P08 **Final Action: Reject**
(344.30(B)(4))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-33
Recommendation: Delete.
Substantiation: Runs through openings are not prohibited by the NEC and are assumed to be permitted by 300.4 if in accordance with that Section.

(A) and (B) provide requirements which do not exempt runs through openings or notches whether or not vertical, horizontal, or other angles.
Panel Meeting Action: Reject
Panel Statement: This section deals with horizontal raceway runs. Vertical runs must be supported and secured. The submitter's reference to 300.4 is not applicable as that section addresses protection of cables and raceways from physical damage.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-16 Log #2105 NEC-P08 **Final Action: Reject**
(344.30(C))

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-35
Recommendation: Proposal 8-35 should have been rejected and the language retained as in the present NEC.
Substantiation: During the 2008 NEC cycle Panel 8 fully considered the need for adding the section which the submitter of Proposal 8-35 proposes to delete. The Panel determined that the present language was needed to clarify that short nipples do not require additional support and that this was not universally understood by AHJ's, especially in remote & rural areas. It is, therefore, not generally true that "This new NEC provision (in the 2008 NEC)… addressed a non-existent problem" as the submitter of Proposal 8-35 asserts.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-17 Log #2792 NEC-P08 **Final Action: Reject**
(344.30(C))

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 8-35
Recommendation: Revise text to read as follows:

344.30(C) Unsupported Raceways. Type RMC shall be permitted to be installed unsupported where the raceway is not more than 900 mm (3 ft) in length and terminates in an outlet box, junction box, device box cabinet or other termination on either end.
Substantiation: I agree with the substantiation in Propsoal 8-35 that historically many raceways have been installed between enclosures that are not more than three feet apart and there has been no significant number of failures reported. However, I would recommend accepting the proposal in principle and revising the existing text as I also agree with the original substantiation from the 2008 NEC cycle that the literal wording "within three feet" means that support is required. Revising the text as proposed in this comment will continue to resolve future issues of whether the raceway must be supported where it runs between enclosures that are not more than three feet apart, add clarity to the section, and address the submitter's concerns.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-18 Log #2106 NEC-P08 **Final Action: Reject**
(344.60)

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-39
Recommendation: Proposal 8-39 should have been accepted.
Substantiation: Industry experience indicates that, for several reasons including the one presented by the proposal submitter, metallic conduit systems do not always provide adequate equipment grounding. As a result, ANSI/IEEE Standard 142-2007 (the "Green Book"), section 2.2.3, recommends installation of a separate equipment grounding conductor (EGC) in conduit.

With regard to the Panel statement that RMC is tested and listed for grounding, there does not appear to any reference to a test method for establishing the adequacy of RMC as an equipment grounding conductor in the UL White Book either in the section on RMC or in the White Book NEC Correlation Index. Further, if there is such a UL test described elsewhere, the current level used and resulting voltage drop would both be of interest as factors in determining the suitability of RMC as an EGC for all installations.

Finally, if the proposed change is ultimately accepted it would have to be correlated with other sections of the NEC that presently recognize RMC as a grounding means. Similarly, Article 342 for IMC would require revision. (See also my Comments on Proposal 8-129).
Panel Meeting Action: Reject
Panel Statement: The submitter has not demonstrated evidence of any failure of this raceway type to perform reliably when installed as directed by the NEC. Furthermore this product is listed for grounding. Reference to damaged raceways possibly not performing the equipment grounding function of the raceway does not support the elimination of this type of raceway as an effective equipment grounding means. Any component of an electrical system that is damaged may not perform its intended function reliably and therefore should be effectively repaired or replaced.
Number Eligible to Vote: 12

Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 348 — FLEXIBLE METAL CONDUIT: TYPE FMC

8-19 Log #1469 NEC-P08 **Final Action: Reject**
(348.12(7))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-42
Recommendation: Accept the proposal with the following revisions: Where likely to be subject to physical damage.
Substantiation: See Explanation of Negative Vote on Proposal 7-9, 320.12(I).
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-7.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-20 Log #1209 NEC-P08 **Final Action: Hold**
(348.60)

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 8-51
Recommendation: If the NEMA comments on proposals 8-51 and 8-65 should be accepted, Section 356.60 should be revised for harmonization of the sections. Revise 356.60 to read as follows:

356.60 Grounding and Bonding. ~~Where~~ If used to connect equipment where flexibility is ~~required~~, necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation, an equipment grounding conductor shall be installed.

Substantiation: If the NEMA Comments are accepted for proposals 8-51 and 8-65 then Section 356.60 should be revised for harmonization of the sections.
Panel Meeting Action: Hold
Panel Statement: Comment 8-20 introduces new material to 356.60.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 1
Ballot Not Returned: 1 Griffith, M.
Explanation of Negative:

LOYD, R.: I see no value in holding this comment. It is not new material. The submitter indicates it is intended to apply to 356.60 and not 348.60. For consistency in the raceway articles, this should have been accepted. The vibration concept has been introduced for the last several cycles. Since it was accepted by CMP-5 and in all flexible raceway articles except 356, it should also be accepted here.

8-21 Log #1233 NEC-P08 **Final Action: Accept**
(348.60)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 8-51
Recommendation: The Panel should accept the proposal in principle with the following changes to the first sentence of 348.60:

"~~Where~~ If used to connect equipment where flexibility is ~~required~~ necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation, an equipment grounding conductor shall be installed."

Substantiation: The revised text is the same text as accepted by Panel 5 in Proposal 5-273 for Section 250.118(5)(d). This comment should be accepted to reduce confusion between requirements in 348.60 and 250.118.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-22 Log #2107 NEC-P08 **Final Action: Accept in Principle**
(348.60)

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-51
Recommendation: Proposal 8-51 should have been accepted as submitted.
Substantiation: Acceptance of the proposed language in original Proposal 8-51 will better clarify the meaning of the "flexibility" that FMC is suitable to provide. And, while it is understood that the NEC is not a design guide, inclusion of the proposed language will also aid in facilitating responsible engineering designs seeking compliance with the intent of the NEC. Installation and definition of the equipment grounding conductor is covered under CMP-5 responsibility and acceptance of the proposed revision by CMP-8 should be correlated with CMP-5.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 8-21.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-23 Log #2585 NEC-P08 **Final Action: Accept in Principle**
(348.60)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-51
Recommendation: Accept the proposal in principle. Accept the entire text, except replace "required" with "necessary":
Substantiation: As the originator of the concept that the flexibility rule must be limited to applications where the flexing continues after the installation is complete, this submitter believes the proposal is squarely within the original concept and very helpful. Questions about vibration isolation crop up repeatedly, and this proposal provides excellent clarification. Furthermore, without this language, this section will again be at odds with 250.118(5)(d) because CMP 5 has accepted it under Proposal 5-273.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 8-21.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 350 — LIQUIDTIGHT FLEXIBLE METAL CONDUIT: TYPE LFMC

8-24 Log #582 NEC-P08 **Final Action: Accept**
(350.10(4))

Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 8-54
Recommendation: Continue to reject.
Substantiation: I agree with Mr. Dabe and Mr. Griffith's negative voting on Proposal 8-108. No substantiation was provided and more information is needed. Mr. Berman's comment points out that shipping and handling may be a problem, but states we should not worry about that, I disagree.

This is a flexible wiring method and not suitable for prewiring in unlimited lengths and sizes. There is no evidence that the product is presently tested with enclosed conductors. The weight could vary from a few pounds to hundreds of pounds which could only be moved with equipment. Moving is likely to damage the raceway and conductors which may not be detected by the installer.

300.18 requires the raceway to be installed prior to insertion of the conductors so that the conductors are protected from damage until installed in the raceway which is properly secured and supported with all boxes and fittings in place.
Panel Meeting Action: Accept
Panel Statement: Evidence of suitability for use in all product sizes and unlimited lengths has not been presented. The submitter's assertion that Mr. Berman's comment on shipping and handling is a problem is incorrect.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-25 Log #1489 NEC-P08 **Final Action: Reject**
(350.30)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-56
Recommendation: Accept the proposal with the following revisions:

"LFMC shall be securely fastened to supports by approved means within 300 mm (12 in) of each conduit termination and at intervals not to exceed 1.4 m (4 1/2 ft).

Exception No. 1, 2, 3 no change

Exception No. 4: Lengths not exceeding 1.8 m (6 ft) within an accessible above ceiling space from the last point where the surface mounted on such ceilings.

Exception No. 5: Where direct buried.

Exception No. 6: Where installed in cable trays except as specified in 392.8(B).

Substantiation: Fastening should be to the required supports, which does not exclude concrete walls, or other approved means. There is no reason not to include equipment surface mounted on such ceilings. Where direct buried or installed horizontally in cable trays fastening to support is not needed.

Panel Meeting Action: Reject
Panel Statement: Additional changes do not improve the usability of the NEC. "Securely Fastened" is not restricted to supports only. Securing to concrete walls, cable trays, and other approved means are acceptable whether it is fished, exposed, or concealed. Exception 4 applies to raceways within an accessible ceiling only. It is recognized that a degree of concealment is present and the luminaire would be installed in the ceiling grid. It does not permit supporting the raceway to the ceiling grid. Proposed Exception 5 is new material that is not needed since raceways that are direct buried are both secured and supported by the earth. Proposed Exception 6 is unacceptable since Section 392.6(J) requires raceways to be secured to the cable tray per the appropriate raceway article. Section 392.8(B) applies to cable only.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-26 Log #1471 NEC-P08 **Final Action: Reject**
(350.30(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-62
Recommendation: Delete.
Substantiation: Runs through openings are not prohibited by the NEC and are assumed to be permitted by 300.4 if in accordance with that section.
(A) and (B) provide requirements which do not exempt runs through openings or notches whether or not vertical, horizontal, or other angles.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-15.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-27 Log #1662 NEC-P08 **Final Action: Reject**
(350.30(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-62
Recommendation: Accept the proposal with the following revisions:
Article350 Liquidtight Flexible Metal Conduit. Type LFMC and Liquidtight Flexible Nonmetallic Conduit. Type LFNC
350.1 Scope. This article covers the use, installations, and construction specifications for liquidtight flexible metal conduit (LFMC) and liquidtight flexible nonmetallic conduit (LFNC) and their associated fittings.
350.2 Definitions. Liquidtight Flexible Metal Conduit (LFMC). A raceway of circular cross section with an outer liquidtight nonmetallic sunlight resistant jacket over a flexible metal core, with associated fittings.
Liquidtight Flexible Nonmetallic Conduit (LFNC). A raceway of circular cross section of various types as follows:
(1) A smooth seamless inner core and cover bonded together and having one or more reinforcement layers between the core and covers, designated as Type LFNC-A.
(2) A smooth inner surface with integral reinforcement within the conduit wall, designated as Type LFNC-B that is a prewired manufactured assembly provided in continuous lengths in a coil or on a reel.
(3) A corrugated internal and external surface without integral reinforcement within the conduit wall, designated as Type LFNC-C, which is flame resistant.
FPN No. 1: FNMC is an alternate designation.
FPN No. 2: Extreme cold may cause some types of LFNM to become brittle and more susceptible to physical damage.
350.3 Listing. LFMC and LFNC and their associated fittings shall be listed.
II. Installation
350.4 Uses Permitted. Use of LFMC and LFNC shall be permitted in exposed or concealed locations only as follows:
(1) Where flexibility is required for installation, operation, or maintenance.
(2) For routing and protection of conductors and cable from liquids, vapors, or solids.
(3) LFNC shall only be permitted outdoors if listed and marked for such use.
350.5 Uses Not Permitted. LFMC and LFNC shall not be permitted as follows:
(1) Where likely to be subject to physical damage for which it is not designed and approved.
(2) Where ambient temperatures, conductor temperatures, or both are in excess of that for which the conduit is approved.
(3) Where conductors in LFNC operate at over 600 volts, nominal, except as permitted in 600.32(A).
(4) In any hazardous (classified) location, except as permitted elsewhere in this Code.
350.6 Size.
(A) Minimum LFMC and LFNC smaller than metric designation 16 (1/2) shall not be permitted.
Exception: Where in accordance 348.20.
(B) Maximum. LFMC and LFNC larger than metric designation 103 (trade size 4) shall not be permitted.
FPN: See 300.1(C) for the metric designers and trade sizes. These are for identification purposes only, and do not relate to actual dimensions.
350.7 Number of Conductors and Cables. The number of conductors and cables in LFMC and LFNC shall not exceed the percentage fill specified in Table 1, Chapter 9, and the Notes to Table 1.
Exception: For metric designator 12 (trade size 3/8 Table 348.22). "Fittings Outside Conduit" columns shall apply.
350.8 Bends, How Made. Bends in LFMC and LFNC shall be made so the conduit is not damaged and the internal cross section area is not effectively reduced. The radius of the curve to the center line of any bend shall be not less than in Table 2, Chapter 9, in the column "Other Bends".
350.9 Bends-.
Number in One Run. More than 360 degrees of bends, including offsets, kicks, and saddles, shall not be permitted in a run of LFMC or LFNC between conductor or cable pull points, including other raceways to which they are connected.
350.10 Trimming. All ends of LFMC and LFNC shall be trimmed to remove rough edges.
350.11 Securing and Supporting. LFMC and LFNC shall be securely fastened to supports by approved straps, staples, cable ties, hangers, or other approved means designed and installed so as not to damage the conduit, at intervals not to exceed 1.4 m (4-1/2 ft) and within 300 mm (12 in.) of the end of a run of conduit.
Exception: Fastening to support shall not be required as follows:
(1) For that portion of conduit that is fished between access points through concealed spaces in finished buildings or other structures and supporting is impractical.
(2) Where direct buried.
(3) Where encased in cement concrete.
(4) If not more than 600 mm (2 ft) in length at terminations where flexibility is necessary.
(5) If not more than 1.8 m (6 ft) in length from the last point where secured to the connection to a luminaire or other equipment within an accessible ceiling space or surface mounted on such ceiling.
(6) Type LFNC-B where installed in lengths not exceeding 1.8 m (6 ft).
350.12 Connectors. Angle connectors for LFMC and LFNC shall not be concealed.
III. Construction Specifications.
350.13 Marking. LFMC and LFNC shall comply with 110.21 and include a type designation in accordance with 350.2, and the trade size. Where suitable for outdoor use or direct burial, it shall be so marked. The type, size, and number of conductors in prewired manufactured assemblies (Type LFNC-B) shall be provided by a printed tag or label attached to the carton, coil,or reel. The enclosed conductors shall comply with 310.11(A) and (B). Delete present Articles 350 and 356.
Substantiation: The proposal is largely editorial to combine similar or identical provisions of two articles and reduce the bulk of the NEC. However, many of the proposed revisions are not presently covered, e.g., Article 356 has no support requirements for LFNC other than Type LFNC-B. Cables such as optical fiber, coaxial, and NM may not be deemed covered by "conductors." There are no provisions for fishing other than Type LFNC-B. The number of bends should include provision for other raceways directly connected to LFMC or LFNC without a junction box. The provision for number of conductors should include reference to Notes to Table 1, Chapter 9. I don't believe there are couplings specifically listed for use with LFMC; usually rigid metal conduit couplings are used. Bonding jumpers should be permitted. Installation of equipment grounding and bonding conductors is already covered in Article 250. The length restriction in 356.12(3) is negated by the condition of where a longer length is necessary or where it is secured, therefore, serves no useful purpose.
Panel Meeting Action: Reject
Panel Statement: CMP 8 accepted the Task Group Proposal to separate Article 351 for Liquidtight Flexible Metal Conduit and Liquidtight Flexible Nonmetallic Conduit into two separate Articles 350 and 356 for the 2002 NEC. The proposed language does not follow the agreed upon cable and raceway articles format. The submitter includes elements of various rejected proposals for which there is a lack of substantiation to support the changes submitted in the body of the comment.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-28 Log #1499 NEC-P08 **Final Action: Reject**
(350.42)

TCC Action: The Technical Correlating Committee clarifies that the text of Proposal 8-64 remains as modified in the A2010 NEC Report on Proposals.
Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-64
Recommendation: Accept the proposal.
Substantiation: Since there are no couplings specifically designed for joining LFMC, there is no reason to prohibit them. The revised text covers couplings but addresses angle connectors. A straight conduit coupling can join runs of LFMC with the use of straight LFMC connectors.
Panel Meeting Action: Reject
Panel Statement: The submitter is incorrect, there are couplings for joining LFMC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-29 Log #1234 NEC-P08 **Final Action: Accept**
(350.60)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 8-65
Recommendation: The Panel should accept the proposal in principle with the following changes to the first sentence of 350.60:
"~~Where~~ If used to connect equipment where flexibility is ~~required~~ necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation, an equipment grounding conductor shall be installed."
Substantiation: The revised text is the same text as accepted by Panel 5 in Proposal 5-274 for Section 250.118(6)(e). This comment should be accepted to reduce confusion between requirements in 350.60 and 250.118.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-30 Log #2108 NEC-P08 **Final Action: Accept in Principle**
(350.60)

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-65
Recommendation: Proposal 8-51 should have been accepted as submitted.
Substantiation: Acceptance of the proposed language in original Proposal 8-51 will better clarify the meaning of the "flexibility" that FMC is suitable to provide. And, while it is understood that the NEC is not a design guide, inclusion of the proposed language will also aid in facilitating responsible engineering designs seeking compliance with the intent of the NEC. Installation and definition of the equipment grounding conductor is covered under CMP-5 responsibility and acceptance of the proposed revision by CMP-8 should be correlated with CMP-5.
Panel Meeting Action: Accept in Principle
See panel action on Comment 8-29.
Panel Statement: The panel recognizes that Proposal 8-65 should have been referenced in the recommendation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-31 Log #2109 NEC-P08 **Final Action: Accept in Principle**
(350.60)

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-65
Recommendation: Proposal 8-65 should have been accepted as submitted.
Substantiation: Acceptance of the proposed language in original Proposal 8-65 will better clarify the meaning of the "flexibility" that LFMC is suitable to provide. And, while it is understood that the NEC is not a design guide, inclusion of the proposed language will also aid in facilitating responsible engineering designs seeking compliance with the intent of the NEC. Installation and definition of the equipment grounding conductor is covered under CMP-5 responsibility and acceptance of the proposed revision by CMP-8 should be correlated with CMP-5.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 8-29.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-32 Log #2586 NEC-P08 **Final Action: Accept in Principle**
(350.60)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-65
Recommendation: Accept the proposal in principle. Accept the entire text, except replace "required" with "necessary":
Substantiation: As the originator of the concept that the flexibility rule must be limited to applications where the flexing continues after the installation is complete, this submitter believes the proposal is squarely within the original concept and very helpful. Questions about vibration isolation crop up repeatedly, and this proposal provides excellent clarification. Furthermore, without this language, this section will again be at odds with 250.118(6)(e) because CMP 5 has accepted it under Proposal 5-274.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 8-29.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 352 — RIGID NONMETALLIC CONDUIT: TYPE RNC

8-33 Log #2587 NEC-P08 **Final Action: Reject**
(352.10(G))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-68
Recommendation: Reject the proposal.
Substantiation: This comment, which will likely be rejected, is simply being submitted in order to elicit a response on the record as to whether or not CMP 8 supports accepting the nonhomogenious version of this product in above ground applications. This was an extremely contentious issue in the previous code making cycle, ultimately leading to a battle at the NFPA Annual Meeting. A rejection would signify that the answer is now yes, and an acceptance would signify the opposite.
Panel Meeting Action: Reject
Panel Statement: CMP 8 recognizes that both homogenous and nonhomogenous PVC Conduits are listed to UL651 in accordance with the NEC and are permitted to be used per 352.10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-34 Log #1488 NEC-P08 **Final Action: Reject**
(352.12(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-70
Recommendation: Accept the proposal.
Substantiation: See Explanation of Negative Vote on Proposal 7-9, 320.12(1) in the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-7.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-35 Log #2110 NEC-P08 **Final Action: Reject**
(352.30(C))

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-78
Recommendation: Proposal 8-78 should have been rejected and the language retained as in the present NEC.
Substantiation: During the 2008 NEC cycle Panel 8 fully considered the need for adding the section which the submitter of Proposal 8-78 proposes to delete. The Panel determined that the present language was needed to clarify that short nipples do not require additional support and that this was not universally understood by AHJ's, especially in remote & rural areas.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-36 Log #2793 NEC-P08 **Final Action: Reject**
(352.30(C))

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 8-78
Recommendation: Revise text to read as follows:
352.30(C) Unsupported Raceways. Type PVC conduit shall be permitted to be installed unsupported where the raceway is not more than 900 mm (3 feet) in length and terminates in an outlet box, junction box, device box cabinet or other termination on either end.
Substantiation: I agree with the substantiation in Proposal 8-78 that historically many raceways have been installed between enclosures that are not more than three feet apart and there has been no significant number of failures reported. However, I would recommend accepting the proposal in principle and revising the existing text as I also agree with the original substantiation from the 2008 NEC cycle that the literal wording "within three feet" means that support is required. Revising the text as proposed in this comment will continue to resolve future issues of whether the faceway must be supported where it runs between enclosures that are not more than three feet apart, add clarity to the section, and address the submitter's concerns.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-37 Log #1498 NEC-P08 **Final Action: Reject**
(352.48 and Exception (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-83
Recommendation: Delete and substitute the following:
All unthreaded joints and connections of PVC conduit shall be made by means of an approved solvent.
Exception: The solvent shall not be required for the movable part of an expansion fitting.
Substantiation: "Approved" alone (acceptable to the Authority Having Jurisdiction) could be made by a slip-fit connection only which can permit separation due to expansion and not provide watertightness.
Panel Meeting Action: Reject
Panel Statement: The requirements of Section 110.3(B) mandate the use of suitable connection methods per the product listing.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-38 Log #1497 NEC-P08 **Final Action: Reject**
(352.60)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-84
Recommendation: Substitute the following:
Where equipment grounding or bonding is provided, a separate equipment grounding or bonding conductor shall be provided.
Substantiation: As written, this provision could require a 100 ft run of RMC with 2 ft of connected PVC conduit to contain an equipment grounding conductor the full length and possibly require an increase in raceway size. A bonding conductor in accordance with 250.102(E) should be permitted.
Panel Meeting Action: Reject
Panel Statement: The current language of this section adequately conveys the requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 353 — HIGH DENSITY POLYETHYLENE CONDUIT: TYPE HDPE CONDUIT

8-39 Log #1496 NEC-P08 **Final Action: Reject**
(353.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-86
Recommendation: Accept the proposal.
Substantiation: Of course "shall be permitted" is an acceptable phrase, but that does not respond to the substantiation that it does not impose a requirement and is not enforceable, and does not prohibit any use that does not violate 353.12 or other NEC provision. Many NEC provisions specify "only".
Panel Meeting Action: Reject
Panel Statement: The language used in 353.10 is consistent with other raceway Articles. "Uses Permitted" is not an all inclusive list and is not intended to prohibit the use of HDPE Conduit.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 355 — REINFORCED THERMOSETTING RESIN CONDUIT: TYPE RTRC

8-40 Log #1478 NEC-P08 **Final Action: Reject**
(355.10(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-97
Recommendation: Accept the proposal with the following revisions:
"The use of RTRC shall only be permitted in accordance with 355.10(A) through (H).
Substantiation: "Shall be permitted" per 90.5(B) does not impose a requirement thus not enforceable. Other uses not prohibited by 355.12 can be employed. If this section is not a limitation it can be deleted and 355.12 can govern. Some sections use the word "only" with "permitted" or have conditions or specify "limited to" as in 230.43.
Panel Meeting Action: Reject
Panel Statement: The language used in 355.10 is consistent with other raceway Articles. "Uses Permitted" is not an all inclusive list and is not intended to prohibit the use of RTRC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-41 Log #2534 NEC-P08 **Final Action: Accept in Principle**
(355.10(F), FPN)

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 8-98
Recommendation: Add new text to read as follows:
FPN: RTRC conduit, type XW, is identified for areas of physical damage.
Substantiation: The panel has accepted the proposal in principle for clarification of 255.10 (F). Actions from other code panels have accepted an "-XW" type RTRC for acceptance in areas subject to physical damage. As related to this and other panel actions this could be treated as a related proposal as permitted 4.4.6 from the regulations governing committees that states " A TC shall consider and act on all comments that are directly related to the substantive content of the Report on Proposals. Panel actions 3-106 [300.50 (B)], 4-115 [230.50 (b) (1)], and 7-94 [334.15 (B)] have accepted the reference for type -XW for areas subject to physical damage and providing adequate protection. As a similar action CMP 8 took for PVC, 352.10 (F) the addition of a FPN and the same action should be applied to RTRC-XW. This specific –XW reference is also found in the UL white book. Although the specific comment has not had public review the referenced other panel proposal actions were to accept in principle 3-106 and 4-115 and accepted for 7-94 and therefore have had some public review. There even appears to be questioning as shown in 19-153 (551.47 (P) (2) and 551.80 (B) as the panel statement was

"The addition of the references to RTRC as shown in the panel actions meets the submitter's intent. The addition of the "marked with the suffix –XW" is rejected because it is not included in Article 355, but the submitter's intent is addressed by the requirement "listed for exposure to physical damage." The addition of –XW would provide that RTRC will qualify for installations similar to other raceways "if identified for such use" and not "listed" as the panel action states.

Panel Meeting Action: Accept in Principle

Add an Information Note to state the following to 355.10(F):

Informational Note: RTRC, Type XW, is identified for areas of physical damage.

Panel Statement: The word "conduit" is already used in the acronym "RTRC" and is redundant. Also the panel recognizes that "FPN" is being replaced throughout the code with "Informational Note".

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-42 Log #1487 NEC-P08 **Final Action: Reject**
(355.22)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 8-102

Recommendation: Accept the proposal with the following revisions:

"The number of conductors, cables, and flexible cords or cables shall not exceed the raceway fill indicated in Table 1, Chapter 9 and the notes thereto.

Substantiation: This provision should include single and multiconductor cables and flexible cords or cables and the notes to the table which recognizes them since the outer jacket and fillers comprise a cross section larger than the contained conductors.

Panel Meeting Action: Reject

Panel Statement: Cables are permitted to be installed per the second sentence (right after the sentence with the proposed revision) of 355.22. Note 9 does reference flexible cord, but a proposal with the technical substantiation to support the addition of cords to 355.22 has not been submitted nor submitted to the other raceway articles. Flexible cords are not permitted to be installed in raceways "except as otherwise permitted in this code" per Section 400.8(6).

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-43 Log #2111 NEC-P08 **Final Action: Reject**
(355.30(C))

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)

Comment on Proposal No: 8-105

Recommendation: Proposal 8-105 should have been rejected and the language retained as in the present NEC.

Substantiation: During the 2008 NEC cycle Panel 8 fully considered the need for adding the section which the submitter of Proposal 8-105 proposes to delete. The Panel determined that the present language was needed to clarify that short nipples do not require additional support and that this was not universally understood by AHJ's, especially in remote & rural areas. It is, therefore, not generally true that "This new NEC provision (in the 2008 NEC)… addressed a non-existent problem" as the submitter of Proposal 8-105 asserts.

Panel Meeting Action: Reject

Panel Statement: See panel statement on Comment 8-10.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-44 Log #2794 NEC-P08 **Final Action: Reject**
(355.30(C))

Submitter: Mark R. Hilbert, Wolfeboro, NH

Comment on Proposal No: 8-105

Recommendation: Revise text to read as follows:

355.30(C) Unsupported Raceways. Type RTRC shall be permitted to be installed unsupported where the raceway is not more than 900 mm (3 ft) in length and terminates in an outlet box, junction box, device box cabinet or other termination on either end.

Substantiation: I agree with the substantiation in Proposal 8-105 that historically many raceways have been installed between enclosures that are not more than three feet apart and there has been no significant number of failures reported. However I would recommend accepting the proposal in principle and revising the existing text as I also agree with the original substantiation from the 2008 NEC cycle that the literal wording "within three feet" means that support is required. Revising the text as proposed in this comment will continue resolve future issues of whether the raceway must be supported where it runs between enclosures that are not more than three feet apart, add clarity to the section and address the submitters concerns.

Panel Meeting Action: Reject

Panel Statement: See panel statement on Comment 8-10.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

ARTICLE 356 — LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT: TYPE LFNC

8-45 Log #581 NEC-P08 **Final Action: Accept**
(356.10(6))

Submitter: Richard E. Loyd, Sun Lakes, AZ

Comment on Proposal No: 8-108

Recommendation: Reconsider and reject this proposal to be consistent with action taken on Proposal 8-54.

Substantiation: I agree with Mr. Dabe and Mr. Griffith's negative voting, no substantiation was provided and more information is needed and the action should be consistent with the action taken on Proposal 8-54. Mr. Berman's vote on Proposal 8-54 acknowledges shipping and handling may be a problem, but states we should not worry about that, I disagree.

This is a flexible wiring method and not suitable for prewiring in unlimited lengths and sizes. There is no evidence that the product is presently tested with enclosed conductors. The weight could vary from a few pounds to hundreds of pounds which could only be moved with equipment. Moving is likely to damage the raceway and conductors which may not be detected by the installer.

300.18 requires the raceway to be installed prior to insertion of the conductors so that the conductors are protected from damage until installed in the raceway which is properly secured and supported with all boxes and fittings in place.

Panel Meeting Action: Accept

Panel Statement: Evidence of suitability to expand product sizes with unlimited lengths has not been presented. The submitter's assertion that Mr. Berman's comment on shipping and handling is a problem is incorrect.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-46 Log #2112 NEC-P08 **Final Action: Accept**
(356.10(6))

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)

Comment on Proposal No: 8-108

Recommendation: Proposal 8-108 should have been rejected.

Substantiation: This Proposal should have been rejected for consistency with Panel Action on Proposal 8-54.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-47 Log #1486 NEC-P08 **Final Action: Reject**
(356.12(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-109
Recommendation: Accept the proposal with the following revisions:
"Where likely to be exposed to physical damage."
Substantiation: None provided.
Panel Meeting Action: Reject
Panel Statement: This comment does not comply with Section 4.4.5 of the NFPA Regulations Governing Committee Projects in that it does not provide a statement of the problem and substantiation for the comment. See panel statement on Comment 8-7.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 358 — ELECTRICAL METALLIC TUBING: TYPE EMT

8-48 Log #1485 NEC-P08 **Final Action: Accept**
(358.10(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-115
Recommendation: Accept the proposal with the following revisions:
"... and approved as suitable for the condition."
Substantiation: "Judged" does not indicate who is to do the judging; "approved" is "acceptable to the Authority Having Jurisdiction."
Panel Meeting Action: Accept
Revise text to read as follows:
(B) Corrosion Protection. Ferrous or nonferrous EMT, elbows, couplings, and fittings shall be permitted to be installed in concrete, in direct contact with the earth, or in areas subject to severe corrosive influences where protected by corrosion protection and approved as suitable for the condition.
Panel Statement: Accept Comment 8-48 as shown and replace the word "judged" with the words "approved as".
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-49 Log #2113 NEC-P08 **Final Action: Reject**
(358.30(C))

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-125
Recommendation: Proposal 8-125 should have been rejected and the language in the present NEC retained.
Substantiation: During the 2008 NEC cycle Panel 8 fully considered the need for adding the section which the submitter proposes to delete. The Panel determined that the present language was needed to clarify that short nipples do not require additional support and that this was not universally understood by AHJ's, especially in remote & rural areas. It is, therefore, not generally true that "This new NEC provision (in the 2008 NEC)… addressed a non-existent problem" as the submitter of Proposal 8-125 asserts.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-50 Log #2795 NEC-P08 **Final Action: Reject**
(358.30(C))

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 8-125
Recommendation: Revise text to read as follows:
358.30(C) Unsupported Raceways. Type EMT shall be permitted to be installed unsupported where the raceway is not more than 900 mm (3 ft) in length and terminates in an outlet box, junction box, device box cabinet or other termination on either end.
Substantiation: I agree with the substantiation in Proposal 8-125 that historically many raceways have been installed between enclosures that are not more than three feet apart and there has been no significant number of failures reported. However, I would recommend accepting the proposal in principle and revising the existing text as I also agree with the original substantiation from the 2008 NEC cycle that the literal wording "within three feet" means that support is required. Revising the text as proposed in this comment will continue to resolve future issues of whether the raceway must be supported where it runs between enclosures that are not more than three feet apart, add clarity to the section and address the submitter's concerns
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-51 Log #2114 NEC-P08 **Final Action: Reject**
(358.60)

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-129
Recommendation: Proposal 8-129 should have been accepted.
Substantiation: Industry experience indicates that, for several reasons including the one presented by the proposal submitter, metallic conduit systems do not always provide adequate equipment grounding. As a result, ANSI/IEEE Standard 142-2007 (the "Green Book"), section 2.2.3, recommends installation of a separate equipment grounding conductor (EGC) in conduit.
With regard to the Panel statement that EMT is tested and listed for grounding, there does not appear to any reference to a test method for establishing the adequacy of EMT as an equipment grounding conductor in the UL White Book either in the section on EMT or in the White Book NEC Correlation Index. Further, if there is such a UL test described elsewhere, the current level used and resulting voltage drop would both be of interest as factors in determining the suitability of EMT as an EGC for all installations.
Finally, if the proposed change is ultimately accepted it would have to be correlated with other sections of the NEC that presently recognize EMT as a grounding means. Similarly, Article 342 for IMC would require revision. (See also my Comments on Proposal 8-39).
Panel Meeting Action: Reject
Panel Statement: The submitter has not demonstrated evidence of any failure of this raceway type to perform reliably when installed as directed by the NEC. Furthermore this product is listed for grounding. Reference to damaged raceways possibly not performing the equipment grounding function of the raceway does not support the elimination of this type of raceway as an effective equipment grounding means. Any component of an electrical system that is damaged may not perform its intended function reliably and therefore should be effectively repaired or replaced.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 360 — FLEXIBLE METALLIC TUBING: TYPE FMT

8-52 Log #449 NEC-P08 **Final Action: Accept in Principle**
(360.24(A))

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 8-135
Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:
"Where FMT ~~may be~~ is infrequently flexed in service after installation,…".
Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.
However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms may or can shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term may shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."
Since the use of the term may in this Section does not meet these either of these criteria, it should be changed.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
(A) Infrequent Flexing Use. When FMT is infrequently flexed in service after installation, the radii of bends measured to the inside of the bend shall not be less than specified in Table 360.24(A).

Panel Statement: Additional wording was changed to comply with the style manual.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-53 Log #1484 NEC-P08 **Final Action: Accept in Principle**
(360.24(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-135
Recommendation: Accept the proposal or accept with "is" in place of "May be."
Substantiation: "May" is also a term to be avoided per the NEC Style Manual and shall only be used to recognize discretionary judgment by the AHJ. Does the NEC Style Manual apply to panels?
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 8-52.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 362 — ELECTRICAL NONMETALLIC TUBING: TYPE EMT

8-54 Log #1477 NEC-P08 **Final Action: Reject**
(362.60)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-148
Recommendation: Accept the proposal with the following revisions:
"Where equipment grounding is provided a separate wire type equipment grounding conductor or bonding conductor shall be installed.
Substantiation: A bonding conductor in accordance with 250.102(E) should be permitted. As written, a 100 ft run of RMC with 2 ft of connecting PVC conduit would require a wire type EGC for the entire length, and possibly require a larger raceway due to conductor fill. Where equipment grounding is not required but provided by choice the provision should apply. Reference to Article 250 is superfluous; all applicable provisions of that article already apply unless amended.
Panel Meeting Action: Reject
Panel Statement: The current language of this section adequately conveys the requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 366 — AUXILIARY GUTTERS

8-55 Log #1475 NEC-P08 **Final Action: Reject**
(366.12(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-151
Recommendation: Accept the proposal.
Substantiation: There can be installations where the same auxiliary gutter supplements wiring space for equipment separated by a wall.
Panel Meeting Action: Reject
Panel Statement: The submitter's assertion of an auxiliary gutter supplementing wiring space for equipment separated by a wall is impractical. The function of an auxiliary gutter is to supplement equipment at a specific location not to pass through walls or ceilings.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-56 Log #119 NEC-P08 **Final Action: Accept**
(366.22(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 8-155
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered by the panel relative to the actions taken on Proposals 6-59, 8-155, 8-194 and 8-204.
The Technical Correlating Committee directs the Chairs of Code-Making Panels 6 and 8 form a Task Group to correlate Proposals 6-59, 8-155, 8-194 and 8-204, and submit comments, if deemed appropriate.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 8-57.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-57 Log #2262 NEC-P08 **Final Action: Accept**
(366.22(A))

Submitter: Scott Cline, Monterey Park, CA
Comment on Proposal No: 8-155
Recommendation: Reject this Proposal.
Substantiation: This Proposal is part of a group: 6-59, 8-155, 8-194, and 8-204. There were unforeseen consequences to this which were not editorial in nature. No Substantiation was given for a technical change. All four need to be Rejected. Comments with the same text are submitted for the three Accepted Proposal.
Statement/Substantiation text:
The TCC has asked for correlative action between CMP-6 and CMP-8 regarding 2011 cycle Proposals 6-59, 8-155, 8-194, and 8-204, I have submitted this for that purpose.
If the Actions of8-155, 8-194, and 8-204 are allowed to stay as-is, then with the Rejection of 6-59, it appears that signaling and control conductors will have to be counted in the affected raceways as current-carrying; this is certainly an unintended consequence. The proposals turn out to not be the editorial change the submitter thought - they would have had significant impact. It is unfortunate that the submitter did not make the group of Proposals co-dependent, such that the Proposals would only take effect if they were all Accepted.
The reference phrase in the Proposals is: **Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current-carrying conductors.**
The following text ***in bold italics*** is from the 2011 cycle ROP for 6-59:
Panel Meeting Action: Reject
Panel Statement: While the reference phrase is contained in all of the sections referenced* (8-155, 8-194, and 8-204)*, the proposal would allow signaling and control cables to be loaded into circular raceways and in cables and not require adjustment. These conductors would take up space, reduce airflow, and reduce heat dissipation. The restrictive nature of circular raceways is different from auxiliary gutters, metallic, and non-metallic wireways. The proposed text should not apply as a general rule.
Number Eligible to Vote: 11
Ballot Results:Affirmative: 11
Proposal 2011-6-59 must be Rejected.
Panel Meeting Action: Accept
Revise 366.22(A) to read as follows:
366.22 Number of Conductors.
(A) Sheet Metal Auxiliary Gutters. The sum of the cross-sectional areas of all contained conductors at any cross section of a sheet metal auxiliary gutter shall not exceed 20 percent of the interior cross-sectional area of the sheet metal auxiliary gutter. The adjustment factors in 310.15(B)(3)(a) shall be applied only where the number of current-carrying conductors, including neutral conductors classified as current-carrying under the provisions of 310.15(B)(5), exceeds 30. Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current carrying conductors.
Panel Statement: Reject Proposal 8-155 and reinstate the deleted language to 366.22(A).
The panel also updated the Section 310.15 references in this section.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-58 Log #2354 NEC-P08 **Final Action: Reject**
(366.22(A))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 8-155
Recommendation: Please withdraw my proposal.
Substantiation: The panel statement on Proposal 6-59 is correct.
Panel Meeting Action: Reject
Panel Statement: Proposals submitted cannot be withdrawn in accordance with the Regulations Governing Committee Projects Section 4.3.4. See panel action and statement on Comment 8-57.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-59 Log #2588 NEC-P08 **Final Action: Accept**
(366.22(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-155
Recommendation: Reject the proposal.
Substantiation: The proposal is unnecessary and creates a direct conflict with 725.51(B), which adequately addresses the same topic in a more comprehensive and technically appropriate manner. The CMP 8 locations referenced in the substantiation differ, as appropriate based on the differing wiring methods involved, from the one-size-fits-all approach in this proposal. A companion comment is being drafted by this submitter to continue to oppose the change in the Article 310.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 8-57.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.
Comment on Affirmative:

HUMPHREY, D.: The limitation of 40% fill applies to signaling and controller circuits as well as other conductors permitted to be installed in a common raceway. Conductors that are intended to carry no or negligible loads such as neutrals that carry only the unbalanced load, equipment grounding conductors etc. have historically not been counted as current carrying. The inclusion of signaling and motor control conductors used only for starting duty is a similar application that should not be counted as "current carrying" per 310.15(B).

8-60 Log #359 NEC-P08 **Final Action: Accept**
(366.58(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-162
Recommendation: Continue to reject the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment, including CMP 9 which unanimously rejected the companion proposal (9-28) which would have changed the terminology in the column heading to agree with this text. The CMP 8 panel action correlates correctly with Article 312.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-61 Log #1295 NEC-P08 **Final Action: Reject**
(366.58(A))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 8-162
Recommendation: The Proposal should be Accepted in Principle and the phrase revised as follows: "…one wire <u>on a</u> ~~per~~ terminal in Table 312.6(A) shall apply."
Substantiation: The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: The NEC style manual does not restrict the use of the word "per" in this code section. The proposed change does not add clarity.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 368 — BUSWAYS

8-62 Log #1474 NEC-P08 **Final Action: Reject**
(368.12(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-165
Recommendation: Accept the proposal with the following revisions: Busways shall not be installed where likely to be subject to corrosion or physical damage unless identified for such use.
Substantiation: Corrosive liquids and solids can also cause damage. If busways were required to be listed, I would have used that term. "Severe" is not NEC defined, is subjective, and most other sections regarding physical damage do not use the word, e.g., 110.12(B). Section 368.12(B) uses the word "identified."
Panel Meeting Action: Reject
Panel Statement: The language of the proposal would result in another level of subjective analysis that would not serve to clarify the proper application of this section.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-63 Log #1483 NEC-P08 **Final Action: Reject**
(368.13 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-168
Recommendation: Accept the proposal.
Substantiation: It is difficult to rationalize why a lighting busway does not have to be listed when the luminaries supplied by it are required to be listed; or why a 4000 ampere busway does not have to be listed and the switches and circuit breakers supplied by it have to be listed.
Panel Meeting Action: Reject
Panel Statement: Per the 2002 and 2008 ROCs, CMP 8 continues to reaffirm its position that it is not the intent of the panel to require listing of all busways. The submitter has not provided evidence that a safety issue exists that would warrant this additional code requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 1
Ballot Not Returned: 1 Griffith, M.
Explanation of Negative:

WALBRECHT, G.: The Authority Having Jurisdiction does not have the means available to determine the safety of the design, manufacture, installation, and operation of a busway in accordance with the 110.3(A). Busways and their associated fittings, as with any wiring method, should be evaluated and listed by a nationally recognized third party certification organization. Field fabrication and modification of factory-produced components can also be hazardous and should be properly examined and evaluated by a nationally recognized testing organization.

8-64 Log #1479 NEC-P08 **Final Action: Reject**
(368.320(3)(5))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-170
Recommendation: Accept the proposal.
Substantiation: Frequency is not relative to a busway designed and installed for dc. Withstand voltage should also apply to other frequencies such as 50 or 400 hertz.
Panel Meeting Action: Reject
Panel Statement: The term "if for alternating current" does not improve the clarity or usability of the Code. The rated withstand voltage in 368.320(5) is a value determined through testing and does not indicate the operating frequency of the busway.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 370 — CABLEBUS

8-65 Log #745 NEC-P08 **Final Action: Accept**
(370.4(B))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 8-172
Recommendation: The Proposal should be Accepted in Principal and revise "Table 310.17 and Table 310.19" to read "Table 310.15(B)(17) and Table 310.15(B)(19)".
Substantiation: This will correlate with the Panel Action on Proposal 6-52.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-66 Log #746 NEC-P08 **Final Action: Accept**
(370.4(B))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 8-173
Recommendation: The Proposal should be Accepted in Principal and revise "Table 310.69 and Table 310.70" to read "Table 310.60(C)(69) and Table 310.60(C)(70)".
Substantiation: This will correlate with the Panel Action on Proposal 6-123.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 372 — CELLULAR CONCRETE FLOOR RACEWAYS

8-67 Log #1507 NEC-P08 **Final Action: Reject**
(372.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-176
Recommendation: Accept the proposal with the following revisions:
A transverse raceway providing access to predetermined cells of a precast concrete floor, thereby permitting installation of electrical conductors and optical fiber cables from a distribution center to the floor cells.
Substantiation: Raceways are clearly defined in Article 100. Non-conductive optical fiber cables should be included.
Panel Meeting Action: Reject
Panel Statement: It is not the intention of this definition to provide a list of all possible conductor types that may be installed. The definition is intended to provide the user with a general understanding of this raceway type. The installer should refer to Article 770 for installing fiber optical cables in any raceway.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-68 Log #120 NEC-P08 **Final Action: Accept**
(372.12)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 8-178
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel actions on this proposal to comply with 3.1.3 of the NEC Style Manual regarding mandatory language in Fine Print Notes.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise text to read as follows:
372.12 Splices and Taps.
Splices and taps shall be made only in header access units or junction boxes. A continuous unbroken conductor connecting the individual outlets is not a splice or tap.
Panel Statement: CMP 8 reconsidered Proposal 8-178 and modified the FPN and included it in the body of the text.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-69 Log #2115 NEC-P08 **Final Action: Reject**
(372.17 (New))

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-179
Recommendation: Revise proposed Exception to read as follows:
Exception: Where multiple outlets on the same circuit are supplied by separate conductor sets it shall be permitted to count only one such set of current-carrying conductors for the purpose of ampacity adjustment.
Substantiation: To permit such a conductor count for purposes of determining circuit ampacity (adjustment factor) in a raceway is no different than where only current carrying conductors are permitted to be counted in other code sections. See, for example, 392.11(A)(1) & 392.11(B), both of which permit omission of non-load-carrying cable conductors for conductor count in tray and 310.15(B)(4) which permits omission of the non-load-carrying neutral conductor in the conductor count. Further, no additional conductor heating in the same raceway is introduced if the current associated with the circuit is instead assumed to be distributed across the separate conductor sets. In fact, the heating is less in this case since the heating varies as the current magnitude squared and the sum of the current in all sets is limited to the circuit rating. For example, if the total current on a 30 Ampere circuit was assumed to be equally divided between two conductor sets, the total heating would be one-fourth of that seen if the entire 30 Amperes was assumed to be carried by a single set (the set to be counted by this proposal). The adjustment factors of 310.15(B)(2) would still apply according to Panel's stated intent. Only the method of counting conductors would change to become consistent with that permitted elsewhere in the code to accurately recognize the actual current loading of conductors.
Panel Meeting Action: Reject
Panel Statement: There is no way to determine the load division. The adjustment factors of 310.15(B)(2) apply to this type of raceway as they do other raceway types.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-70 Log #1493 NEC-P08 **Final Action: Reject**
(372.17 Exception (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-179
Recommendation: Accept the proposal in principle.
Substantiation: Refer to the Explanation of Negative Vote.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 8-69.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 374 — CELLULAR METAL FLOOR RACEWAYS

8-71 Log #1494 NEC-P08 **Final Action: Reject**
(374.17)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-181
Recommendation: Accept the proposal in principle.
Substantiation: Refer to the Explanation of Negative Vote for Proposal 8-179, 372.17, Exception (new).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 8-74.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-72 Log #1960 NEC-P08 **Final Action: Reject**
(374.17)

Submitter: John J. Michlovic, H.H. Robertson Floor Systems
Comment on Proposal No: 8-183
Recommendation: Revise text to read as follows:
374.17 Ampacity of Conductors. The ampacity adjustment factors in 310.15(B)(2)(a) shall not apply to conductors installed in cellular metal floor raceways.
Substantiation: Ampacity adjustment Table 310.15(B)(2)(a) was devised for round conduit and other small raceways. It makes no allowance for large flat bottom raceways nor does it address the available area for wiring. Testing submitted proved the table too conservative for cells and trenches.
Panel Meeting Action: Reject
Panel Statement: CMP 8 continues to reject Proposal 8-183. The submitter has proposed that the ampacity adjustment factors in Table 310.15(B)(3) (Old Table 310.15(B)(2)) shall not apply to cellular metal floor raceways. CMP 8 has not been provided with a fact finding report using a variety of worst case scenarios sufficient to support this proposal. CMP 8 would expect to see test data without diversity for representative wire sizes permitted in Section 374.4, and conductor types within cellular metal floor raceway installations constructed in accordance with Section 374.5, which allows a maximum number of conductors up to 40 percent of the interior cross-sectional area of the cell or header. CMP 8 also recommends that any exception to Table 310.15(B)(3) should be made to CMP 6.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-73 Log #1961 NEC-P08 **Final Action: Reject**
(374.17)

Submitter: John J. Michlovic, H.H. Robertson Floor Systems
Comment on Proposal No: 8-184
Recommendation: Revise text to read as follows:
374.17 Ampacity of Conductors. The ampacity adjustment factors in 310.15(B)(2)(a) shall apply to conductors installed in cellular metal floor raceways only where the number of conductors in cells or header compartments exceeds 30.
Substantiation: Raceways in Articles 366, 376, 384 and 386 are permitted 30 conductors before ampacity adjustments are required. No testing was required for these raceways. Cells and headers in Article 374 are larger and concrete embedded. There is no valid reason to deny 30 conductor exemption to Article 374 raceways regardless of test results.
Panel Meeting Action: Reject
Panel Statement: The other raceways cited in the submitter's substantiation include additional restrictions regarding ampacity adjustment that were not included for cellular metal floor raceways. The other raceways are not installed in concrete.
Cellular floor metal raceways are similar to the raceway found in Article 390, not the raceways referenced in the submitter's comment. The submitter should provide a fact finding report for future consideration.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-74 Log #2116 NEC-P08 **Final Action: Reject**
(374.17 (New))

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-186
Recommendation: Revise proposed Exception to read as follows:
Exception: Where multiple outlets on the same circuit are supplied by separate conductor sets it shall be permitted to count only one such set of current-carrying conductors for the purpose of ampacity adjustment.
Substantiation: To permit such a conductor count for purposes of determining circuit ampacity (adjustment factor) in a raceway is no different than where only current carrying conductors are permitted to be counted in other code sections. See, for example, 392.11(A)(1) & 392.11(B), both of which permit omission of non-load-carrying cable conductors for conductor count in tray and 310.15(B)(4) which permits omission of the non-load-carrying neutral conductor in the conductor count. Further, no additional conductor heating in the same raceway is introduced if the current associated with the circuit is instead assumed to be distributed across the separate conductor sets. In fact, the heating is less in this case since the heating varies as the current magnitude squared and the sum of the current in all sets is limited to the circuit rating. For example, if the total current on a 30 Ampere circuit was assumed to be equally divided between two conductor sets, the total heating would be one-fourth of that seen if the entire 30 Amperes was assumed to be carried by a single set (the set to be counted by this proposal). The adjustment factors of 310.15(B)(2) would still apply according to Panel's stated intent. Only the method of counting conductors would change to become consistent with that permitted elsewhere in the code to accurately recognize the actual current loading of conductors.
Panel Meeting Action: Reject
Panel Statement: There is no way to determine the load division. The adjustment factors of 310.15(B)(2) apply to this type of raceway as they do other raceway types.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-75 Log #774 NEC-P08 **Final Action: Reject**
(374.17 Exception (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-186
Recommendation: Delete present Articles 372 and 374 and accept proposal revision as follows:
Article 372.
Cellular Concrete and Metal Floor Raceways.
Scope.
This article covers the use and installation requirements for cellular concrete and metal floor raceways.
372.2 Definitions.
Cellular Concrete and Metal Floor Raceways. The hollow spaces of cellular concrete or metal floors with associated metal fittings designed and installed as enclosures for electrical conductors and other cables.
Cell. A single enclosed tubular sp, debris, or other matter. Ace in a precast cellular slab or a cellular metal floor member, the axis of the cell being parallel to the axis of the floor member.
Header. A transverse metal raceway designed and installed to provide access to selected cells.
372.3 Uses not permitted. Conductors and cables shall not be installed in cellular concrete or metal floor raceways as follows:
(1) Where likely to be subject to corrosion.
(2) In any hazardous (classified) location except as permitted by other articles of this Code.
(3) In commercial garages, other than for supplying ceiling outlets or fittings or extensions below the floor.
FPN: See 300.8 for installation of conductors and cables with other systems.
372.4 Header. The header shall be installed in a straight line at a right angle to the cell(s) and mechanically secured to the top of the raceway(s). The ends shall be enclosed by approved metal fittings and sealed to prevent entry of water, dirt, debris, or other matter. The header shall be mechanically and electrically continuous and connected to an equipment grounding conductor in accordance with applicable provisions of Article 250.
572.5 Connection to other equipment. Connections from cells to equipment shall be made with approved wiring methods.
372.6 Junction boxes. Junction boxes shall be metal, leveled to floor grade and sealed to prevent entry of water, dirt, debris, and other matter, mechanically secured to the raceway, and grounded as required.
572.7 Markers. A number of markers acceptable to the authority having jurisdiction shall be installed for the location of cells.
572.8 Inserts. Inserts shall be leveled and sealed to prevent the entry of water, dirt, debris, or other matter. Inserts shall be metal. Where grounding is provided, a wire type equipment grounding conductor shall connect outlet devices to an approved grounding connection in the header. Where cutting through the cell wall for inserts or other purposes, chips and debris shall be removed, and the cutting tool shall be designed and used to prevent damage to contained conductors and cables.
372.9 Size of conductors. No electrical conductors or cables larger than 1/0 AWG shall be installed in a cell except by special permission.
372.10 Maximum number of conductors. The combined cross-sectional area of conductors and cables shall not exceed 40 percent of the cross-sectional area of a cell or header. This provision shall include the cross-sectional area of optical fiber cables installed in accordance with 770.133.
372.11 Splices and taps. Splices and taps shall only be permitted in header access units and junction boxes. Loop wiring (continuous unbroken conductor connecting individual outlets shall not be considered to be a splice or tap).

372.12 Removed outlet devices. When an outlet or fitting is removed, the section of conductors or cable supplying the outlet or fitting, including equipment grounding conductors, shall be removed from the raceway.

372.13 Ampacity. The ampacity adjustment factors provided in 310.15(B)(2) shall apply.

372.14 Construction specifications.

General. Cellular concrete and metal floor raceways shall be constructed and installed to provide secure mechanical continuity of the complete system and reliable electrical continuity of metal floor systems. They shall provide a complete enclosure for conductors and cables. The interior surfaces shall be free of burrsand sharp edges or provided with approve means to protect conductors and cables from damage...

Substantiation: The proposal provides for one article to cover both types of cellular floors. “Cable” is specified to include coaxial cables which may be installed separately or in compliance with 770.133. There is no electrical safety reason to require removal of an outlet when use is discontinued; use may resume at any time and the provision is impossible to enforce. Acceptance will reduce the bulk of the NEC and simplify the use for code users.

Panel Meeting Action: Reject

Panel Statement: CMP 8 does not support combining Articles 372 and 374 into a single Article. The proposed language does not follow the agreed upon cable and raceway article format.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-76 Log #1480 NEC-P08 **Final Action: Reject**

(374.17 Exception (New))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 8-186

Recommendation: Accept the proposal in principle.

Substantiation: Refer to Explanation of Negative Vote for Proposal 8-179, 372.17, Exception (new).

Panel Meeting Action: Reject

Panel Statement: There is no way to determine the load division. The adjustment factors on 310.15(B)(2) apply to this type of raceway as they do other raceway types.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

ARTICLE 376 — METAL WIREWAYS

8-77 Log #1482 NEC-P08 **Final Action: Reject**

(376.10)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 8-188

Recommendation: Accept the proposal.

Substantiation: Since this section is not a requirement it is not necessary and users can be governed only by “uses not permitted.” Permitted uses should be restrictive; the AHJ should not have the responsibility to determine uses not specified. Some NEC sections use the word “only” with “permitted” e.g., 230.82, or have conditions or specify “limited to” (230.43).

Panel Meeting Action: Reject

Panel Statement: The language used in 376.10 is consistent with other raceway Articles. “Uses Permitted” is not an all inclusive list and is not intended to prohibit the use of Metal Wireways.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-78 Log #2263 NEC-P08 **Final Action: Accept**

(376.22(A))

Submitter: Scott Cline, Monterey Park, CA

Comment on Proposal No: 8-194

Recommendation: Reject this proposal.

Substantiation: This Proposal is part of a group: 6-59, 8-155, 8-194, and 8-204. There were unforeseen consequences to this which were not editorial in nature. No Substantiation was given for a technical change. All four need to be Rejected. Comments with the same text are submitted for the three Accepted Proposal.

Statement/Substantiation text:

The TCC has asked for correlative action between CMP-6 and CMP-8 regarding 2011 cycle Proposals 6-59, 8-155, 8-194, and 8-204, I have submitted this for that purpose.

If the Actions of8-155, 8-194, and 8-204 are allowed to stay as-is, then with the Rejection of 6-59, it appears that signaling and control conductors will have to be counted in the affected raceways as current-carrying; this is certainly an unintended consequence. The proposals turn out to not be the editorial change the submitter thought - they would have had significant impact. It is unfortunate that the submitter did not make the group of Proposals co-dependent, such that the Proposals would only take effect if they were all Accepted.

The reference phrase in the Proposals is: **Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current-carrying conductors.**

The following text ***in bold italics*** is from the 2011 cycle ROP for 6-59:

Panel Meeting Action: Reject

Panel Statement: While the reference phrase is contained in all of the sections referenced* (8-155, 8-194, and 8-204), ***the proposal would allow signaling and control cables to be loaded into circular raceways and in cables and not require adjustment. These conductors would take up space, reduce airflow, and reduce heat dissipation. The restrictive nature of circular raceways is different from auxiliary gutters, metallic, and non-metallic wireways. The proposed text should not apply as a general rule.***

Number Eligible to Vote: 11

Ballot Results:Affirmative: 11

Proposal 2011-6-59 must be Rejected.

Panel Meeting Action: Accept

Revise 376.22(B) to read as follows:

376.22 Number of Conductors.

(B) Adjustment Factors. The adjustment factors in 310.15(B)(3)(a) shall be applied only where the number of current-carrying conductors, including neutral conductors classified as current-carrying under the provisions of 310.15(B)(5), exceeds 30. Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current-carrying conductors.

Panel Statement: CMP 8 recognizes that the referenced section should be 376.22(B), not 376.22(A). Reject Proposal 8-194 and reinstate the deleted language.

The panel also updated the Section 310.15 references in this section.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

Comment on Affirmative:

HUMPHREY, D.: See my Explanation of Affirmative Vote on Comment 8-59.

8-79 Log #121 NEC-P08 **Final Action: Accept**

(376.22(B))

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 8-194

Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered by the panel relative to the actions taken on Proposals 6-59, 8-155, 8-194 and 8-204.

The Technical Correlating Committee directs the Chairs of Code-Making Panels 6 and 8 to form a Task Group to correlate Proposals 6-59, 8-155, 8-194 and 8-204, and submit comments, if deemed appropriate.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action on Comment 8-78.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-80 Log #2355 NEC-P08 **Final Action: Reject**

(376.22(B))

Submitter: Mike Holt, Mike Holt Enterprises

Comment on Proposal No: 8-194

Recommendation: Please withdraw my proposal.

Substantiation: The panel statement on Proposal 6-59 is correct.

Panel Meeting Action: Reject

Panel Statement: See panel statement on Comment 8-58.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-81 Log #2589 NEC-P08 **Final Action: Accept**

(376.22(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 8-194

Recommendation: Reject the proposal.

Substantiation: The proposal is unnecessary and creates a direct conflict with 725.51(B), which adequately addresses the same topic in a more comprehensive and technically appropriate manner. The CMP 8 locations

referenced in the substantiation differ, as appropriate based on the differing wiring methods involved, from the one-size-fits-all approach in this proposal. A companion comment is being drafted by this submitter to continue to oppose the change in the Article 310.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 8-78.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-82 Log #360 NEC-P08 **Final Action: Accept**
(376.23(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-198
Recommendation: Continue to reject the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment, including CMP 9 which unanimously rejected the companion proposal (9-28) which would have changed the terminology in the column heading to agree with this text. The CMP 8 panel action correlates correctly with Article 312.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-83 Log #1296 NEC-P08 **Final Action: Reject**
(376.23(A))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 8-198
Recommendation: The Proposal should be Accepted in Principle and the phrase revised as follows: "…one wire on a ~~per~~ terminal in Table 312.6(A) shall apply."
Substantiation: The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: The NEC style manual does not restrict the use of the word "per" in this code section. The proposed change does not add clarity.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-84 Log #1481 NEC-P08 **Final Action: Accept in Principle**
(376.100(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-200
Recommendation: Accept the proposal with the following revisions:

"Wireways shall be constructed and installed so that reliable and effective electrical and mechanical continuity of the complete system is assured."
Substantiation: 3.2.1 of the NEC Style Manual states "adequate" is a term, by itself, that shall not be used.
Panel Meeting Action: Accept in Principle

Revise text to read as follows:

376.100 Construction.

(A) Electrical and Mechanical Continuity. Wireways shall be constructed and installed so that electrical and mechanical continuity of the complete system is assured.
Panel Statement: The revised text addresses the submitter's concern with the compliance to the NEC style manual.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 378 — NONMETALLIC WIREWAYS

8-85 Log #122 NEC-P08 **Final Action: Accept**
(378.22)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 8-204
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered by the panel relative to the actions taken on Proposals 6-59, 8-155, 8-194 and 8-204.

The Technical Correlating Committee directs the Chairs of Code-Making Panels 6 and 8 to form a Task Group to correlate Proposals 6-59, 8-155, 8-194 and 8-204, and submit comments, if deemed appropriate.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 8-88.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.
Comment on Affirmative:

HUMPHREY, D.: See my Explanation of Affirmative Vote on Comment 8-59.

8-86 Log #2305 NEC-P08 **Final Action: Reject**
(378.22)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 8-204
Recommendation: Please withdraw my proposal.
Substantiation: The panel statement on proposal 6-59 is correct.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-58.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-87 Log #2590 NEC-P08 **Final Action: Accept**
(378.22)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-204
Recommendation: Reject the proposal.
Substantiation: The proposal is unnecessary and creates a direct conflict with 725.51(B), which adequately addresses the same topic in a more comprehensive and technically appropriate manner. The CMP 8 locations referenced in the substantiation differ, as appropriate based on the differing wiring methods involved, from the one-size-fits-all approach in this proposal. A companion comment is being drafted by this submitter to continue to oppose the change in the Article 310.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 8-88.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-88 Log #2264 NEC-P08 **Final Action: Accept**
(378.22(A))

Submitter: Scott Cline, Monterey Park, CA
Comment on Proposal No: 8-204
Recommendation: Reject this proposal.
Substantiation: This Proposal is part of a group: 6-59, 8-155, 8-194, and 8-204. There were unforeseen consequences to this which were not editorial in nature. No Substantiation was given for a technical change. All four need to be Rejected. Comments with the same text are submitted for the three Accepted Proposal.

Statement/Substantiation text:

The TCC has asked for correlative action between CMP-6 and CMP-8 regarding 2011 cycle Proposals 6-59, 8-155, 8-194, and 8-204, I have submitted this for that purpose.

If the Actions of8-155, 8-194, and 8-204 are allowed to stay as-is, then with the Rejection of 6-59, it appears that signaling and control conductors will have to be counted in the affected raceways as current-carrying; this is certainly an unintended consequence. The proposals turn out to not be the editorial change the submitter thought - they would have had significant impact. It is unfortunate that the submitter did not make the group of Proposals co-dependent, such that the Proposals would only take effect if they were all Accepted.

The reference phrase in the Proposals is: **Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current-carrying conductors.** The following text ***in bold italics*** is from the 2011 cycle ROP for 6-59:
Panel Meeting Action: Reject

Panel Statement: While the reference phrase is contained in all of the sections referenced* (8-155, 8-194, and 8-204)*, the proposal would allow signaling and control cables to be loaded into circular raceways and in cables and not require adjustment. These conductors would take up space, reduce airflow, and reduce heat dissipation. The restrictive nature of circular raceways is different from auxiliary gutters, metallic, and non-metallic wireways. The proposed text should not apply as a general rule.

Number Eligible to Vote: 11

Ballot Results:Affirmative: 11

Proposal 2011-6-59 must be Rejected.
Panel Meeting Action: Accept

Revise 378.22 to read as follows:

378.22 Number of Conductors. The sum of cross-sectional areas of all contained conductors at any cross section of the nonmetallic wireway shall not exceed 20 percent of the interior cross-sectional area of the nonmetallic wireway. Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current-carrying conductors.

The adjustment factors specified in 310.15(B)(3)(a) shall be applicable to the current-carrying conductors up to and including the 20 percent fill specified above.

Panel Statement: CMP 8 recognizes that the referenced section should be 378.22, not 378.22(A). Reject Proposal 8-204 and reinstate the deleted language to 378.22.
The panel also updated the Section 310.15 references in this section.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-89 Log #361 NEC-P08 **Final Action: Accept**
(378.23(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-206
Recommendation: Continue to reject the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment, including CMP 9 which unanimously rejected the companion proposal (9-28) which would have changed the terminology in the column heading to agree with this text. The CMP 8 panel action correlates correctly with Article 312.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-90 Log #1297 NEC-P08 **Final Action: Reject**
(378.23(A))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 8-206
Recommendation: The Proposal should be Accepted in Principle and the phrase revised as follows: "…one wire <u>on a</u> ~~per~~ terminal in Table 312.6(A) shall apply."
Substantiation: The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: The NEC style manual does not restrict the use of the word "per" in this code section. The proposed change does not add clarity.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-91 Log #1506 NEC-P08 **Final Action: Reject**
(378.60)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-207
Recommendation: Accept the proposal with the following revisions:

Where equipment is to be grounded or bonded, a separate equipment grounding or bonding conductor shall be installed in the nonmetallic wireway.
Substantiation: The provision should apply where grounding or bonding is required or by choice and include bonding conductors.
Panel Meeting Action: Reject
Panel Statement: CMP 8 continues to support the reject of Proposal 8-207. The proposed changes do not improve the clarity or content of the existing text.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 380 — MULTIOUTLET ASSEMBLY

8-92 Log #123 NEC-P08 **Final Action: Accept in Principle**
(380)

TCC Action: The Technical Correlating Committee advises that article scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the panel action.

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 8-208
Recommendation: It was the action of the Technical Correlating Committee that the definition of "multioutlet assembly" remains in Article 100 according to 2.2.2.1 of the NEC Style Manual.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Principle
Revise Article 380 to read as follows:
ARTICLE 380
Multioutlet Assembly
I. General
380.1 Scope. This article covers the use and installation requirements for multioutlet assemblies.
Informational Note: See the definition of multioutlet assembly in Article 100.
II. Installation
380.10 Uses Permitted. The use of a multioutlet assembly shall be permitted in dry locations.
380.12 Uses Not Permitted. A multioutlet assembly shall not be installed as follows:
(1) Where concealed, except that it shall be permissible to surround the back and sides of a metal multioutlet assembly by the building finish or recess a nonmetallic multioutlet assembly in a baseboard
(2) Where subject to severe physical damage
(3) Where the voltage is 300 volts or more between conductors unless the assembly is of metal having a thickness of not less than 1.02 mm (0.040 in.)
(4) Where subject to corrosive vapors
(5) In hoistways
(6) In any hazardous (classified) location, except as permitted by other articles in this Code
380.23 Insulated Conductors. For field assembled multioutlet assemblies, insulated conductors shall comply with 380.23(A) and (B).
(A) Deflected Insulated Conductors. Where insulated conductors are deflected within a multioutlet assembly, either at the ends or where conduits, fittings, or other raceways or cables enter or leave the multioutlet assembly, or where the direction of the multioutlet assembly is deflected greater than 30 degrees, dimensions corresponding to one wire per terminal in Table 312.6(A) shall apply.
(B) Multioutlet Assemblies Used as Pull Boxes. Where insulated conductors 4 AWG or larger are pulled through a multioutlet assembly, the distance between raceway and cable entries enclosing the same conductor shall not be less than that required by 314.28(A)(1) for straight pulls and 314.28(A)(2) for angle pulls. When transposing cable size into raceway size, the minimum metric designator (trade size) raceway required for the number and size of conductors in the cable shall be used.
380.76 Metal Multioutlet Assembly Through Dry Partitions.
It shall be permissible to extend a metal multioutlet assembly through (not run within) dry partitions if arrangements are made for removing the cap or cover on all exposed portions and no outlet is located within the partitions.
Panel Statement: A Multioutlet Assembly is a unique wiring method that serves code applications other than the raceway function. The inclusion of "Multioutlet Assembly" in Article 100 is accordingly entirely appropriate. See 2.2.2.1 of the NEC Style Manual.
The panel supports the inclusion of the definition of a multioutlet assembly in Article 100. The panel intends to keep the formatting of Article 380 intact as shown in the 2011 NEC draft. Adding the informational note directs the user to Article 100 for the definition.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-93 Log #2306 NEC-P08 **Final Action: Reject**
(380.2)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 8-208
Recommendation: Please correlate 8-208 and 18-7.
Substantiation: In the ROP draft, the definition is in both 100 and 380. While the style manual mandates that it be in Article 100, it is inconsistent with every other wiring method definition.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 8-92.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-94 Log #1505 NEC-P08 **Final Action: Reject**
(380.2(B)(2) and 380.2(B)(4))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-211
Recommendation: Accept the proposal with revised (4):
Where likely to be subject to corrosive conditions.
Substantiation: "Severe" is subjective and not NEC defined. Corrosive agents other than vapors should be included. "Likely" is a term used in many sections.
Panel Meeting Action: Reject
Panel Statement: CMP 8 continues to support the reject of Proposal 8-211. The proposed changes do not improve the clarity or content of the existing text.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-95 Log #1235 NEC-P08 **Final Action: Reject**
(380.23)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 8-212
Recommendation: The panel should reject this proposal.
Substantiation: The proposal that was accepted by the panel imposes the wire bending requirements for products that are significantly different than multioutlet assemblies in both construction and installation. Multioutlet assemblies are typically lengths of channel with a removable cover. The wire bending requirements that were accepted are for cabinets, cutout boxes, junction and pull boxes, which have a design and function completely different than multioutlet assemblies. Applying these wiring bending requirements to multioutlet assemblies is not only inappropriate due to the differences in product functionality but would also have very little affect on the conductor overfill issue cited in the substantiation.
This proposal may be confusing surface raceway with multioutlet assemblies. The design and function of multioutlet assemblies make it unlikely that the conductor overfill condition described in the substantiation will occur. The multioutlet assemblies typically have conductors installed to feed the receptacles that are an integral part of the multioutlet assembly. Surface raceway is commonly used for the installation of conductors that feed the multioutlet assembly. Conductor fill in surface raceways is addressed by Articles 386 and 388.
There is no clear indication in the substantiation that overfill of conductors in multioutlet assemblies is occurring in field installations of multioutlet assemblies.
Panel Meeting Action: Reject
Panel Statement: Multioutlet assemblies may be "field assembled" and may contain conductors that pass through one section in order to supply another section of multioutlet assembly. Direction is appropriate especially to field installations with regard to wire bending space within the assembly. As stated in the ROP the panel wanted to differentiate between field assembled versus listed multioutlet assemblies.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 1
Ballot Not Returned: 1 Griffith, M.
Explanation of Negative:
WEST, R.: While it is clear that the new text applies only to field assembled (not listed) multioutlet assemblies, there is no clear indication in the substantiation of proposal 8-212 that overfill of conductors in multioutlet assemblies is occurring in field installations.

ARTICLE 382 — NONMETALLIC EXTENSIONS

7-57 Log #2815 NEC-P07 **Final Action: Hold**
(382.2, 382.10(C), 382.15(B), and 382.30(B))

Submitter: Richard Temblador, Southwire Company
Comment on Proposal No: 7-144
Recommendation: This proposal should be accepted as submitted.
Substantiation: A Fact-Finding Report has been completed based on the installation of Concealable Nonmetallic Extensions under flooring materials. The proposed expanded use of concealable nonmetallic extensions broadens its use to serve as a safe alternative to extension cords. Branch circuit wiring can be safely extended using concealable flat wire nonmetallic extension for power or lighting where needed, and as needed, to accommodate decorating schemes, placement of specific equipment or furniture to suit ever-changing lifestyles.
A copy of the fact-finding report in support of Proposal 7-144 has been provided.
Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Hold
Panel Statement: Currently this product is not listed. The information presented during the panel meeting did not specify when such listing could be expected. The panel has reviewed the fact finding material and recognizes that this document's data is primarily focused on the wiring methods performance regarding thermal readings while operated under flooring material. Absence of technical data indicating the ability of this product to perform when subjected to hazards such as crush, impact, and other flexing, abrasion and foreign object penetration when installed under a variety of flooring materials this CMP has determined it appropriate to put Proposal 7-144 on hold.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-58 Log #362 NEC-P07 **Final Action: Accept**
(382.15(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 7-149
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-59 Log #363 NEC-P07 **Final Action: Accept**
(382.104(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 7-151
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 388 — SURFACE NONMETALLIC RACEWAYS

8-96 Log #1502 NEC-P08 **Final Action: Reject**
(388.30)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-228
Recommendation: Accept the proposal with the following revisions:
Surface nonmetallic raceways shall be securely fastened to supports at intervals in accordance with the manufacturers' instructions.
Substantiation: "Supported" does not necessarily require fastening. Support means includes the concrete walls and other means noted in the panel statement. Raceways can be supported on any horizontal surface without any attachment.
Panel Meeting Action: Reject
Panel Statement: The current language of this section adequately conveys the requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-97 Log #1504 NEC-P08 **Final Action: Reject**
(388.60)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-229
Recommendation: Accept the proposal with the following revisions:
Where equipment is to be grounded or bonded, a separate equipment grounding or bonding conductor shall be installed in the monmetallic conduit.
Substantiation: The provision should apply whether grounding or bonding is required or by choice. Bonding conductors should be included. "Separate" is superfluous; an EGC in the raceway is separate.
Panel Meeting Action: Reject
Panel Statement: The current language of this section adequately conveys the requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 390 — UNDERFLOOR RACEWAYS

8-98 Log #1501 NEC-P08 **Final Action: Reject**
(390.2(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-231
Recommendation: Accept the proposal.
Substantiation: This provision is not a requirement, which it appears intended to be.
Panel Meeting Action: Reject
Panel Statement: The proposed language does not reconcile with the intended permitted uses of this raceway type. There are different rules for installation depending on the occupancy type. The deletion of the limiting text would effectively expand the permitted use of the product into areas for which this products use may not have been evaluated.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-99 Log #1503 NEC-P08 **Final Action: Reject**
(390.2(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-231
Recommendation: Accept the proposal.
Substantiation: "Shall be permitted" does not impose a requirement per 90.5(B), and therefore, not enforceable. How is the Authority Having Jurisdiction to determine if a use not covered in (A) and not prohibited by (B), is suitable? Some sections use the word "only" with "permitted", e.g., 230.82, or have conditions or specify "limited to" as in 230.43.
Panel Meeting Action: Reject
Panel Statement: The language used in 390.2(A) is consistent with other raceway Articles. "Uses Permitted" is not an all inclusive list and is not intended to prohibit the use of Metal Wireways.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-100 Log #1500 NEC-P08 **Final Action: Reject**
(390.15)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-233
Recommendation: Accept the proposal with the following revisions:
Electrical connections to underfloor raceways shall be made by fittings and wiring methods approved for the use.
Substantiation: Connections to underfloor raceways maybe to other than distribution centers and wall outlets. "Any" wiring method of Chapter 3 does not correlate with "not permitted" use and "only" permitted use of some wiring methods.
Panel Meeting Action: Reject
Panel Statement: The heading of the section is "Connections to Cabinets and Wall Outlets". The current language provides clear and concise direction to the user. The proposed change does not enhance clarity.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

Comment on Affirmative:

BLOM, J.: Because this Article re-write involves a relocation of material into new sub-dividing sections, future users of the 2011 NEC may have difficulty finding the desired material in the new sub-dividing section names. I recommend the NFPA staff add to the 2011 sub-dividing section cross-references from the former 2008 NEC sub-dividing section. CMP-6 has made a similar request for cross-references for relocated material within Article 310.

ARTICLE 392 — CABLE TRAYS

8-100a Log #CC800 NEC-P08 **Final Action: Accept**
(Article 392)

TCC Action: The Technical Correlating Committee advises that article scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the panel action.

Submitter: Code-Making Panel 8,
Comment on Proposal No:
Recommendation: Revise Article 392 to read as follows:

Article 392 Cable Tray

I. General

392.1 Scope. This article covers cable tray systems, including ladder, ventilated trough, ventilated channel, solid bottom, and other similar structures.

Informational Note: For further information on cable trays, see ANSI/ NEMA–VE 1-2002, *Metal Cable Tray Systems*; NECA/NEMA 105-2007, *Standard for Installing Metal Cable Tray Systems*; and NEMA–FG 1-1998, *Nonmetallic Cable Tray Systems*.

392.2 Definition.

Cable Tray System. A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways.

II. Installation

392.10 Uses Permitted. Cable tray shall be permitted to be used as a support system for service conductors, feeders, branch circuits, communications circuits, control circuits, and signaling circuits. Cable tray installations shall not be limited to industrial establishments. Where exposed to direct rays of the sun, insulated conductors and jacketed cables shall be identified as being sunlight resistant. Cable trays and their associated fittings shall be identified for the intended use.

(A) Wiring Methods. The wiring methods in Table 392.10(A) shall be permitted to be installed in cable tray systems under the conditions described in their respective articles and sections.

Table 392.10(A) Wiring Methods

Wiring	Method Article
Armored cable	320
CATV cables	820
Class 2 and Class 3 cables	725
Communications cables	800
Communications raceways	800
Electrical metallic tubing	358
Electrical nonmetallic tubing	362
Fire alarm cables	760
Flexible metal conduit	348
Flexible metallic tubing	360
Instrumentation tray cable	727
Intermediate metal conduit	342
Liquidtight flexible metal conduit	350
Liquidtight flexible nonmetallic conduit	356
Metal-clad cable	330
Mineral-insulated, metal-sheathed cable	332
Multiconductor service-entrance cable	338
Multiconductor underground feeder and branch-circuit cable	340
Network-powered broadband Communications cables	830
Nonmetallic-sheathed cable	334
Non-power-limited fire alarm cable	760
Optical fiber cables	770
Optical fiber raceways	770
Other factory-assembled, multiconductor control, signal, or power cables that are specifically approved for installation in cable trays	
Polyvinyl chloride PVC conduit	352
Power and control tray cable	336
Power-limited fire alarm cable	760
Power-limited tray cable	725
Rigid metal conduit	344
Rigid nonmetallic conduit	352
RTRC	355
Signaling raceway	725

(B) In Industrial Establishments. The wiring methods in Table 392.10(A) shall be permitted to be used in any industrial establishment under the conditions described in their respective articles. In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified persons service the installed cable tray system, any of the cables in 392.10(B)(1) and (B)(2) shall be permitted to be installed in ladder, ventilated trough, solid bottom, or ventilated channel cable trays.

(1) Single-conductor cables shall be permitted to be installed in accordance with (B)(1)(a) through (B)(1)(c).

(a) Single-conductor cable shall be 1/0 AWG or larger and shall be of a type listed and marked on the surface for use in cable trays. Where 1/0 AWG through 4/0 AWG single-conductor cables are installed in ladder cable tray, the maximum allowable rung spacing for the ladder cable tray shall be 225 mm (9 in.).

(b) Welding cables shall comply with the provisions of Article 630, Part IV.

(c) Single conductors used as equipment grounding conductors shall be insulated, covered, or bare, and they shall be 4 AWG or larger.

(2) Single- and multiconductor medium voltage cables shall be Type MV cable. Single conductors shall be installed in accordance with 392.10(B)(1).

(C) Hazardous (Classified) Locations. Cable trays in hazardous (classified) locations shall contain only the cable types and raceways as permitted by other articles in this *Code*.

(D) Nonmetallic Cable Tray. In addition to the uses permitted elsewhere in 392.10, nonmetallic cable tray shall be permitted in corrosive areas and in areas requiring voltage isolation.

392.12 Uses Not Permitted. Cable tray systems shall not be used in hoistways or where subject to severe physical damage.

392.18 Cable Tray Installation

(A) Complete System. Cable trays shall be installed as a complete system. Field bends or modifications shall be so made that the electrical continuity of the cable tray system and support for the cables is maintained. Cable tray systems shall be permitted to have mechanically discontinuous segments between cable tray runs or between cable tray runs and equipment.

(B) Completed Before Installation. Each run of cable tray shall be completed before the installation of cables.

(C) Covers. In portions of runs where additional protection is required, covers or enclosures providing the required protection shall be of a material that is compatible with the cable tray.

(D) Through Partitions and Walls. Cable trays shall be permitted to extend transversely through partitions and walls or vertically through platforms and floors in wet or dry locations where the installations, complete with installed cables, are made in accordance with the requirements of 300.21.

(E) Exposed and Accessible. Cable trays shall be exposed and accessible except as permitted by 392.10(D).

(F) Adequate Access. Sufficient space shall be provided and maintained about cable trays to permit adequate access for installing and maintaining the cables.

(G) Raceways, Cables, Boxes, and Conduit Bodies Supported from Cable Tray Systems. In industrial facilities where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable tray systems are designed and installed to support the load, such systems shall be permitted to support raceways and cables, and boxes and conduit bodies covered in 314.1. For raceways terminating at the tray, a listed cable tray clamp or adapter shall be used to securely fasten the raceway to the cable tray system. Additional supporting and securing of the raceway shall be in accordance with the requirements of the appropriate raceway article.

For raceways or cables running parallel to and attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of the appropriate raceway or cable article.

For boxes and conduit bodies attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of 314.23.

(H) Marking. Cable trays containing conductors rated over 600 volts shall have a permanent, legible warning notice carrying the wording “DANGER-HIGH VOLTAGE-KEEP AWAY” placed in a readily visible position on all cable trays with spacing of warning notices not to exceed 3m (10 ft).

392.20 Cable and Conductor Installation

(A) Multiconductor Cables Rated 600 Volts or Less. Multiconductor cables rated 600 volts or less shall be permitted to be installed in the same cable tray.

(B) Cables Rated Over 600 Volts. Cables rated over 600 volts and those rated 600 volts or less installed in the same cable tray shall comply with either of the following:

(1) The cables rated over 600 volts are Type MC.

(2) The cables rated over 600 volts are separated from the cables rated 600 volts or less by a solid fixed barrier of a material compatible with the cable tray.

(C) Connected in Parallel. Where single conductor cables comprising each phase, neutral, or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.10(H), the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance.

Single conductors shall be securely bound in circuit groups to prevent excessive movement due to fault-current magnetic forces unless single conductors are cabled together, such as triplexed assemblies.

(D) Single Conductors. Where any of the single conductors installed in ladder or ventilated trough cable trays are 1/0 through 4/0 AWG, all single conductors shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

392.22 Number of Conductors or Cables.

(A) Number of Multiconductor Cables, Rated 2000 Volts or Less, in Cable Trays. The number of multiconductor cables, rated 2000 volts or less, permitted in a single cable tray shall not exceed the requirements of this section. The conductor sizes apply to both aluminum and copper conductors.

(1) Ladder or Ventilated Trough Cable Trays Containing Any Mixture of Cables. Where ladder or ventilated trough cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(a) Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed the cable tray width, and the cables shall be installed in a single layer. Where the cable ampacity is determined according to 392.80 (A)(1)(c), the cable tray width shall not be less than the sum of the diameters of the cables and the sum of the required spacing widths between the cables.

(b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.22(A) for the appropriate cable tray width.

(c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the calculation in Column 2 of Table 392.22(A) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

(2) Ladder or Ventilated Trough Cable Trays Containing Multiconductor Control and/or Signal Cables Only. Where a ladder or ventilated trough cable tray having a usable inside depth of 150mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 50 percent of the interior cross-sectional area of the cable tray. A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(3) Solid Bottom Cable Trays Containing Any Mixture of Cables. Where solid bottom cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(a) Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed 90 percent of the cable tray width, and the cables shall be installed in a single layer.

(b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 3 of Table 392.22(A) for the appropriate cable tray width.

(c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the computation in Column 4 of Table 392.22(A) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

(4) Solid Bottom Cable Tray Containing Multiconductor Control and/or Signal Cables Only. Where a solid bottom cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross sectional areas of all cables at any cross section shall not exceed 40 percent of the interior cross-sectional area of the cable tray. A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(5) Ventilated Channel Cable Trays Containing Mulitconductor Cables of Any Type. Where ventilated channel cable trays contain multiconductor cables of any type, the following shall apply:

(a) Where only one multiconductor cable is installed, the cross-sectional area shall not exceed the value specified in Column 1 of Table 392.22(A)(5).

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cables shall not exceed the value specified in Column 2 of Table 392.22(A)(5).

See Table 392.22(A) on Page 233

Table 392.22(A)(5) Allowable Cable Fill Area for Multiconductor Cables in Ventilated Channel Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Multiconductor Cables					
Inside Width of Cable Tray		Column 1 One Cable		Column 2 More Than One Cable	
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$
75	3	1500	2.3	850	1.3
100	4	2900	4.5	1600	2.5
150	6	4500	7.0	2450	3.8

(6) Solid Channel Cable Trays Containing Multiconductor Cables of Any Type. Where solid channel cable trays contain multiconductor cables of any type, the following shall apply:

(a) Where only one multiconductor cable is installed, the cross-sectional area of the cable shall not exceed the value specified in Column 1 of Table 392.22(A)(6).

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cable shall not exceed the value specified in Column 2 of Table 392.22(A)(6).

Table 392.22(A)(6) Allowable Cable Fill Area for Multiconductor Cables in Solid Channel Cable Trays for Cables Rated 2000 Volts or Less

Inside Width of Cable Tray		Column 1 One Cable		Column 2 More Than One Cable	
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$
50	2	850	1.3	500	0.8
75	3	1300	2.0	700	1.1
100	4	2400	3.7	1400	2.1
150	6	3600	5.5	2100	3.2

(B) Number of Single-Conductor Cables, Rated 2000 Volts or Less, in Cable Trays. The number of singleconductor cables, rated 2000 volts or less, permitted in a single cable tray section shall not exceed the requirements of this section. The single conductors, or conductor assemblies, shall be evenly distributed across the cable tray. The conductor sizes apply to both aluminum and copper conductors.

(1) Ladder or Ventilated Trough Cable Trays. Where ladder or ventilated trough cable trays contain single-conductor cables, the maximum number of single conductors shall conform to the following:

(a) Where all of the cables are 1000 kcmil or larger, the sum of the diameters of all single-conductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

(b) Where all of the cables are from 250 kcmil through 900 kcmil, the sum of the cross-sectional areas of all single-conductor cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.22(B)(1) for the appropriate cable tray width.

(c) Where 1000 kcmil or larger single-conductor cables are installed in the same cable tray with single-conductor cables smaller than 1000 kcmil, the sum of the cross sectional areas of all cables smaller than 1000 kcmil shall not exceed the maximum allowable fill area resulting from the computation in Column 2 of Table 392.22(B)(1) for the appropriate cable tray width.

(d) Where any of the single conductor cables are 1/0 through 4/0 AWG, the sum of the diameters of all single conductor cables shall not exceed the cable tray width.

(2) Ventilated Channel Cable Trays. Where 50 mm (2 in.), 75 mm (3 in.), 100 mm (4 in.), or 150 mm (6 in.) wide ventilated channel cable trays contain single-conductor cables, the sum of the diameters of all single conductors shall not exceed the inside width of the channel.

Table 392.22(A)

Table 392.22(A) Allowable Cable Fill Area for Multiconductor Cables in Ladder, Ventilated Trough, or Solid Bottom Cable Trays for Cables Rated 2000 Volts or Less

		Maximum Allowable Fill Area for Multiconductor Cables							
		Ladder or Ventilated Trough or Wire Mesh Cable Trays, 392.22(A)(1)				Solid Bottom Cable Trays, 392.22(A)(3)			
		Column 1 Applicable for 392.22(A)(1)(b) Only		Column 2[a] Applicable for 392.22(A)(1)(c) Only		Column 3 Applicable for 392.22(A)(3)(b) Only		Column 4[a] Applicable for 392.22(A)(3)(c) Only	
Inside Width of Cable tray									
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$	mm^2	$in.^2$	mm^2	$in.^2$
50	2.0	1,500	2.5	1,500– (30 Sd)[b]	2.5– (1.2 Sd)[b]	1,200	2.0	1,200– (25 Sd)[b]	2.0–Sd[b]
100	4.0	3,000	4.5	3,000 – 30 Sd)[b]	4.5– (1.2 Sd)	2,300	3.5	2,300–(25 Sd)	3.5–Sd
150	6.0	4,500	7.0	4,500 – (30 Sd)[b]	7– (1.2 Sd)	3,500	5.5	3,500–(25 Sd)[b]	5.5–Sd
200	8.0	6,000	9.5	6,000 – (30 Sd)[b]	9.5– (1.2 Sd)	4,500	7.0	4,500–(25 Sd)	7.0–Sd
225	9.0	6,800	10.5	6,800 – (30 Sd)	10.5– (1.2 Sd)	5,100	8.0	5,100–(25 Sd)	8.0–Sd
300	12.0	9,000	14.0	9,000 – (30 Sd)	14– (1.2 Sd)	7,100	11.0	7,100–(25 Sd)	11.0–Sd
400	16.0	12,000	18.5	12,000 – (30 Sd)	18.5– (1.2 Sd)	9,400	14.5	9,400– (25 Sd)	14.5–Sd
450	18.0	13,500	21.0	13,500 – (30 Sd)	21– (1.2 Sd)	10,600	16.5	10,600–(25 Sd)	16.5–Sd
500	20.0	15,000	23.5	15,000 – (30 Sd)	23.5– (1.2 Sd)	11,800	18.5	11,800–(25 Sd)	18.5–Sd
600	24.0	18,000	28.0	18,000 – (30 Sd)	28– (1.2 Sd)	14,200	22.0	14,200–(25 Sd)	22.0–Sd
750	30.0	22,500	35.0	22,500 – (30 Sd)	35– (1.2 Sd)	17,700	27.5	17,700–(25 Sd)	27.5–Sd
900	36.0	27,000	42.0	27,000 – (30 Sd)	42– (1.2 Sd)	21,300	33.0	21,300–(25 Sd)	33.0–Sd

[a]The maximum allowable fill areas in Columns 2 and 4 shall be calculated. For example, the maximum allowable fill in mm2 for a 150-mm wide cable tray in Column 2 shall be 4500 minus (30 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 7 minus (1.2 multiplied by Sd)].

[b]The term Sd in Columns 2 and 4 is equal to the sum of the diameters, in mm, of all cables 107.2 mm (in inches, of all 4/0 AWG) and larger multiconductor cables in the same cable tray with smaller cables.

(C) Number of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays. The number of cables rated 2001 volts or over permitted in a single cable tray shall not exceed the requirements of this section.
The sum of the diameters of single-conductor and multiconductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer. Where single conductor cables are triplexed, quadruplexed, or bound together in circuit groups, the sum of the diameters of the single conductors shall not exceed the cable tray width, and these groups shall be installed in single layer arrangement.

392.30 Securing and Supporting.

(A) Cable Trays. Cable trays shall be supported at intervals in accordance with the installation instructions.

(B) Cables and Conductors. Cables and conductors shall be secured to and supported by the cable tray system in accordance with (1), (2) and (3) as applicable:

(1) In other than horizontal runs, the cables shall be fastened securely to transverse members of the cable runs.

(2) Supports shall be provided to prevent stress on cables where they enter raceways from cable tray systems.

Informational Note: Examples of non-power conductors include Nonconductive Optical Fiber Cables, Class 2 and Class 3 Remote Control Signaling and Power Limiting Circuits.

(B) Steel or Aluminum Cable Tray Systems. Steel or aluminum cable tray systems shall be permitted to be used as equipment grounding conductors, provided all the following requirements are met:

(1) The cable tray sections and fittings are identified as an equipment grounding conductor.

(2) The minimum cross-sectional area of cable trays conform to the requirements in Table 392.60(A).

(3) All cable tray sections and fittings are legibly and durably marked to show the cross-sectional area of metal in channel cable trays, or cable trays of one-piece construction, and the total cross-sectional area of both side rails for ladder or trough cable trays.

(4) Cable tray sections, fittings, and connected raceways are bonded in accordance with 250.96, using bolted mechanical connectors or bonding jumpers sized and installed in accordance with 250.102.

Table 392.22(B)(1) Allowable Cable Fill Area for Single-Conductor Cables in Ladder, Ventilated Trough, or Wire Mesh Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Single-Conductor Cables in Ladder, Ventilated Trough, or Wire Mesh Cable Trays					
Inside Width of Cable Tray		Column 1 Applicable for 392.22(B)(1)(b) Only		Column 2[a] Applicable for 392.22(B)(1)(c) Only	
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$
50	2	1,400	2.0	1,400 - (28 Sd)[b]	2.0 - (1.1 Sd)[b]
100	4	2,800	4.5	2,800 - (28 Sd)	4.5 - (1.1 Sd)
150	6	4,200	6.5	4,200 - (28 Sd)[b]	6.5 - (1.1 Sd)[b]
200	8	5,600	8.5	5,600 - (28 Sd)	8.5 - (1.1 Sd)
225	9	6,100	9.5	6,100 - (28 Sd)	9.5 - (1.1 Sd)
300	12	8,400	13.0	8,400 - (28 Sd)	13.0 - (1.1 Sd)
400	16	11,200	17.5	11,200 - (28 Sd)	17.5 - (1.1 Sd)
450	18	12,600	19.5	12,600 - (28 Sd)	19.5 - (1.1 Sd)
500	20	14,000	21.5	14,000 - (28 Sd)	21.5 - (1.1 Sd)
600	24	16,800	26.0	16,800 - (28 Sd)	26.0 - (1.1 Sd)
750	30	21,000	32.5	21,000 - (28 Sd)	32.5 - (1.1 Sd)
900	36	25,200	39.0	25,200 - (28 Sd)	39.0 - (1.1 Sd)

[a]The maximum allowable fill areas in Column 2 shall be calculated. For example, the maximum allowable fill, in mm^2, for a 150 mm wide cable tray in Column 2 shall be 4200 minus (28 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 6.5 minus (1.1 multiplied by Sd)].

[b]The term Sd in Column 2 is equal to the sum of the diameters, in mm, of all cables 507 mm^2 (in inches, of all 1000 kcmil) and larger single-conductor cables in the same cable tray with smaller cables.

See Table 392.60(A) on Page 235

(3) The system shall provide for the support of cables and raceway wiring methods in accordance with their corresponding articles. Where cable trays support individual conductors and where the conductors pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between the cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8m (6 ft). The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.

392.46 Bushed Conduit and Tubing. A box shall not be required where cables or conductors are installed in bushed conduit and tubing used for support or for protection against physical damage.

392.56 Cable Splices. Cable splices made and insulated by approved methods shall be permitted to be located within a cable tray, provided they are accessible. Splices shall be permitted to project above the side rails where not subject to physical damage.

392.60 Grounding and Bonding.

(A) Metallic Cable Trays. Metallic cable trays shall be permitted to be used as equipment grounding conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system and the cable tray complies with provisions of this section. Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and Part IV of Article 250. Metal cable trays containing only non-power conductors shall be electrically continuous through approved connections or the use of a bonding jumper not smaller than a 10 AWG.

(C) Transitions. Where metallic cable tray systems are mechanically discontinuous, as permitted in 392.18(A), a bonding jumper sized in accordance with 250.102 shall connect the two sections of the cable tray, or the cable tray and the raceway or equipment. Bonding shall be in accordance with 250.96.

392.80 Ampacity of Conductors.

(A) Ampacity of Cables, Rated 2000 Volts or Less, in Cable Trays.

(1) Multiconductor Cables. The allowable ampacity of multiconductor cables, nominally rated 2000 volts or less, installed according to the requirements of 392.22(A) shall be as given in Table 310.15(B)(16) and Table 310.15(B)(18), subject to the provisions of (a), (b), (c), and 310.15(A)(2).

(a) The adjustment factors of 310.15(B)(3)(a) shall apply only to multiconductor cables with more than three current-carrying conductors. Adjustment factors shall be limited to the number of current-carrying conductors in the cable and not to the number of conductors in the cable tray.

(b) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not over 95 percent of the allowable ampacities of Table 310.15(B)(16) and Table 310.15(B)(18) shall be permitted for multiconductor cables.

(c) Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0 through 2000 volts in free air, in accordance with 310.15(C).

Informational Note: See Table B.310.15(B)(2)(3).

Table 392.60(A) Metal Area Requirements for Cable Trays Used as Equipment Grounding Conductor

Maximum Fuse Ampere Rating, Circuit Breaker Ampere Trip Setting, or Circuit Breaker Protective Relay Ampere Trip Setting for Ground-Fault Protection of Any Cable Circuit in the Cable Tray System	Minimum Cross-Sectional Area of Metal[a]			
	Steel Cable trays		Aluminum Cable Trays	
	mm^2	$in.^2$	mm^2	$in.^2$
60	129	0.20	129	0.20
100	258	0.40	129	0.20
200	451.5	0.70	129	0.20
400	645	1.00	258	0.40
600	967.5	1.50[b]	258	0.40
1000	---	---	387	0.60
1200	---	---	645	1.00
1600	---	---	967.5	1.50
2000	---	---	1290	2.00[b]

[a]Total cross-sectional area of both side rails for ladder or trough cable trays; or the minimum cross-sectional area of metal in channel cable trays or cable trays of one-piece construction.

[b]Steel cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 2000 amperes.

(2) Single-Conductors Cables. The allowable ampacity of single-conductor cables shall be as permitted by 310.15(A)(2). The adjustment factors of 310.15(B)(3)(a) shall not apply to the ampacity of cables in cable trays. The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), nominally rated 2000 volts or less, shall comply with the following:

(a) Where installed according to the requirements of 392.22(B), the ampacities for 600 kcmil and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.15(B)(17) and Table 310.15(B)(19). Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the allowable ampacities in Table 310.15(B)(17) and Table 310.15(B)(19).

(b) Where installed according to the requirements of 392.22(B), the ampacities for 1/0 AWG through 500 kcmil single-conductor cables in uncovered cable trays shall not exceed 65 percent of the allowable ampacities in Table 310.15(B)(17) and Table 310.15(B)(19). Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the allowable ampacities in Table 310.15(B)(17) and Table 310.15(B)(19).

(c) Where single conductors are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.15(B)(17) and Table 310.15(B)(19).

Exception to (2)(3): For solid bottom cable trays the ampacity of single conductor cables shall be determined by 310.15(C).

(d) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free airspace of not less than 2.15 times one conductor diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities of two or three single insulated conductors rated 0 through 2000 volts supported on a messenger in accordance with 310.15(B).

Informational Note: See Table 310.15(B)(20).

(3) Combinations of Multiconductor and Single-Conductor Cables. Where a cable tray contains a combination of multiconductor and single-conductor cables, the allowable ampacities shall be as given in 392.17(A)(1) for multiconductor cables and 392.17(A)(2) for single-conductor cables, provided that the following conditions apply:

(1) The sum of the multiconductor cable fill area as a percentage of the allowable fill area for the tray calculated in accordance with 392.22(A), and the single-conductor cable fill area as a percentage of the allowable fill area for the tray calculated in accordance with 392.22(B), totals not more than 100 percent.

(2) Multiconductor cables are installed according to 392.22(A) and single-conductor cables are installed according to 392.22(B) and 392.20(C) and (D).

(B) Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays. The ampacity of cables, rated 2001 volts, nominal, or over, installed according to 392.22(C) shall not exceed the requirements of this section.

(1) Multiconductor Cables (2001 Volts or Over). The allowable ampacity of multiconductor cables shall be as given in Table 310.60(C)(75) and Table 310.60(C)(76), subject to the following provisions:

(a) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not more than 95 percent of the allowable ampacities of Table 310.60(C)(75) and Table 310.60(C)(76) shall be permitted for multiconductor cables.

(b) Where multiconductor cables are installed in a single layer in uncovered cable trays, with maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Table 310.60(C)(71) and Table 310.60(C)(72).

(2) Single-Conductor Cables (2001 Volts or Over). The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), shall comply with the following:

(a) The ampacities for 1/0 AWG and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.60(C)(69) and Table 310.60(C)(70). Where the cable trays are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the allowable ampacities in Table 310.60(C)(69) and Table 310.60(C)(70).

(b) Where single-conductor cables are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.60(C)(69) and Table 310.60(C)(70).

(c) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free air space of not less than 2.15 times the diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.60(C)(67) and Table 310.60(C)(68).

III. Construction Specifications

392.100 Construction.

(A) Strength and Rigidity. Cable trays shall have suitable strength and rigidity to provide adequate support for all contained wiring.

(B) Smooth Edges. Cable trays shall not have sharp edges, burrs, or projections that could damage the insulation or jackets of the wiring.

(C) Corrosion Protection. Cable tray systems shall be corrosion resistant. If made of ferrous material, the system shall be protected from corrosion as required by 300.6.

(D) Side Rails. Cable trays shall have side rails or equivalent structural members.

(E) Fittings. Cable trays shall include fittings or other suitable means for changes in direction and elevation of runs.

(F) Nonmetallic Cable Tray. Nonmetallic cable trays shall be made of flame-retardant material."

Substantiation: The following rewrite includes changes based on comments received for panel Proposal 8-235a or for proposals associated with Article 392. In addition, Section 392.60 was revised to add the word "only" for clarification and "listed" was changed to "approved" since listed connectors are not currently available. An Informational Note was added to 392.60 to show examples of non-powered conductors and to remove the "(communication, data, signal, etc.)" from the section. Titles have been revised for clarity as needed.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-101 Log #1 NEC-P08 **Final Action: Accept in Principle in Part (392)**

Submitter: Joyce Evans Blom, Kelly Engineering Co. on assignment to Dow Chemical
Comment on Proposal No: 8-235a
Recommendation: ARTICLE 392
Cable Trays
I. General
392.1 Scope. This article covers cable tray systems, including ladder, ventilated trough, ventilated channel, solid bottom, and other similar structures.
FPN: For further information on cable trays, see ANSI/NEMA–VE 1-1998, Metal Cable Tray Systems; NEMA–VE 2-1996, Metal Cable Tray Installation Guidelines; and NEMA–FG-1998, Nonmetallic Cable Tray Systems.
392.2 Definition.
Cable Tray System. A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways.
II. Installation
392.10 Uses Permitted. Cable tray shall be permitted to be used as a support system for service conductors, feeders, branch circuits, communications circuits, control circuits, and signaling circuits. Cable tray installations shall not be limited to industrial establishments. Where exposed to direct rays of the sun, insulated conductors and jacketed cables shall be identified as being sunlight resistant. Cable trays and their associated fittings shall be identified for the intended use.
(A) Wiring Methods. The wiring methods in Table 392.10(A) shall be permitted to be installed in cable tray systems under the conditions described in their respective articles and sections.

Table 392.10(A)

Wiring Method	Article
Armored cable	320
CATV cables	820
CATV raceways	820
Class 2 and Class 3 cables	725
Communications cables	800
Communications raceways	800
Electrical metallic tubing	358
Electrical nonmetallic tubing	362
Fire alarm cables	760
Flexible metal conduit	348
Flexible metallic tubing	360
Instrumentation tray cable	727
Intermediate metal conduit	342
Liquidtight flexible metal conduit	350
Liquidtight flexible nonmetallic conduit	356
Metal-clad cable	330
Mineral-insulated, metal-sheathed cable	332
Multiconductor service-entrance cable	338
Multiconductor underground feeder and branch-circuit cable	340
Network-powered broadband communications cables	830
Nonmetallic-sheathed cable	334
Non-power-limited fire alarm cable	760
Optical fiber cables	770
Optical fiber raceways	770
Other factory-assembled, multiconductor control, signal, or power cables that are specifically approved for installation in cable trays	
Polyvinyl chloride PVC conduit	352
Power and control tray cable	336
Power-limited fire alarm cable	760
Power-limited tray cable	725
Rigid metal conduit	344
Rigid nonmetallic conduit	352
RTRC	355
Signaling raceway	725

(B) In Industrial Establishments. The wiring methods in Table 392.10(A) shall be permitted to be used in any industrial establishment under the conditions described in their respective articles.
In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified persons service the installed cable tray system, any of the cables in 392.10(B)(1) and (B)(2) shall be permitted to be installed in ladder, ventilated trough, solid bottom, or ventilated channel cable trays.
(1) Single-conductor. Single-conductor cables shall be permitted to be installed in accordance with (B)(1)(a) through (B)(1)(c).
(a) Single-conductor cable shall be 1/0 AWG or larger and shall be of a type listed and marked on the surface for use in cable trays. Where 1/0 AWG through 4/0 AWG single-conductor cables are installed in ladder cable tray, the maximum allowable rung spacing for the ladder cable tray shall be 225 mm (9 in.).
(b) Welding cables shall comply with the provisions of Article 630, Part IV.
(c) Single conductors used as equipment grounding conductors shall be insulated, covered, or bare, and they shall be 4 AWG or larger.
(2) Medium Voltage. Single and multiconductor medium voltage cables shall be Type MV cable. Single conductors shall be installed in accordance with 392.10(B)(1).
(C) Hazardous (Classified) Locations. Cable trays in hazardous (classified) locations shall contain only the cable types permitted in 501.10, 502.10, 503.10, 504.20, and 505.15.
(D) Nonmetallic Cable Tray. In addition to the uses permitted elsewhere in 392.10, nonmetallic cable tray shall be permitted in corrosive areas and in areas requiring voltage isolation.
392.12 Uses Not Permitted.
Cable tray systems shall not be used in hoistways or where subject to severe physical damage.
Cable tray systems shall not be used in ducts, plenums, and other air-handling spaces, except as permitted in 300.22, to support wiring methods recognized for use in such spaces.
392.18 Cable Tray Installation
(A) **Complete System.** Cable trays shall be installed as a complete system. Field bends or modifications shall be so made that the electrical continuity of the cable tray system and support for the cables is maintained. Cable tray systems shall be permitted to have mechanically discontinuous segments between cable tray runs or between cable tray runs and equipment. The system shall provide for the support of the cables in accordance with their corresponding articles. Where cable trays support individual conductors and where the conductors pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft). ~~The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.~~
~~A bonding jumper sized in accordance with 250.102 shall connect the two sections of cable tray, or the cable tray and the raceway or equipment. Bonding shall be in accordance with 250.96.~~
Cable tray systems used as equipment grounding conductors shall be bonded as required by 392.60 (B) to ensure electrical continuity.
(B) Cable Tray Support. Cable trays shall be supported at intervals in accordance with the installation instructions.
(C) Completed Before Installation. Each run of cable tray shall be completed before the installation of cables.
(D) Covers. In portions of runs where additional protection is required, covers or enclosures providing the required protection shall be of a material that is compatible with the cable tray.
(E) Through Partitions and Walls. Cable trays shall be permitted to extend transversely through partitions and walls or vertically through platforms and floors in wet or dry locations where the installations, complete with installed cables, are made in accordance with the requirements of 300.21.
(F) Exposed and Accessible. Cable trays shall be exposed and accessible except as permitted by 392.18~~0~~(E~~H~~).
(G) Adequate Access. Sufficient space shall be provided and maintained about cable trays to permit adequate access for installing and maintaining the cables.
(H) Raceways, Cables, Boxes, and Conduit Bodies Supported from Cable Tray Systems. In industrial facilities where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable tray systems are designed and installed to support the load, such systems shall be permitted to support raceways and cables, and boxes and conduit bodies covered in 314.1. ~~For~~ R~~r~~aceways terminating at the tray ~~a listed cable tray clamp or adapter~~ shall be ~~used to~~ securely fasten~~ed~~ ~~the raceway~~ to the cable tray system. Additional supporting and securing of the raceway shall be in accordance with the requirements of the appropriate raceway article. For raceways or cables running parallel to and attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of the appropriate raceway or cable article. For boxes and conduit bodies attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of 314.23.
392.19 Cable Installation.

(A) **Multiconductor Cables Rated 600 Volts.** Multiconductor cables rated 600 volts or less shall be permitted to be installed in the same cable tray.

(B) **Cables Rated Over 600 Volts.** Cables rated over 600 volts and those rated 600 volts or less installed in the same cable tray shall comply with either of the following:

(1) The cables rated over 600 volts are Type MC.

(2) The cables rated over 600 volts are separated from the cables rated 600 volts or less by a solid fixed barrier of a material compatible with the cable tray.

(C) Connected in Parallel. Where single conductor cables comprising each phase, neutral, or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.4, the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance. Single conductors shall be securely bound in circuit groups to prevent excessive movement due to fault-current magnetic forces unless single conductors are cabled together, such as triplexed assemblies.

(D) Single Conductors. Where any of the single conductors installed in ladder or ventilated trough cable trays are 1/0 through 4/0 AWG, all single conductors shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

392.12 Uses Not Permitted.

~~Cable tray systems shall not be used in hoistways or where subject to severe physical damage.~~

~~Cable tray systems shall not be used in ducts, plenums, and other air-handling spaces, except as permitted in 300.22, to support wiring methods recognized for use in such spaces.~~

~~**392.17 Ampacity of Conductors**~~

~~**(A) Ampacity of Cables, Rated 2000 Volts or Less, in Cable Trays.**~~

~~(1) The allowable ampacity of multiconductor cables, nominally rated 2000 volts or less, installed according to the requirements of 392.22(A) shall be as given in Table 310.16 and Table 310.18, subject to the provisions of (1), (2), (3), and 310.15(A)(2).~~

~~(a) The derating factors of 310.15(B)(2)(a) shall apply only to multiconductor cables with more than three current-carrying conductors. Derating shall be limited to the number of currentcarrying conductors in the cable and not to the number of conductors in the cable tray.~~

~~(b) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not over 95 percent of the allowable ampacities of Table 310.16 and Table 310.18 shall be permitted for multiconductor cables.~~

~~(c) Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0 through 2000 volts in free air, in accordance with 310.15(C).~~

~~FPN: See Table B.310.3.~~

~~The allowable ampacity of single-conductor cables shall be as permitted by 310.15(A)(2). The derating factors of 310.15(B)(2)(a) shall not apply to the ampacity of cables in cable trays. The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), nominally rated 2000 volts or less, shall comply with the following:~~

~~(a) Where installed according to the requirements of 392.22(B), the ampacities for 600 kcmil and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the allowable ampacities in Table 310.17 and Table 310.19.~~

~~(b) Where installed according to the requirements of 392.22(B), the ampacities for 1/0 AWG through 500 kcmil single-conductor cables in uncovered cable trays shall not exceed 65 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the allowable ampacities in Table 310.17 and Table 310.19.~~

~~(c) Where single conductors are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.17 and Table 310.19.~~

~~*Exception to (2)(c): For solid bottom cable trays the ampacity of single conductor cables shall be determined by 310.15(C).*~~

~~(d) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free airspace of not less than 2.15 times one conductor diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities of two or three single insulated conductors rated 0 through 2000 volts supported on a messenger in accordance with 310.15(B).~~

~~FPN: See Table 310.20.~~

~~Where a cable tray contains a combination of multiconductor and single-conductor cables, the allowable ampacities shall be as given in 392.17(A)(1) for multiconductor cables and 392.17(A)(2) for single-conductor cables, provided that the following conditions apply:~~

~~(a) The sum of the multiconductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.22(A), and the single-conductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.22(B), totals not more than 100 percent.~~

~~(b) Multiconductor cables are installed according to 392.22(A) and single-conductor cables are installed according to 392.22(B) and 392.10(M) and (N).~~

~~**(B) Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.** The ampacity of cables, rated 2001 volts, nominal, or over, installed according to 392.22(C) shall not exceed the requirements of this section.~~

~~(1) The allowable ampacity of multiconductor cables shall be as given in Table 310.75 and Table 310.76, subject to the following provisions:~~

~~(a) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not more than 95 percent of the allowable ampacities of Table 310.75 and Table 310.76 shall be permitted for multiconductor cables.~~

~~(b) Where multiconductor cables are installed in a single layer in uncovered cable trays, with maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Table 310.71 and Table 310.72.~~

~~(2) The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), shall comply with the following:~~

~~(a) The ampacities for 1/0 AWG and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.69 and Table 310.70. Where the cable trays are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the allowable ampacities in Table 310.69 and Table 310.70.~~

~~(b) Where single-conductor cables are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.69 and Table 310.70.~~

Table 392.22(B)(1) Allowable Cable Fill Area for Single-Conductor Cables in Ladder or Ventilated Trough Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Single-Conductor Cables in Ladder or Ventilated Trough Cable Trays					
Inside Width of Cable tray		Column 1 392.22(B)(1)(b) Only		Column 2[a] 392.22(B)(1)(c) Only	
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$
150	6	4,200	6.5	4,200 – (28 Sd)b	6.5 – (1.1 Sd)b
225	9	6,100	9.5	6,100 – (28 Sd)	9.5 – (1.1 Sd)
300	12	8,400	13.0	8,400 – (28 Sd)	13.0 – (1.1 Sd)
450	18	12,600	19.5	12,600 – (28 Sd)	19.5 – (1.1 Sd)
600	24	16,800	26.0	16,800 – (28 Sd)	26.0 – (1.1 Sd)
750	30	21,000	32.5	21,000 – (28 Sd)	32.5 – (1.1 Sd)
900	36	25,200	39.0	25,200 – (28 Sd)	39.0 – (1.1 Sd)

~~(c) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free air space of not less than 2.15 times the diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.67 and Table 310.68.~~

392.22 Number of Conductors or Cables

(A) Number of Multiconductor Cables, Rated 2000 Volts or Less, in Cable Trays.

The number of multiconductor cables, rated 2000 volts or less, permitted in a single cable tray shall not exceed the requirements of this section. The conductor sizes herein apply to both aluminum and copper conductors.

(1) Ladder or Ventilated Trough Cable Trays. Where ladder or ventilated trough cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(a) Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed the cable tray width, and the cables shall be installed in a single layer. Where the cable ampacity is determined according to 392.~~17~~80(A)(1)(c), the cable tray width shall not be less than the sum of the diameters of the cables and the sum of the required spacing widths between the cables.

(b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.22(A) for the appropriate cable tray width.

(c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the calculation in Column 2 of Table 392.22(A) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

(2) Multiconductor Control and/or Signal Cables only. Where a ladder or ventilated trough cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 50 percent of the interior cross-sectional area of the cable tray. A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(3) Solid Bottom Cable Trays Containing Any Mixture. Where solid bottom cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power,
lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(a) Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed 90 percent of the cable tray width, and the cables shall be installed in a single layer.

(b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 3 of Table 392.22(A) for the appropriate cable tray width.

(c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the computation in Column 4 of Table 392.22(A) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

See Table 392.22(A) on Page 239

(4) Solid Bottom Cable Tray - Multiconductor and/or Signal Cables Only. Where a solid bottom cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 40 percent of the interior cross-sectional area of the cable tray. A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(5) Ventilated Channel Cable Trays. Where ventilated channel cable trays contain multiconductor cables of any type, the following shall apply:

(a) Where only one multiconductor cable is installed, the cross-sectional area shall not exceed the value specified in Column 1 of Table 392.22(A)(5).

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cables shall not exceed the value specified in Column 2 of Table 392.22(A)(5).

Table 392.22(A)(5) Allowable Cable Fill Area for Multiconductor Cables in Ventilated Channel Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Multiconductor Cables					
Inside Width of Cable Tray		Column 1 One Cable		Column 2 More Than One Cable	
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$
75	3	1500	2.3	850	1.3
100	4	2900	4.5	1600	2.5
150	6	4500	7.0	2450	3.8

(6) Solid Channel Cable Trays. Where solid channel cable trays contain multiconductor cables of any type, the following shall apply:

(a) Where only one multiconductor cable is installed, the cross-sectional area of the cable shall not exceed the value specified in Column 1 of Table 392.22(A)(6).

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cable shall not exceed the value specified in Column 2 of Table 392.22(A)(6).

Table 392.22(A)(6) Allowable Cable Fill Area for Multiconductor Cables in Solid Channel Cable Trays for Cables Rated 2000 Volts or Less

Inside Width of Cable Tray		Column 1 One Cable		Column 2 More Than One Cable	
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$
50	2	850	1.3	500	0.8
75	3	1300	2.0	700	1.1
100	4	2400	3.7	1400	2.1
150	6	3600	5.5	2100	3.2

(B) Number of Single-Conductor Cables, Rated 2000 Volts or Less, in Cable Trays.

The number of single-conductor cables, rated 2000 volts or less, permitted in a single cable tray section shall not exceed the requirements of this section. The single conductors, or conductor assemblies, shall be evenly distributed across the cable tray. The conductor sizes herein apply to both aluminum and copper conductors.

(1) Ladder or Ventilated Trough Cable Trays. Where ladder or ventilated trough cable trays contain single-conductor cables, the maximum number of single conductors shall conform to the following:

(a) Where all of the cables are 1000 kcmil or larger, the sum of the diameters of all single-conductor cables shall not exceed cable tray width, and the cables shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

(b) Where all of the cables are from 250 kcmil through 900 kcmil, the sum of the crosssectional
of all single-conductor cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.22(B)(1) for the appropriate cable tray width.

(c) Where 1000 kcmil or larger single-conductor cables are installed in the same cable tray with single-conductor cables smaller than 1000 kcmil, the sum of the cross-sectional areas of all cables smaller than 1000 kcmil shall not exceed the maximum allowable fill area resulting from the computation in Column 2 of Table 392.22(B)(1) for the appropriate cable tray width.

(d) Where any of the single conductor cables are 1/0 through 4/0 AWG, the sum of the diameters of all single conductor cables shall not exceed the cable tray width.

(2) **Ventilated Channel Cable Trays.** Where 50 mm (2 in.), 75 mm (3 in.), 100 mm (4 in.), or 150 mm (6 in.) wide ventilated channel cable trays contain single-conductor cables, the sum of the diameters of all single conductors shall not exceed the inside width of the channel.

(C) Number of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.

The number of cables rated 2001 volts or over permitted in a single cable tray shall not exceed the requirements of this section.

The sum of the diameters of single-conductor and multiconductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer. Where single conductor cables are triplexed, quadruplexed, or bound together in circuit groups, the sum of the diameters of the single conductors shall not exceed the cable tray width, and these groups shall be installed in single layer arrangement.

392.30 Securing and Supporting of Cables

(A) Securely Fastened. In other than horizontal runs, the cables shall be fastened securely to transverse members of the cable trays.

Table 392.22(A)

Table 392.22(A) Allowable Cable Fill Area for Multiconductor Cables in Ladder, Ventilated Trough, or Solid Bottom Cable Trays for Cables Rated 2000 Volts or Less

	Maximum Allowable Fill Area for Multiconductor Cables									
	Ladder or Ventilated Trough Cable Trays, 392.22(A)(1)						Solid Bottom Cable Trays, 392.22(A)(3)			
Inside Width of Cable tray	Column 1 Applicable for 392.22(A)(1)(b) Only		Column 2[a] Applicable for 392.22(A)(1)(c) Only		Column 3 Applicable for 392.22(A)(3)(b) Only		Column 4a Applicable for 392.22(A)(3) (c) Only			
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$	mm^2	$in.^2$	mm^2	$in.^2$	
150	6.0	4,500	7.0	4,500 – (30 Sd)b	7– (1.2 Sd)b	3,500	5.5	3,500–(25 Sdb)	5.5–Sdb	
225	9.0	6,800	10.5	6,800 – (30 Sd)	10.5– (1.2 Sd)	5,100	8.0	5,100–(25 Sd)	8.0–Sd	
300	12.0	9,000	14.0	9,000 – (30 Sd)	14– (1.2 Sd)	7,100	11.0	7,100–(25 Sd)	11.0–Sd	
450	18.0	13,500	21.0	13,500 – (30 Sd)	21– (1.2 Sd)	10,600	16.5	10,600–(25 Sd)	16.5–Sd	
600	24.0	18,000	28.0	18,000 – (30 Sd)	28– (1.2 Sd)	14,200	22.0	14,200–(25 Sd)	22.0–Sd	
750	30.0	22,500	35.0	22,500 – (30 Sd)	35– (1.2 Sd)	17,700	27.5	17,700–(25 Sd)	27.5–Sd	
900	36.0	27,000	42.0	27,000 – (30 Sd)	42– (1.2 Sd)	21,300	33.0	21,300–(25 Sd)	33.0–Sd	

[a]The maximum allowable fill areas in Columns 2 and 4 shall be calculated. For example, the maximum allowable fill in mm2 for a 150-mm wide cable tray in Column 2 shall be 4500 minus (30 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 7 minus (1.2 multiplied by Sd)].

[b]The term Sd in Columns 2 and 4 is equal to the sum of the diameters, in mm, of all cables 107.2 mm (in inches, of all 4/0 AWG) and larger multiconductor cables in the same cable tray with smaller cables.

(B) Supports. Supports shall be provided to prevent stress on cables where they enter raceways or other enclosures from cable tray systems.

~~Cable trays shall be supported at intervals in accordance with the installation instructions.~~

(C) At Transitions. At discontinuous cable tray segments or transitions to raceways or equipment, the conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.

392.46 Bushed Conduit and Tubing. A box shall not be required where cables or conductors are installed in bushed conduit and tubing used for support or for protection against physical damage.

392.56 Cable Splices.

Cable splices made and insulated by approved methods shall be permitted to be located within a cable tray, provided they are accessible. Splices shall be permitted to project above the side rails where not subject to physical damage.

392.60 Grounding and Bonding.

(A) Metallic Cable Trays. Metallic cable trays shall be permitted to be used as equipment grounding conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system and the cable tray complies with provisions of this section. Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and Part IV of Article 250.

(B) Steel or Aluminum Cable Tray Systems. Steel or aluminum cable tray systems shall be permitted to be used as equipment grounding conductors, provided all the following requirements are met:

(1) The cable tray sections and fittings are identified as an equipment grounding conductor.

(2) The minimum cross-sectional area of cable trays conform to the requirements in Table 392.60(A).

(3) All cable tray sections and fittings are legibly and durably marked to show the cross-sectional area of metal in channel cable trays, or cable trays of one-piece construction and the total crosssectional area of both side rails for ladder or trough cable tray.

(4) Cable tray sections, fittings, and connected raceways are bonded in accordance with 250.96, using listed cable tray clamps or adapters, bolted mechanical connectors or bonding jumpers sized and installed in accordance with 250.102.

392.80 Ampacity of Conductors

(A) Ampacity of Cables, Rated 2000 Volts or Less, in Cable Trays.

(1) **Multiconductor Cables.** The allowable ampacity of multiconductor cables, nominally rated 2000 volts or less, installed according to the requirements of 392.22(A) shall be as given in Table 310.16 and Table 310.18, subject to the provisions of (1), (2), (3), and 310.15(A)(2).

(a) The derating factors of 310.15(B)(2)(a) shall apply only to multiconductor cables with more than three current-carrying conductors. Derating shall be limited to the number of current-carrying conductors in the cable and not to the number of conductors in the cable tray.

(b) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not over 95 percent of the allowable ampacities of Table 310.16 and Table 310.18 shall be permitted for multiconductor cables.

(c) Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0 through 2000 volts in free air, in accordance with 310.15(C).

FPN: See Table B.310.3.

2) **Single-Conductor Cables.** The allowable ampacity of single-conductor cables shall be as permitted by 310.15(A)(2). The derating factors of 310.15(B)(2)(a) shall not apply to the ampacity of cables in cable trays. The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), nominally rated 2000 volts or less, shall comply with the following:

(a) Where installed according to the requirements of 392.22(B), the ampacities for 600 kcmil and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the allowable ampacities in Table 310.17 and Table 310.19.

(b) Where installed according to the requirements of 392.22(B), the ampacities for 1/0 AWG through 500 kcmil single-conductor cables in uncovered cable trays shall not exceed 65 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the allowable ampacities in Table 310.17 and Table 310.19.

(c) Where single conductors are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.17 and Table 310.19.

Exception to (2)(c): For solid bottom cable trays the ampacity of single conductor cables shall be determined by 310.15(C).

(d) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free airspace of not less than 2.15 times one conductor diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities of two or three single insulated conductors rated 0 through 2000 volts supported on a messenger in accordance with 310.15(B).

Table 392.60(A) Metal Area Requirements for Cable Trays Used as Equipment Grounding Conductor

Maximum Fuse Ampere Rating, Circuit Breaker Ampere Trip Setting, or Circuit Breaker Protective Relay Ampere Trip Setting for Ground-Fault Protection of Any Cable Circuit in the Cable Tray System	Minimum Cross-Sectional Area of Metal[a]			
	Steel Cable trays		Aluminum Cable Trays	
	mm^2	$in.^2$	mm^2	$in.^2$
60	129	0.20	129	0.20
100	258	0.40	129	0.20
200	451.5	0.70	129	0.20
400	645	1.00	258	0.40
600	967.5	1.50b	258	0.40
1000	---	---	387	0.60
1200	---	---	645	1.00
1600	---	---	967.5	1.50
2000	---	---	1290	2.00b

[a]Total cross-sectional area of both side rails for ladder or trough cable trays; or the minimum cross-sectional area of metal in channel cable trays or cable trays of one-piece construction.

[b]Steel cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 2000 amperes.

FPN: See Table 310.20.
(3) **Combinations of Multiconductor and Single-conductor Cables.** Where a cable tray contains a combination of multiconductor and single-conductor cables, the allowable ampacities shall be as given in 392.80(A)(1) for multiconductor cables and 392.80(A)(2) for singleconductor cables, provided that the following conditions apply:
(a) The sum of the multiconductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.22(A), and the single-conductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.22(B), totals not more than 100 percent.
(b) Multiconductor cables are installed according to 392.22(A) and single-conductor cables are installed according to 392.22(B) and 392.19(C) and (D).
(B) Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.
The ampacity of cables, rated 2001 volts, nominal, or over, installed according to 392.22(C) shall not exceed the requirements of this section.
(1) Multiconductor Cables. The allowable ampacity of multiconductor cables shall be as given in Table 310.75 and Table 310.76, subject to the following provisions:
(a) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not more than 95 percent of the allowable ampacities of Table 310.75 and Table 310.76 shall be permitted for multiconductor cables.
(b) Where multiconductor cables are installed in a single layer in uncovered cable trays, with maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Table 310.71 and Table 310.72.
(2) **Single-Conductor Cables.** The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), shall comply with the following:
(a) The ampacities for 1/0 AWG and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.69 and Table 310.70.
Where the cable trays are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the allowable ampacities in Table 310.69 and Table 310.70.
(b) Where single-conductor cables are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.69 and Table 310.70.
(c) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free air space of not less than 2.15 times the diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.67 and Table 310.68.
III. Construction Specifications
392.100 Construction
(A) Strength and Rigidity. Cable trays shall have suitable strength and rigidity to provide adequate support for all contained wiring.
(B) Smooth Edges. Cable trays shall not have sharp edges, burrs, or projections that could damage the insulation or jackets of the wiring.
(C) Corrosion Protection. Cable tray systems shall be corrosion resistant. If made of ferrous material, the system shall be protected from corrosion as required by 300.6.
(D) Side Rails. Cable trays shall have side rails or equivalent structural members.
(E) Fittings. Cable trays shall include fittings or other suitable means for changes in direction and elevation of runs.
(F) Nonmetallic Cable Tray. Nonmetallic cable trays shall be made of flame-retardant material.
Substantiation: The comments affirm the intent of CMP-8's CP804 action. These revisions further improve usability of the Article by providing needed additional subdivision, moving some text within the Article in order to correspond to the titles and editing a few sentences for improved clarity.
The outline of the Article was revised as follows:
I. General
II. Installation
392.10 Uses Permitted
392.12 Uses Not Permitted
392.18 Cable Tray Installation
392.19 Cable Installation
392.22 Number of Conductors or Cables
392.30 Securing and Supporting of Cables
392.46 Bushed Conduit and Tubing
392.56 Cable Splices
392.60 Grounding and Bonding
392.80 Ampacity of Conductors
III. Construction Specifications
392.100 Construction
The basis for the outline revisions are:
● Subdivisions 392.18 and 392.19 are changes to clarify for the reader the distinguishing requirements of cable tray installation vs. requirements for installing cables in the cable tray. In addition, the numbering of these subdivisions was selected to correspond to the numbering system in Article 300's sections 300.18 & 300.19.
● Ampacity of Conductors was renumbered to 392.80 so that the numbering would parallel the numbering system found in the Cable Articles 320, 328, 330, 332, 334, 336, and 340.
● The subdivision titles were reinstated. These title additions are consistent with the Style Manual and very helpful for readers to find desired information.
The sentence clarifications or relocations are as follows:
1. Modification to NEC 2008 392.6(A) sentence beginning "where cable trays support individual conductors and where conductors pass from one cable tray to another.....". The modified sentence is : "Where cables or conductors pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft)."
The substantiation for this clarification is: If you take this existing language literally, you can have a single conductor tray cable extend up to 6 ft. from one tray to another (or to a piece of equipment) but you could not have a multi-conductor cable do so without a raceway or other supporting means. This is not likely to have been CMP-8's intent. In fact, if you look at the picture in the NEC 2008 Handbook, Exhibit 392.2, you'll see "examples of multi-conductor cables in cable trays....." not single conductors as mentioned in 392.6(A).
2. Relocated NEC 2008 392.6 Complete System subdivision (A) sentence beginning "A bonding jumper sized…" to 392.60 Grounding and Bonding. This relocation places the text with the corresponding subdivision title.
3. Relocated NEC 2008 392.6 Complete System subdivision (A) sentence beginning "The conductors shall be secured…" to 392.30(C), Securing and Supporting of Cables. This relocation places the text with the corresponding subdivision title. Additionally, clarifying text was provided to indicate that the requirement for securing cables applied to transitions.
4. Finally, the second sentence of NEC 2008 392.6 (J) which begins "For raceways terminating at the tray,…" is changed to "Raceways terminating at the tray shall be securely fastened to the cable tray system." This revised sentence appears in this comment's revised Article text as 392.18 (H). The phrase "a listed cable tray clamp or adapter" is removed. The listing requirement for conduit to cable tray clamps is relocated to 392.60 to recognize that the listing applies for grounding and bonding, not support.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel wants to take this opportunity to thank the submitter for her efforts to improve an outdated Article 392. The panel would like to direct the submitter to the Article 392 re-write included in comment 8-100a. Items mentioned in this comment that were already accepted during the ROP period will not be addressed in this panel statement.
1. Relative to the location of Tables, the printed format of the NEC sometimes makes it difficult to locate the Table where we feel it's best suited. NFPA will use their discretion as to where the NEC format will allow the Tables to appear.
2. The NEC Style Manual requires titles be assigned to Sections (e.g. 392.10 Uses Permitted) and the first level below the Section (e.g. 392.10(A) Wiring Methods). Titles at the next level are permitted but not mandatory, and titles beyond that level are not allowed. The panel retained titles at the third level to 392.22 and 392.80 only.
3. Requirements such as grounding or bonding have been located in Section 392.60 to be consistent with the Chapter 3 format.
4. Requirements relating to Securing and Supporting have been located in Section 392.30 to be consistent with the Chapter 3 format.
5. The panel wasn't able to follow your proposed change to the Section titled "Raceways, Boxes, and Conduit Bodies Supported from Cable Tray Systems". The wording you suggest is currently found in Section 392.18(G). Please refer to the Panel Comment 8-800.
6. The panel agrees with your suggestion to relocate Ampacity of Conductors from 392.17 to 392.80 which follows the format of other Chapter 3 Articles.
7. Proposed text for 392.19 is located to 392.20 as covered in 8-100a.
8. Changing the Section title of 392.30 Securing and Supporting by adding "of Cables" does not coincide with the Section title format adopted during the 1999 cycle.
9. The panel has separated Section 392.30 Securing and Supporting into to subsections (A) Cable Trays and (B) Cables and Conductors. Your suggestion relating to conductor securement during transitions has been located in 392.30(B).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-102 Log #1795 NEC-P08 **Final Action: Accept in Principle in Part (392)**

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 8-235a

Recommendation:

ARTICLE 392

Cable Trays

I. General

392.1 Scope. This article covers cable tray systems, including ladder, ventilated trough, ventilated channel, solid bottom, and other similar structures.

FPN: For further information on cable trays, see ANSI/NEMA–VE 1-1998, ***Metal Cable Tray System***s; NEMA–VE 2-1996, ***Metal Cable Tray Installation Guidelines***; and NEMA–FG-1998, ***Nonmetallic Cable Tray Systems.***

392.2 Definition.

Cable Tray System. A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways.

II. Installation

392.10 Uses Permitted. Cable tray shall be permitted to be used as a support system for service conductors, feeders, branch circuits, communications circuits, control circuits, and signaling circuits. Cable tray installations shall not be limited to industrial establishments. Where exposed to direct rays of the sun, insulated conductors and jacketed cables shall be identified as being sunlight resistant. Cable trays and their associated fittings shall be identified for the intended use.

(A) Wiring Methods. The wiring methods in Table 392.10(A) shall be permitted to be installed in cable tray systems under the conditions described in their respective articles and sections.

Table 392.10(A) Wiring Methods

Wiring Method	Article
Armored cable	320
CATV cables	820
CATV raceways	820
Class 2 and Class 3 cables	725
Communications cables	800
Communications raceways	800
Electrical metallic tubing	358
Electrical nonmetallic tubing	362
Fire alarm cables	760
Flexible metal conduit	348
Flexible metallic tubing	360
Instrumentation tray cable	727
Intermediate metal conduit	342
Liquidtight flexible metal conduit	350
Liquidtight flexible nonmetallic conduit	356
Metal-clad cable	330
Mineral-insulated, metal-sheathed cable	332
Multiconductor service-entrance cable	338
Multiconductor underground feeder and branch-circuit cable	340
Network-powered broadband communications cables	830
Nonmetallic-sheathed cable	334
Non-power-limited fire alarm cable	760
Optical fiber cables	770
Optical fiber raceways	770
Other factory-assembled, multiconductor control, signal, or power cables that are specifically approved for installation in cable trays	
Polyvinyl chloride PVC conduit	352
Power and control tray cable	336
Power-limited fire alarm cable	760
Power-limited tray cable	725
Rigid metal conduit	344
Rigid nonmetallic conduit	352
RTRC	355
Signaling raceway	725

(B) In Industrial Establishments. The wiring methods in Table 392.10(A) shall be permitted to be used in any industrial establishment under the conditions described in their respective articles. In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified persons service the installed cable tray system, any of the cables in 392.10(B)(1) and (B)(2) shall be permitted to be installed in ladder, ventilated trough, solid bottom, or ventilated channel cable trays.

(1) **Single Conductors.** Single-conductor cables shall be permitted to be installed in accordance with (B)(1)(a) through (B)(1)(c).

(a) Single-conductor cable shall be 1/0 AWG or larger and shall be of a type listed and marked on the surface for use in cable trays. Where 1/0 AWG through 4/0 AWG single-conductor cables are installed in ladder cable tray, the maximum allowable rung spacing for the ladder cable tray shall be 225 mm (9 in.).

(b) Welding cables shall comply with the provisions of Article 630, Part IV.

(c) Single conductors used as equipment grounding conductors shall be insulated, covered, or bare, and they shall be 4 AWG or larger.

(2) **Medium Voltage.** Single and multiconductor medium voltage cables shall be Type MV cable. Single conductors shall be installed in accordance with 392.10(B)(1).

(C) Hazardous (Classified) Locations. Cable trays in hazardous (classified) locations shall contain only the cable types permitted in 501.10, 502.10, 503.10, 504.20, and 505.15.

(D) Nonmetallic Cable Tray. In addition to the uses permitted elsewhere in 392.10, nonmetallic cable tray shall be permitted in corrosive areas and in areas requiring voltage isolation.

(E) Complete System. Cable trays shall be installed as a complete system. Field bends or modifications shall be so made that the electrical continuity of the cable tray system and support for the cables is maintained. Cable tray systems shall be permitted to have mechanically discontinuous segments between cable tray runs or between cable tray runs and equipment. The system shall provide for the support of the cables in accordance with their corresponding articles.

Where cable trays support individual conductors and where the conductors pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft). The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.

A bonding jumper sized in accordance with 250.102 shall connect the two sections of cable tray, or the cable tray and the raceway or equipment. Bonding shall be in accordance with 250.96.

(F) Completed Before Installation. Each run of cable tray shall be completed before the installation of cables.

(G) Covers. In portions of runs where additional protection is required, covers or enclosures providing the required protection shall be of a material that is compatible with the cable tray.

(H) Through Partitions and Walls. Cable trays shall be permitted to extend transversely through partitions and walls or vertically through platforms and floors in wet or dry locations where the installations, complete with installed cables, are made in accordance with the requirements of 300.21.

(I) Exposed and Accessible. Cable trays shall be exposed and accessible except as permitted by 392.10(H).

(J) Adequate Access. Sufficient space shall be provided and maintained about cable trays to permit adequate access for installing and maintaining the cables.

(K) Raceways, Cables, Boxes, and Conduit Bodies Supported from Cable Tray Systems. In industrial facilities where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable tray systems are designed and installed to support the load, such systems shall be permitted to support raceways and cables, and boxes and conduit bodies covered in 314.1. For raceways terminating at the tray a listed cable tray clamp or adapter shall be used to securely fasten the raceway to the cable tray system. Additional supporting and securing of the raceway shall be in accordance with the requirements of the appropriate raceway article.

For raceways or cables running parallel to and attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of the appropriate raceway or cable article.

For boxes and conduit bodies attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of 314.23.

(L)Cable Installation.

(1) **Multiconductor Cables Rated 600 Volts or Less.** Multiconductor cables rated 600 volts or less shall be permitted to be installed in the same cable tray.

(2) **Cables Rated Over 600 Volts.** Cables rated over 600 volts and those rated 600 volts or less installed in the same cable tray shall comply with either of the following:

(a) The cables rated over 600 volts are Type MC.

(b) The cables rated over 600 volts are separated from the cables rated 600 volts or less by a solid fixed barrier of a material compatible with the cable tray

(M) Connected in Parallel. Where single conductor cables comprising each phase, neutral, or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.4, the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance.

Single conductors shall be securely bound in circuit groups to prevent excessive movement due to fault-current magnetic forces unless single conductors are cabled together, such as triplexed assemblies.

(N) Single Conductors. Where any of the single conductors installed in ladder or ventilated trough cable trays are 1/0 through 4/0 AWG, all single conductors shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

392.12 Uses Not Permitted.

Cable tray systems shall not be used in hoistways or where subject to severe physical damage. Cable tray systems shall not be used in ducts, plenums, and other air-handling spaces, except as permitted in 300.22, to support wiring methods recognized for use in such spaces.

392.17 Ampacity of Conductors

(A) Ampacity of Cables, Rated 2000 Volts or Less, in Cable Trays.

(1) **Multiconductor Cables.**. The allowable ampacity of multiconductor cables, nominally rated 2000 volts or less, installed according to the requirements of 392.22(A) shall be as given in Table 310.16 and Table 310.18, subject to the provisions of (1), (2), (3), and 310.15(A)(2).

(a) The derating factors of 310.15(B)(2)(a) shall apply only to multiconductor cables with more than three current-carrying conductors. Derating shall be limited to the number of current-carrying conductors in the cable and not to the number of conductors in the cable tray.

(b) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not over 95 percent of the allowable ampacities of Table 310.16 and Table 310.18 shall be permitted for multiconductor cables.

(c) Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0 through 2000 volts in free air, in accordance with 310.15(C).

FPN: See Table B.310.3.

(2)Single-Conductor Cables. The allowable ampacity of single-conductor cables shall be as permitted by 310.15(A)(2). The derating factors of 310.15(B)(2)(a) shall not apply to the ampacity of cables in cable trays. The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), nominally rated 2000 volts or less, shall comply with the following:

(a) Where installed according to the requirements of 392.22(B), the ampacities for 600 kcmil and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the allowable ampacities in Table 310.17 and Table 310.19.

(b) Where installed according to the requirements of 392.22(B), the ampacities for 1/0 AWG through 500 kcmil single-conductor cables in uncovered cable trays shall not exceed 65 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the allowable ampacities in Table 310.17 and Table 310.19.

(c) Where single conductors are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.17 and Table 310.19.

Exception to (2)(c): For solid bottom cable trays the ampacity of single conductor cables shall be determined by 310.15(C).

(d) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free airspace of not less than 2.15 times one conductor diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities of two or three single insulated conductors rated 0 through 2000 volts supported on a messenger in accordance with 310.15(B).

FPN: See Table 310.20.

(3) **Combinations Of Multiconductor And Single-Conductor Cables**. Where a cable tray contains a combination of multiconductor and single-conductor cables, the allowable ampacities shall be as given in 392.17(A)(1) for multiconductor cables and 392.17(A)(2) for single-conductor cables, provided that the following conditions apply:

(a) The sum of the multiconductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.22(A), and the single-conductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.22(B), totals not more than 100 percent.

(b) Multiconductor cables are installed according to 392.22(A) and single-conductor cables are installed according to 392.22(B) and 392.10(M) and (N).

(B) Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.

The ampacity of cables, rated 2001 volts, nominal, or over, installed according to 392.22(C) shall not exceed the requirements of this section.

(1) **Multiconductor Cables (2001 Volts or Over).** The allowable ampacity of multiconductor cables shall be as given in Table 310.75 and Table 310.76, subject to the following provisions:

(a) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not more than 95 percent of the allowable ampacities of Table 310.75 and Table 310.76 shall be permitted for multiconductor cables.

(b) Where multiconductor cables are installed in a single layer in uncovered cable trays, with maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Table 310.71 and Table 310.72.

(2) **Single-Conductor Cables (2001 Volts or Over).** The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), shall comply with the following:

(a) The ampacities for 1/0 AWG and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.69 and Table 310.70. Where the cable trays are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the allowable ampacities in Table 310.69 and Table 310.70.

(b) Where single-conductor cables are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.69 and Table 310.70.

(c) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free air space of not less than 2.15 times the diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.67 and Table 310.68.

392.22 Number of Conductors or Cables

(A) Number of Multiconductor Cables, Rated 2000 Volts or Less, in Cable Trays.

The number of multiconductor cables, rated 2000 volts or less, permitted in a single cable tray shall not exceed the requirements of this section. The conductor sizes herein apply to both aluminum and copper conductors.

(1) **Any Mixture of Cables.** Where ladder or ventilated trough cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(a) Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed the cable tray width, and the cables shall be installed in a single layer. Where the cable ampacity is determined according to 392.17(A)(1)(c), the cable tray width shall not be less than the sum of the diameters of the cables and the sum of the required spacing widths between the cables.

(b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.22(A) for the appropriate cable tray width.

(c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the calculation in Column 2 of Table 392.22(A) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

(2) **Multiconductor Control and/or Signal Cables Only.** Where a ladder or ventilated trough cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 50 percent of the interior cross-sectional area of the cable tray. A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(3) **Solid Bottom Cable Trays Containing Any Mixture.** Where solid bottom cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(a) Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed 90 percent of the cable tray width, and the cables shall be installed in a single layer.

(b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 3 of Table 392.22(A) for the appropriate cable tray width.

(c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the computation in Column 4 of Table 392.22(A) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

Table 392.22(A) Allowable Cable Fill Area for Multiconductor Cables in Ladder, Ventilated Trough, or Solid Bottom Cable Trays for Cables Rated 2000 Volts or Less

Table 392.22(A) Allowable Cable Fill Area for Multiconductor Cables in Ladder, Ventilated Trough, or Solid Bottom Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Multiconductor Cables								
Ladder or Ventilated Trough Cable Trays, 392.22(A)(1)					Solid Bottom Cable Trays, 392.22(A)(3)			
Column 1	Column 3	Column 4[a]						
Inside Width of Cable Tray	Applicable for 392.22(A)(1)(b) Only	Column 2[a] Applicable for		Applicable for 392.22(A)(1)(c) Only	Applicable for 392.22(A)(3)(b) Only		392.22(A)(3)(c) Only	
mm	in.	mm²	in.²	mm²	in.²	mm²	in.²	mm²
150	**6.0**	**4,500**	**7.0**	**4,500 – (30 Sd)[b]**	**7– (1.2 Sd)[b]**	**3,500**	**5.5**	**3,500–**
(25 Sd[b])	**5.5–Sd[b]**							
225	9.0	6,800	10.5	6,800 – (30 Sd)	10.5– (1.2 Sd)	5,100	8.0	5,100–
(25 Sd)	8.0–Sd							
300	12.0	9,000	14.0	9,000 – (30 Sd)	14– (1.2 Sd)	7,100	11.0	7,100–
(25 Sd)	11.0–Sd							
450	18.0	13,500	21.0	13,500 – (30 Sd)	21– (1.2 Sd)	10,600	16.5	10,600–
(25 Sd)	16.5–Sd							
600	24.0	18,000	28.0	18,000 – (30 Sd)	28– (1.2 Sd)	14,200	22.0	14,200–
(25 Sd)	22.0–Sd							
750	30.0	22,500	35.0	22,500 – (30 Sd)	35– (1.2 Sd)	17,700	27.5	17,700–
(25 Sd)	27.5–Sd							
900	36.0	27,000	42.0	27,000 – (30 Sd)	42– (1.2 Sd)	21,300	33.0	21,300–
(25 Sd)	33.0–Sd							

[a]The maximum allowable fill areas in Columns 2 and 4 shall be calculated. For example, the maximum allowable fill in mm² for a 150-mm wide cable tray in Column 2 shall be 4500 minus (30 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 7 minus (1.2 multiplied by Sd)].

[b]The term Sd in Columns 2 and 4 is equal to the sum of the diameters, in mm, of all cables 107.2 mm (in inches, of all 4/0 AWG) and larger multiconductor cables in the same cable tray with smaller cables.

(4) **Solid Bottom Cable Tray – Multiconducotr Control and/or Signal Cables Only.** Where a solid bottom cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 40 percent of the interior cross-sectional area of the cable tray. A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(5) **Ventilated Channel Cable Trays**. Where ventilated channel cable trays contain multiconductor cables of any type, the following shall apply:

(a) Where only one multiconductor cable is installed, the cross-sectional area shall not exceed the value specified in Column 1 of Table 392.22(A)(5).

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cables shall not exceed the value specified in Column 2 of Table 392.22(A)(5).

Table 392.22(A)(5) Allowable Cable Fill Area for Multiconductor Cables in Ventilated Channel Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Multiconductor Cables					
Inside Width of Cable Tray	Column 2		Column 1	2 More Than One Cable	
				One Cable	
mm	in.	mm²	in.²	mm²	in.²
75	3	1500	2.3	850	1.3
100	4	2900	4.5	1600	2.5
150	6	4500	7.0	2450	3.8

(6) **Solid Channel Cable Trays.** Where solid channel cable trays contain multiconductor cables of any type, the following shall apply:

(a) Where only one multiconductor cable is installed, the cross-sectional area of the cable shall not exceed the value specified in Column 1 of Table 392.22(A)(6).

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cable shall not exceed the value specified in Column 2 of Table 392.22(A)(6).

Table 392.22(A)(6) Allowable Cable Fill Area for Multiconductor Cables in Solid Channel Cable Trays for Cables Rated 2000 Volts or Less

Column 2						
Inside Width of Cable Tray		Column 1 More than One Cable				One Cable
mm	in.	mm²	in.²		mm²	in.²
50	2	850	1.3	500	0.8	
75	3	1300	2.0	700	1.1	
100	4	2400	3.7	1400	2.1	
150	63600	5.5		2100	3.2	

(B) Number of Single-Conductor Cables, Rated 2000 Volts or Less, in Cable Trays.

The number of single-conductor cables, rated 2000 volts or less, permitted in a single cable tray section shall not exceed the requirements of this section. The single conductors, or conductor assemblies, shall be evenly distributed across the cable tray. The conductor sizes herein apply to both aluminum and copper conductors.

(1) **Ladder Or Ventilated Trough Cable Trays.** Where ladder or ventilated trough cable trays contain single-conductor cables, the maximum number of single conductors shall conform to the following:

(a) Where all of the cables are 1000 kcmil or larger, the sum of the diameters of all single-conductor cables shall not exceed cable tray width, and the cables shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

(b) Where all of the cables are from 250 kcmil through 900 kcmil, the sum of the cross-sectional areas of all single-conductor cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.22(B)(1) for the appropriate cable tray width.

(c) Where 1000 kcmil or larger single-conductor cables are installed in the same cable tray with single-conductor cables smaller than 1000 kcmil, the sum of the cross-sectional areas of all cables smaller than 1000 kcmil shall not exceed the maximum allowable fill area resulting from the computation in Column 2 of Table 392.22(B)(1) for the appropriate cable tray width.

(d) Where any of the single conductor cables are 1/0 through 4/0 AWG, the sum of the diameters of all single conductor cables shall not exceed the cable tray width.

Table 392.22(B)(1) Allowable Cable Fill Area for Single-Conductor Cables in Ladder or Ventilated Trough Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Single-Conductor Cables					
Inside Width of Cable Tray	Column 1		Column 2[a]		
	Applicable for 392.22(B)(1)(b) Only		Applicable for 392.22(B)(1)(c) Only		
mm	in.	mm²	in.²	mm²	in.²
150	6	4,200	6.5	4,200 – (28 Sd)[b]	6.5 – (1.1 Sd)[b]
225	9	6,100	9.5	6,100 – (28 Sd)	9.5 – (1.1 Sd)
300	12	8,400	13.0	8,400 – (28 Sd)	13.0 – (1.1 Sd)
450	18	12,600	19.5	12,600 – (28 Sd)	19.5 – (1.1 Sd)
600	24	16,800	26.0	16,800 – (28 Sd)	26.0 – (1.1 Sd)
750	30	21,000	32.5	21,000 – (28 Sd)	32.5 – (1.1 Sd)
900	36	25,200	39.0	25,200 – (28 Sd)	39.0 – (1.1 Sd)

[a]The maximum allowable fill areas in Column 2 shall be calculated. For example, the maximum allowable fill, in mm², for a 150 mm wide cable tray in Column 2 shall be 4200 minus (28 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 6.5 minus (1.1 multiplied by Sd)].

[b]The term Sd in Column 2 is equal to the sum of the diameters, in mm, of all cables 507 mm² (in inches, of all 1000 kcmil) and larger single-conductor cables in the same ladder or ventilated trough cable tray with small cables.

(2) **Ventilated Channel Cable Trays.** Where 50 mm (2 in.), 75 mm (3 in.), 100 mm (4 in.), or 150 mm (6 in.) wide ventilated channel cable trays contain single-conductor cables, the sum of the diameters of all single conductors shall not exceed the inside width of the channel.

(C) Number of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.
The number of cables rated 2001 volts or over permitted in a single cable tray shall not exceed the requirements of this section.
The sum of the diameters of single-conductor and multiconductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer. Where single conductor cables are triplexed, quadruplexed, or bound together in circuit groups, the sum of the diameters of the single conductors shall not exceed the cable tray width, and these groups shall be installed in single layer arrangement.

1.30 Securing and Supporting

(A) Securely Fastened. In other than horizontal runs, the cables shall be fastened securely to transverse members of the cable trays.
(B) Supports. Supports shall be provided to prevent stress on cables where they enter raceways or other enclosures from cable tray systems.
Cable trays shall be supported at intervals in accordance with the installation instructions.
392.46 Bushed Conduit and Tubing. A box shall not be required where cables or conductors are installed in bushed conduit and tubing used for support or for protection against physical damage.
392.56 Cable Splices.
Cable splices made and insulated by approved methods shall be permitted to be located within a cable tray, provided they are accessible. Splices shall be permitted to project above the side rails where not subject to physical damage.
392.60 Grounding and Bonding.

(A) Metallic Cable Trays. Metallic cable trays shall be permitted to be used as equipment grounding conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system and the cable tray complies with provisions of this section. Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and Part IV of Article 250.
(B) Steel or Aluminum Cable Tray Systems. Steel or aluminum cable tray systems shall be permitted to be used as equipment grounding conductors, provided all the following requirements are met:
(1) The cable tray sections and fittings are identified as an equipment grounding conductor.
(2) The minimum cross-sectional area of cable trays conform to the requirements in Table 392.60(A).
(3) All cable tray sections and fittings are legibly and durably marked to show the cross-sectional area of metal in channel cable trays, or cable trays of one-piece construction and the total cross-sectional area of both side rails for ladder or trough cable tray.
(4) Cable tray sections, fittings, and connected raceways are bonded in accordance with 250.96, using bolted mechanical connectors or bonding jumpers sized and installed in accordance with 250.102.
Table 392.60(A) Metal Area Requirements for Cable Trays Used as Equipment Grounding Conductor

Maximum Fuse Ampere Rating, Circuit Breaker Ampere Trip Setting, or Circuit Breaker Protective Relay Ampere Trip Setting for Ground-Fault Protection of Any Cable Circuit in the Cable Tray System	Minimum Cross-Sectional Area of Metal[a]			
	Steel		Aluminum	
	mm^2	$in.^2$	mm^2	$in.^2$
		60	129	0.20
100		258	0.40	129 0.20
200		451.5	0.70	129 0.20
400		645	1.00	258 0.40
600	967.5	1.50[b]		258 0.40
1000			---	--- 387 0.60
1200	---	--- 645	1.00	
1600	---		--- 967.5	1.50
2000		---		--- 1290 2.00[b]

[a]Total cross-sectional area of both side rails for ladder or trough cable trays; or the minimum cross-sectional area of metal in channel cable trays or cable trays of one-piece construction.
[b]Steel cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 2000 amperes.

III. Construction Specifications

(A) Strength and Rigidity. Cable trays shall have suitable strength and rigidity to provide adequate support for all contained wiring.
(B) Smooth Edges. Cable trays shall not have sharp edges, burrs, or projections that could damage the insulation or jackets of the wiring.
(C) Corrosion Protection. Cable tray systems shall be corrosion resistant. If made of ferrous material, the system shall be protected from corrosion as required by 300.6.
(D) Side Rails. Cable trays shall have side rails or equivalent structural members.
(E) Fittings. Cable trays shall include fittings or other suitable means for changes in direction and elevation of runs.
(F) Nonmetallic Cable Tray. Nonmetallic cable trays shall be made of flame-retardant material

Substantiation: The following proposal affirms the intent of CMP-8's CP804 action. This proposal adds usability and clarity for the reader by re-instating distinguishing subdivision titles. No new content is proposed. These title additions are consistent with the Style Manual and very helpful for readers to find desired information.

Specifically, this proposal includes the re-instatement of titles:
392.10(B)(1) Single Conductors.
392.10(B)(2) Medium Voltage.
392.10(L)(1) Multiconductor Cables Rated 600 Volts or Less.
392.10(L)(2) Cables Rated Over 600 Volts.
392.17(A)(1) Multiconductor Cables.
392.17(A)(2) Single-Conductor Cables.
392.17(A)(3) Combinations Of Multiconductor And Single-Conductor Cables.
392.17(B)(1) Multiconductor Cables (2001 Volts or Over).
392.17(B)(1) Single-Conductor Cables (2001 Volts or Over).
392.22(A)(1) Any Mixture of Cables.
392.22(A)(2) Multiconductor Control and/or Signal Cables Only. 392.22(A)(3) Solid Bottom Cable Trays Containing Any Mixture.
392.22(A)(4) Solid Bottom Cable Tray – Multiconducotr Control and/or Signal Cables Only.
392.22(A)(5) Ventilated Channel Cable Trays.
392.22(A)(6) Solid Channel Cable Trays.
392.22(B)(1) Ladder Or Ventilated Trough Cable Trays.
392.22(B)(2) Ventilated Channel Cable Trays.

Panel Meeting Action: Accept in Principle in Part

Panel Statement: The panel wants to take this opportunity to thank the submitter for his efforts to improve an outdated Article 392. The panel directs the submitter to the Article 392 re-write included in Comment 8-100a.

The NEC Style Manual requires titles be assigned to Sections (e.g. 392.10 Uses Permitted) and the first level below the Section (e.g. 392.10(A) Wiring Methods). Titles at the next level are permitted but not mandatory, and titles beyond that level are not allowed. The panel retained titles at the third level to 392.22 and 392.80 only.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-103 Log #2591 NEC-P08 **Final Action: Accept in Principle in Part (392)**

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 8-235a

Recommendation: Accept the proposal in principle.

Make the following additional editorial changes:

I. In 392.10, include only subsections (A), (B), (C), and (D). Move subsections (E) through (N) into new sections 392.18 and 392.20 as in items II and III below.

II. Create a new section 392.18 entitled "Cable Tray Installation. Relocate 392.10(E) through (K) as 392.18(A) through (G) respectively.

III. Create a new section 392.20 entitled "Cable and Conductor Installations." Relocate 392.10(L) through (N) as 392.20(A) through (C) respectively.

IV. In 392.10(E), which would become 392.18(A), relocate the last sentence of the first paragraph and the second paragraph on tray-to-tray or tray-to-equipment transitions to section 30, as covered in item VIII below. Relocate the final paragraph on bonding jumpers to section 60 as covered in item IX below

V. In 392.10(E), which would become 392.10(A), relocate the third paragraph to section 60, as covered in item IX below.

VI. In 392.17(A) and (B), which is the entirety of this section, relocate this material as 392.80 and 392.82, respectively.

VII. In 392.22, divide (A), (B), and (C) by voltage and configuration as follows:

392.22. Number of Multiconductor Cables, Rated 2000 Volts or Less, in Cable Trays.

392.24. Number of Single-Conductor Cables, Rated 2000 Volts or Less, in Cable Trays.

392.26. Number of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.

VIII. Insert a new Section 392.28 at this location, as follows:

392.28. Marking. Cable trays containing conductors rated over 600 volts shall have a permanent, legible warning notice carrying the wording "DANGER—HIGH VOLTAGE—KEEP AWAY" placed in a readily visible position on all cable trays with ~~maximum~~ the spacing of warning notices not to exceed 3 m (10 ft).

IX. In 392.30, reorganize this section to read as follows:

392.30. Securing and Supporting.

(A) Cable Trays. Cable trays shall be supported at intervals in accordance with the installation instructions.

(B) Cables and Conductors. Cables and conductors shall be secured to and supported by the cable tray system in accordance with (1), (2) and (3) as applicable.

(1) ~~Securing and Supporting.~~ Runs Other Than Horizontal. In other than horizontal runs, the cables shall be fastened securely to transverse member of the cable trays.

(2) ~~Supports.~~ Raceway Transitions. ~~Supports.~~ Supports shall be provided to prevent stress on cables where they enter raceways ~~or other enclosures~~ from cable tray systems.

(3) Tray-to-Tray and Tray-to-Equipment Transitions. The system shall provide for the support of the cables and raceway wiring methods in accordance with their corresponding articles. Where cable trays support individual conductors and where the conductors pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft). The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.

X. In 392.60, insert a new subsection as follows:

(C) Transitions. Where metallic cable tray systems are mechanically discontinuous as permitted in 392.18(A), a bonding jumper sized in accordance with 250.102 shall connect the two segments of the cable tray, or the cable tray and the raceway or equipment. Bonding shall be in accordance with 250.96.

XI. In the final sentences of the opening paragraphs of 392.22(A) and 392.22(B), which will become 392.22 and 392.24, respectively, delete the word "herein."

XII. Retain the 2008 NEC subdivision titles as they were in the current code it new locations, specifically, in 392.10(B)(1) and (2), and in 392.10(L)(1) and (2) [to become 392.20(A)(1) and (2)], 392.17(A)(1) through (3) [to become 392.80(A) through (C)], in 392.17(B)(1) and (2) [to become 392.82(A) and (B)], in 392.22(A)(1) through (6) [to become 392.22 (A) through (F)], and in 392.22(B)(1) and (2) [to become 392.24(A) and (B)]. Note that 392.22(C) will become 392.26 without titled subdivisions.

Substantiation: This comment is in general support of the CMP 8 effort to rearrange this article, as well as the extensive comment in the voting. Further modifications in the interest of readability are offered to improve the final result. Note that the parallel numbering rules in the NEC Style Manual cannot be applied literally and excessively rigidly to an article that covers a topic that is neither raceway not cable, but principally a support for either or both.

Specific substantiation follows:

I through III. Only the first four topics in 392.10 in the original proposal are permitted uses; the remainders are application rules that need separate sections, one for the tray itself and one for the supported conductors and cables. The suggested section numbers are nonconsecutive to allow for future insertions and don't generally conflict with the customary locations in other Chapter 3 wiring method articles.

IV. Writing as the originator of the language now in the NEC on this topic, the principal focus of these requirements is how conductors and cables will be supported at discontinuous points on a cable tray system, so it makes the most sense to include the coverage in the new Section 30. Cabled wiring methods have support limitations built into Sections 30 of the various cable articles, but there are no other NEC requirements for support of single conductors in these applications, necessitating this language. See also the substantiation for item VIII.

V. This topic is a grounding topic and, as pointed out in the comment on vote, belongs in the new section 60.

VI. Section 80 is, generally, the ampacity section in Chapter 3, hence the relocation, as also covered in the comment on vote. By using two sections (80 and 82) instead of one, the text is much more readable and all of the text has the same relative subdivision level as the 2008 and all prior editions of the NEC that covered this topic. This will greatly increase the comfort level for current users of the NEC, while still respecting the spirit of a common numbering scheme. No other Chapter 3 wiring method article approaches this amount of material on ampacity. If the organization in the proposal stands, using the 2008 NEC as a guide, there will be 23 column inches in 392.17, which would be over seven times the length of 334.80, the longest such section elsewhere in Chapter 3.

VII. Here again, an extremely long and complicated topic can be better addressed in terms of readability and continuity with past NEC editions by splitting the coverage into different sections that preserve the same subdivision formatting as in prior NEC editions. In this case almost 43 column inches are needed to address this topic in the current NEC; if this became a single section it would be one of the longest in the entire NEC. This should not be the goal of an article rewrite supposedly directed at usability.

VIII. This wording integrates the action on Proposal 8-260, as reflected in a companion comment. The warning sign must give a command in order to withstand legal challenges, which is why similar labels have been reworded throughout the NEC; see 110.34(C) for an example. The location has also been inserted into a field portion of the article because this is a field marking requirement, and located adjacent to another medium voltage provision. The panel action placed it in where it would become a manufacturing specification; tray manufacturers cannot be expected to have any idea where segments of their tray will end up and whether they will carry medium voltage conductors. The word "maximum" is deleted because it is redundant to the words "not to exceed."
IX. This section has been reorganized from that originally proposed in order to group related topics within the same subdivision. Specifically, (A) covers the support of the tray itself, and (B) covers the support of the contents of the tray. (B)(1) restates the existing NEC text on vertical (actually any non-horizontal) runs and (B)(2) covers tray-raceway transitions. The phrase "or other enclosures" is deleted because it is fully addressed in (B)(3). 392.30(B)(3) opens by picking up the cable support rule in 392.10(E) of the proposal [392.6(A) in the 2008 NEC]; all cable articles have support provisions relative to distances from terminations, and these will govern the required support from a tray to an enclosure. For consistency with raceway articles in Chapter 3, the rule does expand slightly by changing "the cables" to "cable and raceway wiring methods" because cable trays are permitted to support many raceway wiring methods and there is no reason to omit them from this rule.
The wording regarding this subject in the comment on vote (item 1) was not used in this comment because as drafted here it is very clear that multiconductor cables as well as raceways are allowed, and that the 6-foot limit only covers single conductors. This appears to meet the intent of the comment on vote and accords with the intent of this provision.
X. This is the relocation of the bonding jumper provision, as correctly covered in the comment on vote.
XI. The word "herein" is discouraged in the NEC Style Manual at 3.3.4 because "usually this word can be dropped without affecting clarity" and this seems to be the case in these two locations.
XII. The subdivision titles in the existing NEC absolutely should be retained, as mentioned in the comment on vote. If this organization is accepted, these titles will apply to second-level subdivisions in all but two of the cited cases, and thereby become mandatory as covered in 2.1.5.2 of the NEC Style Manual.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel wants to take this opportunity to thank the submitter for his efforts to improve an outdated Article 392. The panel would like to direct the submitter to the Article 392 re-write included in Comment 8-100a. Items mentioned in this comment that were already accepted during the ROP period will not be addressed in this panel statement.

1. The panel agrees that relocating items 392.10(E) through (K) to new Section 392.18(A) through (G) will add clarity to the Article.
2. The panel agrees with your recommendation to create a new Section 392.20 Cable and Conductor Installations for the purpose of relocating items 392.10(L) through (N). This new section will consist of four subsections (A) Multiconductor Cables Rated 600 Volts or Less, (B) Cables Rated Over 600 Volts, (C) Connected in Parallel, and (D) Single Conductors.
3. In Section 392.10(E), the panel agreed to relocate the last sentence of the first paragraph and the entire second paragraph on transitions from cable tray to cable tray or equipment to Section 392.30(B)(3) which incorporates all support requirements in one section. Also, to relocate the entire third paragraph of Section 392.10(E) to the Grounding Section 392.60(C) Transitions, which will locate all grounding and bonding requirements in one section.
4. The panel agreed that all ampacity requirements should be relocated from 392.17 to 392.80 which follows the format of other Chapter 3 Articles.
5. Rather than separate "Number of Conductors and Cables" into three sections, as requested, the panel feels that all related requirements should be located in one area Section 392.22. This section has been structured as (A) Number of Multiconductor Cables, Rated 2000 Volts or Less, in Cable Trays, (B) Number of Single-Conductor Cables, Rated 2000 Volts or Less, in Cable Trays, and (C) Number of Type MV and Type MC Cables (2001 Volts and Over) in Cable Trays. This format adds clarity to the requirement.
6. The panel agrees, instead of creating a new Section 392.28, the panel prefers to locate the WARNING NOTICE in Section 392.18(H).
7. The panel agrees with reorganizing 392.30 Securing and Supporting as suggested. This will make the section clear and easier to understand. However, the panel chooses not to use titles at this level to be consistent with other Articles.
8. The panel agrees that deleting the word "herein" in two places will add clarity to the article.
9. The NEC Style Manual requires titles be assigned to Sections (e.g. 392.10 Uses Permitted) and the first level below the Section (e.g. 392.10(A) Wiring Methods). Titles at the next level are permitted but not mandatory, and titles beyond that level are not allowed. The panel retained titles at the third level to 392.22 and 392.80 only.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-104 Log #28 NEC-P08 **Final Action: Accept**
(Table 392.3(A))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 8-244
Recommendation: Delete the row dealing with CATV raceways.
Substantiation: Panel 16 acceptance of proposal 16-289a eliminated CATV raceways.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 8-100a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-105 Log #1509 NEC-P08 **Final Action: Reject**
(392.3(B) and Exception (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-247
Recommendation: Accept the proposal with the following revisions:
Single Conductors. Single-conductor cables, except where in a raceway or Type MI cable or Type MC cable, shall be installed in accordance with (B)(1)(a) through (B)(1)(c).
Substantiation: "Permitted" is not a requirement per 90.5(B), and therefore, not enforceable. Present wording prohibits Type MI and Type MC single conductor cables smaller than 1/0 AWG.
Panel Meeting Action: Reject
Panel Statement: The language used in 392.10 (2008 NEC 392.3(B)) is consistent with other Articles. "Uses Permitted" is not an all inclusive list and is not intended to prohibit the use of Cable Trays in industrial establishments.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-106 Log #1508 NEC-P08 **Final Action: Reject**
(392.5(G) (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-254
Recommendation: Accept the proposal.
Substantiation: Reconsider the Substantiation and Explanation of Negative Vote.
Panel Meeting Action: Reject
Panel Statement: Cables trays are support hardware systems for cables, raceways and conductors. This supporting system need only be approved per Section 110.2 which is consistent with other supporting materials referenced throughout the NEC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-107 Log #1564 NEC-P08 **Final Action: Reject**
(392.5(G) (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-254
Recommendation: Accept the proposal.
Substantiation: Cable trays are a wiring method also, per Chapter 3, Wiring Methods and if provided with a cover, appear to meet the definition of raceway. Listing would relieve the Authority Having Jurisdiction from having to evaluate the suitability of cable trays such as grounding, spacing of supports, spacing of rungs, etc. One panel has stated they wish to have all wiring methods listed.
Panel Meeting Action: Reject
Panel Statement: Cables trays are support hardware systems for cables, raceways and conductors. This supporting system need only be approved per Section 110.2 which is consistent with other supporting materials referenced throughout the NEC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-108 Log #1294 NEC-P08 **Final Action: Reject**
(392.6(l))

Submitter: Teri Dwyer, Wyoming, MN
Comment on Proposal No: 8-256
Recommendation: Revise text to read as follows:
(l) ~~Adequate~~ Minimum Access. Sufficient space, a minimum of 300 mm (12 in.) access headroom shall be provided and maintained about cable trays to permit ~~adequate~~ access for installing and maintaining the cables. ~~Care shall be taken to ensure that other building components (e.g., air conditioning ducts) do not restrict access to trays or wireways.~~
Substantiation: The panel should accept this as modified; "Adequate Access" is an ambiguous term without definition of space. The 300 mm (12 in.) was inserted to define the amount of space using the ANSI Standard for reference. (ANSI/TIA/EIA-569-A Section 4.5.6.2) In the panel statement, "The intent of the current text is clear and allows judgment by the designer/installer and AHJ", this is as clear as mud. When was the last time a judgment by and installer and an inspector were the same in the absence of definable code language? What is adequate to a 6 ft 180 lb installer may not be adequate to a 5 ft 10 in. 300 lb inspector. The NEC style manual is very clear that the NEC shall not contain references or requirements that are unenforceable or vague. There is a table in the NEC style manual that lists possibly unenforceable or vague terms and adequate is a word included in this table. The NEC style manual requires that the terms contained in this table be reviewed in context and if the resulting requirement is unenforceable or vague, the term shall not be used. To promote a uniform consistency, the NEC should contain defined and enforceable code language, not language that is subjective to individual opinion.
Panel Meeting Action: Reject
Panel Statement: Headroom is not defined. 110.26 reference to headroom has been deleted at the ROP. Requiring this 12 in. space along the entire cable tray would prevent electrical raceways and other building components from crossing the cable tray within 12 in. even though the raceway or component may not interfere with the required access to the contained conductors.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-109 Log #1565 NEC-P08 **Final Action: Reject**
(392.6(E) and (F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-259
Recommendation: Accept the proposal with the following revisions:
(E) Multiconductor and single conductor cables operating at 600 volts, nominal, or less, shall be permitted to be installed in the same cable tray.
(F) Cables operating at over 600 volts, nominal and those operating at 600 volts, nominal or less installed in the same cable tray shall comply with either of the following:
(1) The cables operating at over 600 volts, nominal are Type MC.
(2) The cables operating at over 600 volts, nominal, are separated from the cables operating at 600 volts, nominal or less by an approved fixed barrier of a material compatible with the cable tray.
Substantiation: Single-conductor Type MC and MI cables should be included. The NEC doesn't prohibit cables rated over 600 volts from operating at 600 volts or less. At times, conductors rated over 600 volts are used for 600 volts or less applications, and the operating voltage should be the criterion.
Panel Meeting Action: Reject
Panel Statement: The proposed text does not add clarity to the requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-110 Log #2592 NEC-P08 **Final Action: Accept**
(392.6(F)(3))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-260
Recommendation: Accept the panel action in principle.
Change the wording of the warning and, if Proposal 8-235a does not remain accepted, leave the location of the text as originally proposed; if Proposal 8-235a remains substantially accepted, retain the stand-alone section but relocate it into a field part of the article. See the companion comment submitted on Proposal 8-235a for a suggested location. The wording is to be as follows:
392.XX. Marking. Cable trays containing conductors rated over 600 volts shall have a permanent, legible warning notice carrying the wording "DANGER—HIGH VOLTAGE—KEEP AWAY" placed in a readily visible position on all cable trays with ~~maximum~~ the spacing of warning notices not to exceed 3.0 m (10 ft).
Substantiation: The warning sign must give a command in order to withstand legal challenges, which is why similar labels have been reworded throughout the NEC; see 110.34(C) for an example. The wording must clearly fall into a field portion of the article because this is a field marking requirement. The panel action placed it in where it would become a manufacturing specification; tray manufacturers cannot be expected to have any idea where segments of their tray will end up and whether they will carry medium voltage conductors. The word "maximum" is deleted because it is redundant to the words "not to exceed."
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 8-100a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-111 Log #506 NEC-P08 **Final Action: Reject**
(392.6(I))

Submitter: Patrick G. Heater, Netsian Technologies Group
Comment on Proposal No: 8-255
Recommendation: Revise text to read as follows:
(I) ~~Adequate~~ Minimum Access. Sufficient space, a minimum of 300mm (12 in.) access headroom shall be provided and maintained about cable trays to permit ~~adequate~~ access for installing and maintaining the cables. Care shall be taken to ensure that other building components (e.g., air conditioning ducts) do not restrict access to trays or wireways.
Substantiation: "Adequate Access" is an ambiguous term without definition of space. The 300mm (12in) was inserted to define the amount of space using the ANSI Standard for reference. (ANSI/TIA/EIA-569-A Section4.5.6.2) In the panel statement, "The intent of the current text is clear and allows judgment by the designer/installer and AHJ", this is as clear as mud. When was the last time a judgment by and installer and an inspector were the same in the absence of definable code language? What is adequate to a 6' 180lb installer may not be adequate to a 5'10" 300lb inspector. The NEC style manual is very clear that the NEC shall not contain references or requirements that are unenforceable or vague. There is a table in the NEC style manual that lists possibly unenforceable or vague terms and adequate is a word included in this table. The NEC style manual requires that the terms contained in this table be reviewed in context and if the resulting requirement is unenforceable or vague, the term shall not be used. To promote a uniform consistency, the NEC should contain defined and enforceable code language, not language that is subjective to individual opinion.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-108.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-112 Log #1423 NEC-P08 **Final Action: Reject**
(392.7(A))

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 8-263
Recommendation: Reject this proposal.
~~Metal cable tray containing non power conductors (communication, data, signal, etc.) shall be electrically continuous, through listed connections or the use of an insulated stranded bonding jumper not smaller than 10 AWG.~~
Substantiation: This proposal seems like a good idea. But, there are too many problems with it.
First of all, the majority of cable trays for Metallic data and communications conductors would fall under Article 800. Since Chapter 8 and Article 800 stand alone, they would not be affected by this requirement. Section 800.110 does require that raceways used for communication conductors to meet the requirements of Chapter 3; but, that does not include cable trays.
Second, there's the requirement for the trays to be electrically continuous or bonded with an insulated, stranded 10 AWG conductor. Bonding the cable trays internally, at first sounds like a good idea, but the actual reason is obscure. And if they are to be bonded to some other element of the electrical system (which the proposal does not require) what part of the system is that? To some equipment ground? To the grounding electrode system? Even 250.96, referenced in the present text in this Section, only requires 'internal' continuity.
Panel Meeting Action: Reject
Panel Statement: Cable tray, a support system, is covered by Article 392 not Article 800. 250.96 includes the statement "shall be bonded where necessary to ensure electrical continuity and the capacity to conduct safely any fault current likely to be imposed on them." To conduct any fault current likely to energize the cable tray a bond based on 250.122 for load side, and a bond based on 250.66 for line side tied to the grounding system would be required.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-113 Log #1563 NEC-P08 **Final Action: Reject**
(392.7(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-262
Recommendation: Accept the proposal.
Substantiation: See the Substantiation for the Proposal. The panel should indicate which part is not accurate.
Panel Meeting Action: Reject
Panel Statement: The proposed text does not add clarity to the section. Cable trays with covers are not an enclosure or raceway and are not exempt from 250.86 Exception 2.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-114 Log #1990 NEC-P08 **Final Action: Accept in Principle in Part**
(392.7(A))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 8-263
Recommendation: Revise the accepted text as shown below.
Metal cable tray containing non-power conductors (communication, data, signal, etc.) shall be electrically continuous, through listed connections or the use of a ~~an insulated~~ stranded bonding jumper not smaller than a 10 AWG.
Substantiation: There is no technical reason to require the bonding jumper to be an insulated conductor.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: See panel action on Comment 8-100a. The panel accepted the proposed revision to delete "an insulated". The text that was proposed will revise 392.60(A). "Stranded" was also removed to allow for solid conductors.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-115 Log #1062 NEC-P08 **Final Action: Reject**
(392.7(A) [new 392.60(A)])

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Telecommunications Industry Solutions (ATIS)
Comment on Proposal No: 8-263
Recommendation: Reject Proposal 8-263.
Substantiation: The added text to require bonding of "Metal cable tray containing non-power conductors" is redundant and superfluous. The existing text of 392.7(A) [2008 NEC] presently requires: "Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and Part IV of Article 250". If they are grounded, then they are effectively 'bonded' through the grounding conductor(s). Additionally, the NEC Style Manual states that the use of "etc." should be avoided.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 8-112.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-116 Log #364 NEC-P08 **Final Action: Accept**
(392.8(D))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-264
Recommendation: Continue to reject the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-117 Log #1298 NEC-P08 **Final Action: Reject**
(392.8(D))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 8-264
Recommendation: The Proposal should be Accepted.
Substantiation: The proposed wording is more appropriate for a standard and is more explicit in describing the installation.
The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).
Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: The NEC style manual does not restrict the use of the word "per" in this code section. The proposed change does not add clarity.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-118 Log #3 NEC-P08 **Final Action: Accept**
(392.9, 392.10, and Tables 392.9 and 392.10(A))

Submitter: Dallas Kellerman, Cablofil/Legrand
Comment on Proposal No: 8-267
Recommendation: The panel should accept the proposal with the 2 tables modified as shown below.

See Table 392.22(A) on Page 250

See Table 392.22(B)(1) on Page 250

Note that the tables use the reformatted Article 392 numbering in accordance with accepted Code-Making Panel 8 Proposal 8-235a (Log No. CP804).
Substantiation: The proposal should be accepted with the modifications presented in this comment as the fact exists that inquiries are often received by manufacturers regarding the allowable fill area for 2 in., 4 in., 8 in., 16 in., and 20 in. cable tray widths. These widths are standard widths for wire mesh cable tray (from NEMA VE 1). Since these widths are not listed in the table, and wire mesh cable tray is not mentioned, there is confusion in determining the allowable fill area.
The revised tables correct typographical and rounding errors presented in the original proposal. Table 392.22(B)(1) note b is revised to be consistent with a similar note in Table 392.22(A).
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 8-100a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-119 Log #2104 NEC-P08 **Final Action: Reject**
(Table 392.9 and Table 392.10(A))

Submitter: M. Shan Griffith, ELEKTEK, PLLC / Rep. Institute of Electrical and Electronic Engineers, Inc. (IEEE)
Comment on Proposal No: 8-267
Recommendation: Revise the coefficient ~~30~~ to 25 ahead of the term "Sd" in every row of the column with the heading "mm2" in Table 392.9 proposed by the submitter of Proposal 8-267 and accept the additional, smaller tray widths proposed.
Substantiation: The smaller widths of cable tray originally proposed to be included in these Tables by the submitter of Proposal 8-267 are recognized by NEMA and have been widely used throughout large industry for more than 5 years with proven success and no reported problems/failures. Additionally, these smaller width trays are available with a U/L listing as an equipment grounding conductor just like the larger width trays presently included in the Tables. Once the coefficient of "30" is corrected to "25" as proposed above for Table 392.9 the tray fill criteria will be correct.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree with changing the coefficient from 30 to 25 in Column 2 of new Table 392.22(A) (old Table 392.9). The coefficients as they currently appear are correct because the coefficient for open bottom cable trays are not the same as for solid bottom cable tray. This is due to the additional air flow that open bottom cable trays provide. In addition, there was no technical substantiation provided to justify the change and the submitter of Proposal 8-267, who is the same submitter of Comment 8-118, did

Table 392.22(A) Allowable Cable Fill Area for Multiconductor Cables in Ladder, Ventilated Trough, Wire Mesh, or Solid Bottom Cable Trays for Cables Rated 2000 Volts or Less

		Maximum Allowable Fill Area for Multiconductor Cables							
		Ladder, ~~or~~ Ventilated Trough, or Wire Mesh Cable Trays, 392.22(A)(1)				Solid Bottom Cable Trays, 392.22(A)(3)			
Inside Width of Cable Tray		Column 1 Applicable for 392.22(A)(1)(b) Only		Column 2[a] Applicable for 392.22(A)(1)(c) Only		Column 3 Applicable for 392.22(A)(3)(b) Only		Column 4[a] Applicable for 392.22(A)(3)(c) Only	
mm	in.	mm²	in.²	mm²	in.²	mm²	in.²	mm²	in.²
50	2.0	1,500	2.5	1,500 - (30 Sd)[b]	2.5 - (1.2 Sd)[b]	1,200	2.0	1,200 - (25 Sd)[b]	2.0 - Sd[b]
100	4.0	3,000	4.5	3,000 - (30 Sd)	4.5 - (1.2 Sd)	2,300	3.5	2,300 - (25 Sd)	3.5 - Sd
150	6.0	4,500	7.0	4,500 - (30 Sd)[b]	7 - (1.2 Sd)[b]	3,500	5.5	3,500 - (25 Sd[b])	5.5 - Sd[b]
200	8.0	6,000	9.5	6,000 - (30 Sd)	9.5 - (1.2 Sd)	4,500	7.0	4,500 - (25 Sd)	7.0 - Sd
225	9.0	6,800	10.5	6,800 - (30 Sd)	10.5 - (1.2 Sd)	5,100	8.0	5,100 - (25 Sd)	8.0 - Sd
300	12.0	9,000	14.0	9,000 - (30 Sd)	14 - (1.2 Sd)	7,100	11.0	7,100 - (25 Sd)	11.0 - Sd
400	16.0	12,000	18.5	12,000 - (30 Sd)	18.5 - (1.2 Sd)	9,400	14.5	9,400 - (25 Sd)	14.5 - Sd
450	18.0	13,500	21.0	13,500 - (30 Sd)	21 - (1.2 Sd)	10,600	16.5	10,600 - (25 Sd)	16.5 - Sd
500	20.0	15,000	23.5	15,000 - (30 Sd)	23.5 - (1.2 Sd)	11,800	18.5	11,800 - (25 Sd)	18.5 - Sd
600	24.0	18,000	28.0	18,000 - (30 Sd)	28 - (1.2 Sd)	14,200	22.0	14,200 - (25 Sd)	22.0 - Sd
750	30.0	22,500	35.0	22,500 - (30 Sd)	35 - (1.2 Sd)	17,700	27.5	17,700 - (25 Sd)	27.5 - Sd
900	36.0	27,000	42.0	27,000 - (30 Sd)	42 - (1.2 Sd)	21,300	33.0	21,300 - (25 Sd)	33.0 - Sd

[a]The maximum allowable fill areas in Columns 2 and 4 shall be calculated. For example, the maximum allowable fill in mm² for a 150-mm wide cable tray in Column 2 shall be 4500 minus (30 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 7 minus (1.2 multiplied by Sd)].

[b]The term Sd in Columns 2 and 4 is equal to the sum of the diameters, in mm, of all cables 107.2 mm (in inches, of all 4/0 AWG) and larger multiconductor cables in the same cable tray with smaller cables.

Table 392.22(B)(1) Allowable Cable Fill Area for Single-Conductor Cables in Ladder, ~~or~~ Ventilated Trough, or Wire Mesh Cable Trays for Cables Rated 2000 Volts or Less

		Maximum Allowable Fill Area for Single-Conductor Cables in Ladder, ~~or~~ Ventilated Trough, or Wire Mesh Cable Trays			
Inside Width of Cable Tray		Column 1 Applicable for 392.22(B)(1)(b) Only		Column 2[a] Applicable for 392.22(B)(1)(c) Only	
mm	in.	mm²	in.²	mm²	in.²
50	2	1,400	2.0	1,400 - (28 Sd)[b]	2.0 - (1.1 Sd)[b]
100	4	2,800	4.5	2,800 - (28 Sd)	4.5 - (1.1 Sd)
150	6	4,200	6.5	4,200 - (28 Sd)[b]	6.5 - (1.1 Sd)[b]
200	8	5,600	8.5	5,600 - (28 Sd)	8.5 - (1.1 Sd)
225	9	6,100	9.5	6,100 - (28 Sd)	9.5 - (1.1 Sd)
300	12	8,400	13.0	8,400 - (28 Sd)	13.0 - (1.1 Sd)
400	16	11,200	17.5	11,200 - (28 Sd)	17.5 - (1.1 Sd)
450	18	12,600	19.5	12,600 - (28 Sd)	19.5 - (1.1 Sd)
500	20	14,000	21.5	14,000 - (28 Sd)	21.5 - (1.1 Sd)
600	24	16,800	26.0	16,800 - (28 Sd)	26.0 - (1.1 Sd)
750	30	21,000	32.5	21,000 - (28 Sd)	32.5 - (1.1 Sd)
900	36	25,200	39.0	25,200 - (28 Sd)	39.0 - (1.1 Sd)

[a]The maximum allowable fill areas in Column 2 shall be calculated. For example, the maximum allowable fill, in mm², for a 150 mm wide cable tray in Column 2 shall be 4200 minus (28 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 6.5 minus (1.1 multiplied by Sd)].

[b]The term Sd in Column 2 is equal to the sum of the diameters, in mm, of all cables 507 mm² (in inches, of all 1000 kcmil) and larger single-conductor cables in the same ~~ladder or ventilated trough~~ cable tray with smaller cables.

not intend for the coefficient to change as was indicated in the substantiation of this comment.

See panel action on Comment 8-118. The panel continues to agree with the addition of 2 in., 4 in., 8 in., 16 in., and 20 in. cable tray widths, which are standard widths for wire mesh cable tray.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-120 Log #1794 NEC-P08 **Final Action: Accept in Principle (392.10(E) through (N) and 392.17)**

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 8-235a
Recommendation:
ARTICLE 392
Cable Trays
I. General
392.1 Scope. This article covers cable tray systems, including ladder, ventilated trough, ventilated channel, solid bottom, and other similar structures.
FPN: For further information on cable trays, see ANSI/NEMA–VE 1-1998, Metal Cable Tray Systems; NEMA–VE 2-1996, Metal Cable Tray Installation Guidelines; and NEMA–FG-1998, Nonmetallic Cable Tray Systems.
392.2 Definition.
Cable Tray System. A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways.
II. Installation
392.10 Uses Permitted. Cable tray shall be permitted to be used as a support system for service conductors, feeders, branch circuits, communications circuits, control circuits, and signaling circuits. Cable tray installations shall not be limited to industrial establishments. Where exposed to direct rays of the sun, insulated conductors and jacketed cables shall be identified as being sunlight resistant. Cable trays and their associated fittings shall be identified for the intended use.
(A) Wiring Methods. The wiring methods in Table 392.10(A) shall be permitted to be installed in cable tray systems under the conditions described in their respective articles and sections.
Table 392.10(A) Wiring Methods

Wiring Method	Article
Armored cable	**320**
CATV cables	**820**
CATV raceways	**820**
Class 2 and Class 3 cables	**725**
Communications cables	**800**
Communications raceways	**800**
Electrical metallic tubing	**358**
Electrical nonmetallic tubing	**362**
Fire alarm cables	**760**
Flexible metal conduit	**348**
Flexible metallic tubing	**360**
Instrumentation tray cable	**727**
Intermediate metal conduit	**342**
Liquidtight flexible metal conduit	**350**
Liquidtight flexible nonmetallic conduit	**356**
Metal-clad cable	**330**
Mineral-insulated, metal-sheathed cable	**332**
Multiconductor service-entrance cable	**338**
Multiconductor underground feeder and branch-circuit cable	**340**
Network-powered broadband communications cables	**830**
Nonmetallic-sheathed cable	**334**
Non-power-limited fire alarm cable	**760**
Optical fiber cables	**770**
Optical fiber raceways	**770**
Other factory-assembled, multiconductor control, signal, or power cables that are specifically approved for installation in cable trays	
Polyvinyl chloride PVC conduit	**352**
Power and control tray cable	**336**
Power-limited fire alarm cable	**760**
Power-limited tray cable	**725**
Rigid metal conduit	**344**
Rigid nonmetallic conduit	**352**
RTRC	**355**
Signaling raceway	**725**

(B) In Industrial Establishments. The wiring methods in Table 392.10(A) shall be permitted to be used in any industrial establishment under the conditions described in their respective articles. In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified persons service the installed cable tray system, any of the cables in 392.10(B)(1) and (B)(2) shall be permitted to be installed in ladder, ventilated trough, solid bottom, or ventilated channel cable trays.

(1) Single-conductor cables shall be permitted to be installed in accordance with (B)(1)(a) through (B)(1)(c).

(a) Single-conductor cable shall be 1/0 AWG or larger and shall be of a type listed and marked on the surface for use in cable trays. Where 1/0 AWG through 4/0 AWG single-conductor cables are installed in ladder cable tray, the maximum allowable rung spacing for the ladder cable tray shall be 225 mm (9 in.).

(b) Welding cables shall comply with the provisions of Article 630, Part IV.

(c) Single conductors used as equipment grounding conductors shall be insulated, covered, or bare, and they shall be 4 AWG or larger.

(2) Single and multiconductor medium voltage cables shall be Type MV cable. Single conductors shall be installed in accordance with 392.10(B)(1).

(C) Hazardous (Classified) Locations. Cable trays in hazardous (classified) locations shall contain only the cable types permitted in 501.10, 502.10, 503.10, 504.20, and 505.15.

(D) Nonmetallic Cable Tray. In addition to the uses permitted elsewhere in 392.10, nonmetallic cable tray shall be permitted in corrosive areas and in areas requiring voltage isolation.

~~**(E) Complete System.** Cable trays shall be installed as a complete system. Field bends or modifications shall be so made that the electrical continuity of the cable tray system and support for the cables is maintained. Cable tray systems shall be permitted to have mechanically discontinuous segments between cable tray runs or between cable tray runs and equipment. The system shall provide for the support of the cables in accordance with their corresponding articles.~~

~~Where cable trays support individual conductors and where the conductors pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft). The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.~~

~~A bonding jumper sized in accordance with 250.102 shall connect the two sections of cable tray, or the cable tray and the raceway or equipment. Bonding shall be in accordance with 250.96.~~

~~**(F) Completed Before Installation.** Each run of cable tray shall be completed before the installation of cables.~~

~~**(G) Covers.** In portions of runs where additional protection is required, covers or enclosures providing the required protection shall be of a material that is compatible with the cable tray.~~

~~**(H) Through Partitions and Walls.** Cable trays shall be permitted to extend transversely through partitions and walls or vertically through platforms and floors in wet or dry locations where the installations, complete with installed cables, are made in accordance with the requirements of 300.21.~~

~~**(I) Exposed and Accessible.** Cable trays shall be exposed and accessible except as permitted by 392.10(H).~~

~~**(J) Adequate Access.** Sufficient space shall be provided and maintained about cable trays to permit adequate access for installing and maintaining the cables.~~

~~**(K) Raceways, Cables, Boxes, and Conduit Bodies Supported from Cable Tray Systems**. In industrial facilities where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable tray systems are designed and installed to support the load, such systems shall be permitted to support raceways and cables, and boxes and conduit bodies covered in 314.1. For raceways terminating at the tray a listed cable tray clamp or adapter shall be used to securely fasten the raceway to the cable tray system. Additional supporting and securing of the raceway shall be in accordance with the requirements of the appropriate raceway article.~~
~~For raceways or cables running parallel to and attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of the appropriate raceway or cable article.~~
~~For boxes and conduit bodies attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of 314.23.~~

~~**(L)Cable Installation.**~~
~~(1) Multiconductor cables rated 600 volts or less shall be permitted to be installed in the same cable tray.~~
~~(2) Cables rated over 600 volts and those rated 600 volts or less installed in the same cable tray shall comply with either of the following:~~
~~(a) The cables rated over 600 volts are Type MC.~~
~~(b) The cables rated over 600 volts are separated from the cables rated 600 volts or less by a solid fixed barrier of a material compatible with the cable tray~~

~~**(M) Connected in Parallel.** Where single conductor cables comprising each phase, neutral, or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.4, the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance.~~

Single conductors shall be securely bound in circuit groups to prevent excessive movement due to fault-current magnetic forces unless single conductors are cabled together, such as triplexed assemblies.

(N) Single Conductors. Where any of the single conductors installed in ladder or ventilated trough cable trays are 1/0 through 4/0 AWG, all single conductors shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

392.12 Uses Not Permitted.

Cable tray systems shall not be used in hoistways or where subject to severe physical damage. Cable tray systems shall not be used in ducts, plenums, and other air-handling spaces, except as permitted in 300.22, to support wiring methods recognized for use in such spaces.

392.18 Cable Tray Installation

(A) Complete System. Cable trays shall be installed as a complete system. Field bends or modifications shall be so made that the electrical continuity of the cable tray system and support for the cables is maintained. Cable tray systems shall be permitted to have mechanically discontinuous segments between cable tray runs or between cable tray runs and equipment. The system shall provide for the support of the cables in accordance with their corresponding articles.

Where cable trays support individual conductors and where the conductors pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft). The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.

A bonding jumper sized in accordance with 250.102 shall connect the two sections of cable tray, or the cable tray and the raceway or equipment. Bonding shall be in accordance with 250.96.

(B) Completed Before Installation. Each run of cable tray shall be completed before the installation of cables.

(C) Covers. In portions of runs where additional protection is required, covers or enclosures providing the required protection shall be of a material that is compatible with the cable tray.

(D) Through Partitions and Walls. Cable trays shall be permitted to extend transversely through partitions and walls or vertically through platforms and floors in wet or dry locations where the installations, complete with installed cables, are made in accordance with the requirements of 300.21.

(F) Exposed and Accessible. Cable trays shall be exposed and accessible except as permitted by 392.10(H).

(G) Adequate Access. Sufficient space shall be provided and maintained about cable trays to permit adequate access for installing and maintaining the cables.

(H) Raceways, Cables, Boxes, and Conduit Bodies Supported from Cable Tray Systems. In industrial facilities where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable tray systems are designed and installed to support the load, such systems shall be permitted to support raceways and cables, and boxes and conduit bodies covered in 314.1. For raceways terminating at the tray a listed cable tray clamp or adapter shall be used to securely fasten the raceway to the cable tray system. Additional supporting and securing of the raceway shall be in accordance with the requirements of the appropriate raceway article.

For raceways or cables running parallel to and attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of the appropriate raceway or cable article.

For boxes and conduit bodies attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of 314.23.

392.17 Ampacity of Conductors

(A) Ampacity of Cables, Rated 2000 Volts or Less, in Cable Trays.

(1) The allowable ampacity of multiconductor cables, nominally rated 2000 volts or less, installed according to the requirements of 392.22(A) shall be as given in Table 310.16 and Table 310.18, subject to the provisions of (1), (2), (3), and 310.15(A)(2).

(a) The derating factors of 310.15(B)(2)(a) shall apply only to multiconductor cables with more than three current-carrying conductors. Derating shall be limited to the number of current-carrying conductors in the cable and not to the number of conductors in the cable tray.

(b) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not over 95 percent of the allowable ampacities of Table 310.16 and Table 310.18 shall be permitted for multiconductor cables.

(c) Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0 through 2000 volts in free air, in accordance with 310.15(C).

FPN: See Table B.310.3.

(2) The allowable ampacity of single-conductor cables shall be as permitted by 310.15(A)(2). The derating factors of 310.15(B)(2)(a) shall not apply to the ampacity of cables in cable trays. The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), nominally rated 2000 volts or less, shall comply with the following:

(a) Where installed according to the requirements of 392.22(B), the ampacities for 600 kcmil and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the allowable ampacities in Table 310.17 and Table 310.19.

(b) Where installed according to the requirements of 392.22(B), the ampacities for 1/0 AWG through 500 kcmil single-conductor cables in uncovered cable trays shall not exceed 65 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the allowable ampacities in Table 310.17 and Table 310.19.

(c) Where single conductors are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.17 and Table 310.19.

Exception to (2)(c): For solid bottom cable trays the ampacity of single conductor cables shall be determined by 310.15(C).

(d) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free airspace of not less than 2.15 times one conductor diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities of two or three single insulated conductors rated 0 through 2000 volts supported on a messenger in accordance with 310.15(B).

FPN: See Table 310.20.

(3) Where a cable tray contains a combination of multiconductor and single-conductor cables, the allowable ampacities shall be as given in 392.17(A)(1) for multiconductor cables and 392.17(A)(2) for single-conductor cables, provided that the following conditions apply:

(a) The sum of the multiconductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.22(A), and the single-conductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.22(B), totals not more than 100 percent.

(b) Multiconductor cables are installed according to 392.22(A) and single-conductor cables are installed according to 392.22(B) and 392.10(M) and (N).

(B) Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.

The ampacity of cables, rated 2001 volts, nominal, or over, installed according to 392.22(C) shall not exceed the requirements of this section.

(1) The allowable ampacity of multiconductor cables shall be as given in Table 310.75 and Table 310.76, subject to the following provisions:

(a) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not more than 95 percent of the allowable ampacities of Table 310.75 and Table 310.76 shall be permitted for multiconductor cables.

(b) Where multiconductor cables are installed in a single layer in uncovered cable trays, with maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Table 310.71 and Table 310.72.

(2) The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), shall comply with the following:

(a) The ampacities for 1/0 AWG and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.69 and Table 310.70. Where the cable trays are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the allowable ampacities in Table 310.69 and Table 310.70.

(b) Where single-conductor cables are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.69 and Table 310.70.

(c) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free air space of not less than 2.15 times the diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.67 and Table 310.68.

392.19 Cable Installation.

(A) Multiconductor cables rated 600 volts or less shall be permitted to be installed in the same cable tray.

(B) Cables rated over 600 volts and those rated 600 volts or less installed in the same cable tray shall comply with either of the following:

(a) The cables rated over 600 volts are Type MC.

(b) The cables rated over 600 volts are separated from the cables rated 600 volts or less by a solid fixed barrier of a material compatible with the cable tray

(C) Connected in Parallel. Where single conductor cables comprising each phase, neutral, or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.4, the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance.

Single conductors shall be securely bound in circuit groups to prevent

excessive movement due to fault-current magnetic forces unless single conductors are cabled together, such as triplexed assemblies.

(D) Single Conductors. Where any of the single conductors installed in ladder or ventilated trough cable trays are 1/0 through 4/0 AWG, all single conductors shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

392.22 Number of Conductors or Cables

(A) Number of Multiconductor Cables, Rated 2000 Volts or Less, in Cable Trays.

The number of multiconductor cables, rated 2000 volts or less, permitted in a single cable tray shall not exceed the requirements of this section. The conductor sizes herein apply to both aluminum and copper conductors.

(1) Where ladder or ventilated trough cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(a) Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed the cable tray width, and the cables shall be installed in a single layer. Where the cable ampacity is determined according to 392.17(A)(1)(c), the cable tray width shall not be less than the sum of the diameters of the cables and the sum of the required spacing widths between the cables.

(b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.22(A) for the appropriate cable tray width.

(c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the calculation in Column 2 of Table 392.22(A) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

(2) Where a ladder or ventilated trough cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 50 percent of the interior cross-sectional area of the cable tray. A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(3) Where solid bottom cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(a) Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed 90 percent of the cable tray width, and the cables shall be installed in a single layer.

(b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 3 of Table 392.22(A) for the appropriate cable tray width.

(c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the computation in Column 4 of Table 392.22(A) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

(4) Where a solid bottom cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 40 percent of the interior cross-sectional area of the cable tray. A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(5) Where ventilated channel cable trays contain multiconductor cables of any type, the following shall apply:

(a) Where only one multiconductor cable is installed, the cross-sectional area shall not exceed the value specified in Column 1 of Table 392.22(A)(5).

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cables shall not exceed the value specified in Column 2 of Table 392.22(A)(5).

Table 392.22(A)(5) Allowable Cable Fill Area for Multiconductor Cables in Ventilated

Channel Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Multiconductor Cables					
Inside Width of Cable Tray Column 2					
Column 1 2 More Than		One Cable		One Cable	
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$
75	3	1500	2.3	850	1.3
100	4	2900	4.5	1600	2.5
150	6	4500	7.0	2450	3.8

(6) Where solid channel cable trays contain multiconductor cables of any type, the following shall apply:

(a) Where only one multiconductor cable is installed, the cross-sectional area of the cable shall not exceed the value specified in Column 1 of Table 392.22(A)(6).

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cable shall not exceed the value specified in Column 2 of Table 392.22(A)(6).

Table 392.22(A) Allowable Cable Fill Area for Multiconductor Cables in Ladder, Ventilated Trough, or Solid Bottom Cable Trays for Cables Rated 2000 Volts

or Less

Maximum Allowable Fill Area for Multiconductor Cables									
Ladder or Ventilated Trough Cable Trays, 392.22(A)(1)				Solid Bottom Cable Trays, 392.22(A)(3)					
Column 1		Column 3	Column 4[a]						
Inside Width of Cable Tray	Applicable for 392.22(A)(1)(b) Only	Column 2[a] Applicable for		Applicable for 392.22(A)(1)(c) Only		Applicable for 392.22(A)(3)(b) Only		392.22(A)(3)(c) Only	
mm	in.	mm^2	in^{-2}	mm^2	$in.^2$	mm^2	in^{-2}	mm^2	in^{-2}
150	**6.0**	**4,500**	**7.0**	**4,500 – (30 Sd)[b]**	**7– (1.2 Sd)[b]**	**3,500**	**5.5**	**3,500–(25 Sd[b])**	**5.5–Sd[b]**
225	9.0	6,800	10.5	6,800 – (30 Sd)	10.5– (1.2 Sd)	5,100	8.0	5,100–(25 Sd)	8.0–Sd
300	12.0	9,000	14.0	9,000 – (30 Sd)	14– (1.2 Sd)	7,100	11.0	7,100–(25 Sd)	11.0–Sd
450	18.0	13,500	21.0	13,500 – (30 Sd)	21– (1.2 Sd)	10,600	16.5	10,600–(25 Sd)	16.5–Sd
600	24.0	18,000	28.0	18,000 – (30 Sd)	28– (1.2 Sd)	14,200	22.0	14,200–(25 Sd)	22.0–Sd
750	30.0	22,500	35.0	22,500 – (30 Sd)	35– (1.2 Sd)	17,700	27.5	17,700–(25 Sd)	27.5–Sd
900	36.0	27,000	42.0	27,000 – (30 Sd)	42– (1.2 Sd)	21,300	33.0	21,300–(25 Sd)	33.0–Sd

[a]The maximum allowable fill areas in Columns 2 and 4 shall be calculated. For example, the maximum allowable fill in mm^2 for a 150-mm wide cable tray in Column 2 shall be 4500 minus (30 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 7 minus (1.2 multiplied by Sd)].

[b]The term Sd in Columns 2 and 4 is equal to the sum of the diameters, in mm, of all cables 107.2 mm (in inches, of all 4/0 AWG) and larger multiconductor cables in the same cable tray with smaller cables.

Table 392.22(A)(6) Allowable Cable Fill Area for Multiconductor

Cables in Solid Channel

Cable Trays for Cables Rated 2000 Volts or Less

Column 2 Inside Width of Cable Tray		Column 1 More than One Cable		One Cable	
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$
50	2	850	1.3	500	0.8
75	3	1300	2.0	700	1.1
100	4	2400	3.7	1400	2.1
150	6	3600	5.5	2100	3.2

(B) Number of Single-Conductor Cables, Rated 2000 Volts or Less, in Cable Trays.
The number of single-conductor cables, rated 2000 volts or less, permitted in a single cable tray section shall not exceed the requirements of this section. The single conductors, or conductor assemblies, shall be evenly distributed across the cable tray. The conductor sizes herein apply to both aluminum and copper conductors.

(1) Where ladder or ventilated trough cable trays contain single-conductor cables, the maximum number of single conductors shall conform to the following:

(a) Where all of the cables are 1000 kcmil or larger, the sum of the diameters of all single-conductor cables shall not exceed cable tray width, and the cables shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

(b) Where all of the cables are from 250 kcmil through 900 kcmil, the sum of the cross-sectional areas of all single-conductor cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.22(B)(1) for the appropriate cable tray width.

(c) Where 1000 kcmil or larger single-conductor cables are installed in the same cable tray with single-conductor cables smaller than 1000 kcmil, the sum of the cross-sectional areas of all cables smaller than 1000 kcmil shall not exceed the maximum allowable fill area resulting from the computation in Column 2 of Table 392.22(B)(1) for the appropriate cable tray width.

(d) Where any of the single conductor cables are 1/0 through 4/0 AWG, the sum of the diameters of all single conductor cables shall not exceed the cable tray width.

The sum of the diameters of single-conductor and multiconductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer. Where single conductor cables are triplexed, quadruplexed, or bound together in circuit groups, the sum of the diameters of the single conductors shall not exceed the cable tray width, and these groups shall be installed in single layer arrangement.

1.30 Securing and Supporting

(A) Securely Fastened. In other than horizontal runs, the cables shall be fastened securely to transverse members of the cable trays.

(B) Supports. Supports shall be provided to prevent stress on cables where they enter raceways or other enclosures from cable tray systems.

Cable trays shall be supported at intervals in accordance with the installation instructions.

392.46 Bushed Conduit and Tubing. A box shall not be required where cables or conductors are installed in bushed conduit and tubing used for support or for protection against physical damage.

392.56 Cable Splices.
Cable splices made and insulated by approved methods shall be permitted to be located within a cable tray, provided they are accessible. Splices shall be permitted to project above the side rails where not subject to physical damage.

392.60 Grounding and Bonding.

(A) Metallic Cable Trays. Metallic cable trays shall be permitted to be used as equipment grounding conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system and the cable tray complies with provisions of this section. Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and Part IV of Article 250.

(B) Steel or Aluminum Cable Tray Systems. Steel or aluminum cable tray systems shall be permitted to be used as equipment grounding conductors, provided all the following requirements are met:

(1) The cable tray sections and fittings are identified as an equipment grounding conductor.

(2) The minimum cross-sectional area of cable trays conform to the requirements in Table 392.60(A).

(3) All cable tray sections and fittings are legibly and durably marked to show the cross-sectional area of metal in channel cable trays, or cable trays of one-piece construction and the total cross-sectional area of both side rails for ladder or trough cable tray.

(4) Cable tray sections, fittings, and connected raceways are bonded in accordance with 250.96, using bolted mechanical connectors or bonding jumpers sized and installed in accordance with 250.102.

Table 392.22(B)(1) Allowable Cable Fill Area for Single-Conductor Cables in Ladder of Ventilated Trough Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Single-Conductor Cables Inside Width in Ladder or Ventilated Trough Cable Trays of Cable Tray Applicable for 392.22(B)(1)(b) Only		Column 1 Applicable for 392.22(B)(1)(c) Only		Column 2[a]	
mm	in.	mm^2	$in.^2$	mm^2	$in.^2$
150	6	4,200	6.5	4,200 – (28 Sd)[b]	6.5 – (1.1 Sd)[b]
225	9	6,100	9.5	6,100 – (28 Sd)	9.5 – (1.1 Sd)
300	12	8,400	13.0	8,400 – (28 Sd)	13.0 – (1.1 Sd)
450	18	12,600	19.5	12,600 – (28 Sd)	19.5 – (1.1 Sd)
600	24	16,800	26.0	16,800 – (28 Sd)	26.0 – (1.1 Sd)
750	30	21,000	32.5	21,000 – (28 Sd)	32.5 – (1.1 Sd)
900	36	25,200	39.0	25,200 – (28 Sd)	39.0 – (1.1 Sd)

[a]The maximum allowable fill areas in Column 2 shall be calculated. For example, the maximum allowable fill, in mm^2, for a 150 mm wide cable tray in Column 2 shall be 4200 minus (28 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 6.5 minus (1.1 multiplied by Sd)].

[b]The term Sd in Column 2 is equal to the sum of the diameters, in mm, of all cables 507 mm^2 (in inches, of all 1000 kcmil) and larger single-conductor cables in the same ladder or ventilated trough cable tray with small cables.

(2) Where 50 mm (2 in.), 75 mm (3 in.), 100 mm (4 in.), or 150 mm (6 in.) wide ventilated channel cable trays contain single-conductor cables, the sum of the diameters of all single conductors shall not exceed the inside width of the channel.

(C) Number of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.
The number of cables rated 2001 volts or over permitted in a single cable tray shall not exceed the requirements of this section.

Table 392.60(A) Metal Area Requirements for Cable Trays Used as Equipment Grounding Conductor

Maximum Fuse Ampere Rating, Circuit Breaker Ampere Trip Setting, or Circuit Breaker Protective Relay Ampere Trip Setting for Ground-Fault Protection of Any Cable Circuit in the Cable Tray System	Minimum Cross-Sectional Area of Metal[a] Steel Cable Trays		Aluminum Cable Trays	
	mm^2	$in.^2$	mm^2	$in.^2$
60			129	0.20
100			129	0.20
200	258	0.40	129	0.20
400	451.5	0.70	129	0.20
600	645	1.00	258	0.40
1000	967.5	1.50[b]	258	0.40
1200	---	---	387	0.60
1600	---	---	645	1.00
2000	---	---	967.5	1.50
	---	---	1290	2.00[b]

[a]Total cross-sectional area of both side rails for ladder or trough cable trays; or the minimum cross-sectional area of metal in channel cable trays or cable trays of one-piece construction.
[b]Steel cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 2000 amperes.

392.80 Ampacity of Conductors

(A) Ampacity of Cables, Rated 2000 Volts or Less, in Cable Trays.

(1) The allowable ampacity of multiconductor cables, nominally rated 2000 volts or less, installed according to the requirements of 392.22(A) shall be as given in Table 310.16 and Table 310.18, subject to the provisions of (1), (2), (3), and 310.15(A)(2).

(a) The derating factors of 310.15(B)(2)(a) shall apply only to multiconductor cables with more than three current-carrying conductors. Derating shall be limited to the number of current-carrying conductors in the cable and not to the number of conductors in the cable tray.

(b) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not over 95 percent of the allowable ampacities of Table 310.16 and Table 310.18 shall be permitted for multiconductor cables.

(c) Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0 through 2000 volts in free air, in accordance with 310.15(C).

FPN: See Table B.310.3.

(2) The allowable ampacity of single-conductor cables shall be as permitted by 310.15(A)(2). The derating factors of 310.15(B)(2)(a) shall not apply to the ampacity of cables in cable trays. The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), nominally rated 2000 volts or less, shall comply with the following:

(a) Where installed according to the requirements of 392.22(B), the ampacities for 600 kcmil and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the allowable ampacities in Table 310.17 and Table 310.19.

(b) Where installed according to the requirements of 392.22(B), the ampacities for 1/0 AWG through 500 kcmil single-conductor cables in uncovered cable trays shall not exceed 65 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the allowable ampacities in Table 310.17 and Table 310.19.

(c) Where single conductors are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.17 and Table 310.19.

Exception to (2)(c): For solid bottom cable trays the ampacity of single conductor cables shall be determined by 310.15(C).

(d) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free airspace of not less than 2.15 times one conductor diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities of two or three single insulated conductors rated 0 through 2000 volts supported on a messenger in accordance with 310.15(B).

FPN: See Table 310.20.

(3) Where a cable tray contains a combination of multiconductor and single-conductor cables, the allowable ampacities shall be as given in 392.17(A)(1) for multiconductor cables and 392.17(A)(2) for single-conductor cables, provided that the following conditions apply:

(a) The sum of the multiconductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.22(A), and the single-conductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.22(B), totals not more than 100 percent.

(b) Multiconductor cables are installed according to 392.22(A) and single-conductor cables are installed according to 392.22(B) and 392.10(M) and (N).

(B) Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.

The ampacity of cables, rated 2001 volts, nominal, or over, installed according to 392.22(C) shall not exceed the requirements of this section.

(1) The allowable ampacity of multiconductor cables shall be as given in Table 310.75 and Table 310.76, subject to the following provisions:

(a) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not more than 95 percent of the allowable ampacities of Table 310.75 and Table 310.76 shall be permitted for multiconductor cables.

(b) Where multiconductor cables are installed in a single layer in uncovered cable trays, with maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Table 310.71 and Table 310.72.

(2) The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), shall comply with the following:

(a) The ampacities for 1/0 AWG and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.69 and Table 310.70. Where the cable trays are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the allowable ampacities in Table 310.69 and Table 310.70.

(b) Where single-conductor cables are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.69 and Table 310.70.

(c) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free air space of not less than 2.15 times the diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.67 and Table 310.68.

Substantiation: The following proposal affirms the intent of CMP-8's CP804 action. This proposal adds usability and clarity for the reader by adding two distinguishing subdivisions and relocating one subdivision to create enhanced parallel structure to other NEC Code Articles. No new content is proposed other than the addition of the two subdivisions. Specifically, this proposal includes:

· Add subdivision 392.18 titled "Cable Tray Installation". Move paragraphs

392.10(E) – 392.10(K) to sub-paragraphs of 392.18. The numbering of this subdivision was selected to parallel Article 300's section 300.18 "Raceway Installation."

· Add subdivision 392.19 titled "Cable Installation". Move paragraphs 392.10(L)-392(N) to sub-paragraphs of 392.19. The numbering of this subdivision was selected to parallel Article 300's section 300.19 "Supporting Conductors in Vertical Raceways."

· Re-number subdivision 392.17 "Ampacity of Conductors" to 392.80. This change makes the numbering of this subdivision correspond to the numbering system in Cable Articles 320, 328, 330, 332, 334, 336, and 340.

Panel Meeting Action: Accept in Principle

Panel Statement: The submitter's intent is met with panel action on Comment 8-100a.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-121 Log #1796 NEC-P08 **Final Action: Accept in Part**
(392.10(K) and 392.60(B)(4))

Submitter: Michael P. Walls, American Chemistry Council

Comment on Proposal No: 8-235a

Recommendation: This comment involves editing of both 392.10(K) and 392.60(B)(4).

392.10(K) Raceways, Cables, Boxes, and Conduit Bodies Supported from Cable Tray Systems. In industrial facilities where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable tray systems are designed and installed to support the load, such systems shall be permitted to support raceways and cables, and boxes and conduit bodies covered in 314.1. For raceways terminating at the tray, the raceway ~~a listed cable tray clamp or adapter~~ shall be ~~used to~~ securely fastened ~~the raceway~~ to the cable tray system.

Additional supporting and securing of the raceway shall be in accordance with the requirements of the appropriate raceway article.

392.60(B)(4) Cable tray sections, fittings, and connected raceways are bonded in accordance with 250.96, using listed cable tray clamps or adapters, bolted mechanical connectors or bonding jumpers sized and installed in accordance with 250.102.

Substantiation: This comment affirms the intent of CMP-8's CP804 action. This comment adds usability and clarity for the reader by locating information under the relevant title or subtitle. No new content is proposed other than the relocation of the requirement for the listed cable tray clamp or adapter from 392.10(K) to 392.60(B)(4).

The primary intent of 392.10(K) is to prescribe supporting requirements of raceways, cables, boxes and conduit bodies from cables trays. Furthermore, the intent of 392.60(B) is to prescribe Grounding and bonding requirements of cable tray. Because listed cable tray clamps or adapters are listed by NRTLs based on their suitability for grounding and bonding, then the requirement for the use of listed cable tray clamps or adapters belongs in the section related to grounding and bonding rather than the section related to supporting from cable tray systems.

Panel Meeting Action: Accept in Part

Panel Statement: The panel accepts the proposed title to 392.10(K) per Proposal 8-235a, as indicated in new section 392.18(G) per panel action on Comment 8-8-100a. The rest of the comment was rejected because the proposed text is appropriate for 392.18(G). Listed clamps are available.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-122 Log #747 NEC-P08 **Final Action: Accept**
(392.11(A))

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 8-271

Recommendation: The Proposal should be Accepted in Principle and the text revised as follows:

In 392.17(A)(1) [formerly 392.11(A)], change "Table 310.16 and Table 310.18" to "Table 310.15(B)(16) and Table 310.15(B)(18)".

In 392.17(A)(1)(b) [formerly 392.11(A)(2)], change "Table 310.16 and Table 310.18" to "Table 310.15(B)(16) and Table 310.15(B)(18)".

Substantiation: This will correlate with the Panel Actions on Proposals 6-52 and 8-235a.

Panel Meeting Action: Accept

Panel Statement: See panel action on Comment 8-100a.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-123 Log #748 NEC-P08 **Final Action: Accept**
(392.11(B))

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 8-273

Recommendation: The Proposal should be Accepted in Principle with the following revisions:

In 392.17(A)(2)(a) [formerly 392.11(B)(1)], change "Table 310.17" to "Table 310.15(B)(17)" and change "Table 310.19" to "Table 310.15(B)(19)" in two places.

In 392.17(A)(2)(b) [formerly 392.11(B)(2)], change "Table 310.17" to "Table 310.15(B)(17)" and change "Table 310.19" to "Table 310.15(B)(19)" in two places.

In 392.17(A)(2)(c) [formerly 392.11(B)(3)], change "Table 310.17" to "Table 310.15(B)(17)" and change "Table 310.19" to "Table 310.15(B)(19)".

In 392.17(A)(2)(d) FPN [formerly 392.11(B)(4) FPN], change "Table 310.20" to "Table 310.15(B)(20)".

Substantiation: This will correlate with the Panel Actions on Proposals 6-52 and 8-235a.

Panel Meeting Action: Accept

Panel Statement: See panel action on Comment 8-100a.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-124 Log #365 NEC-P08 **Final Action: Accept**
(392.11(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 8-274

Recommendation: Continue to accept the proposal.

Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-125 Log #749 NEC-P08 **Final Action: Accept**
(392.13)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 8-275

Recommendation: The Proposal should be Accepted in Principle with the following revisions:

In 392.17(B)(1) [formerly 392.13(A)], change "Table 310.75 and Table 310.76" to "Table 310.60(C)(75) and Table 310.60(C)(76)".

In 392.17(B)(1)(a) [formerly 392.13(A)(1)], change "Table 310.75 and Table 310.76" to "Table 310.60(C)(75) and Table 310.60(C)(76)".

In 392.17(B)(1)(b) [formerly 392.13(A)(2)], change "Table 310.71 and Table 310.72 to "Table 310.60(C)(71) and Table 310.60(C)(72)"

In 392.17(B)(2)(a) [formerly 392.13(B)(1)], change "Table 310.69 and Table 310.70" to "Table 310.60(C)(69) and Table 310.60(C)(70)" in two places.

In 392.17(B)(2)(b) [formerly 392.13(B)(2)], change "Table 310.69 and Table 310.70" to "Table 310.60(C)(69) and Table 310.60(C)(70)".

In 392.17(B)(2)(c) [formerly 392.13(B)(3)], change "Table 310.67 and Table 310.68" to "Table 310.60(C)(67) and Table 310.60(C)(68)".

Substantiation: This will correlate with the Panel Actions on Proposals 6-123 and 8-235a.

Panel Meeting Action: Accept

Panel Statement: See panel action on Comment 8-100a.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11

Ballot Not Returned: 1 Griffith, M.

8-126 Log #1063 NEC-P08 **Final Action: Reject**
(392.60 [old 392.7])

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Telecommunications Industry Solutions (ATIS)

Comment on Proposal No: 8-235a

Recommendation: Restore title of 392.60 (old 392.7) to "**392.60 Grounding**" by deleting the text "and Bonding".

Substantiation: The Panel Action on this proposal should have been "Accept in Part". The revision to add "and Bonding" to the title of 392.60 (old 392.7) should not have been accepted. The section currently requires: "Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and Part IV of Article 250". They are to be bonded only if being used as grounding conductors, per 250.96.

Further, if they are grounded (the text implies that all sections shall be grounded), then they are also 'bonded' via the grounding conductors; requiring additional 'bonding' is redundant.
Panel Meeting Action: Reject
Panel Statement: Grounding and bonding are requirements within 392.60.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

8-127 Log #684 NEC-P08 **Final Action: Reject**
(392.120)

Submitter: Paul E. Guidry, Fluor Enterprises, Inc. / Rep. Associated Builders and Contractors
Comment on Proposal No: 8-260
Recommendation: 392.120 Marking. Cable trays containing conductors rated over 600 volts shall have a permanent, legible warning notice carrying the wording "DANGER- HIGH VOLTAGE" placed in a readily visible position on all cable trays with maximum spacing of warning notices not to exceed ~~3m (10 ft)~~ 6 m (20 ft).
Substantiation: As a member of the task group that originated this proposal, I agree that marking high voltage cable trays adds a safety component; however, I feel like 3m (10) ft. is excessive. Most high voltage cables run several hundred or even several thousand feet through cable trays. Some runs are as long as a mile (5,280 ft) or more in refineries and petrochemical plants. On a mile long run, there would be 528 signs required. Pipe supports are typically spaced every 6m (20 ft). I believe one sign per bay is sufficient.
Panel Meeting Action: Reject
Panel Statement: The panel continues to support the Task Group's recommendation for spacing of 10 ft.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

ARTICLE 394 — CONCEALED KNOB-AND-TUBE WIRING

7-60 Log #124 NEC-P07 **Final Action: Accept**
(394.12(4))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-152
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comment expressed in the voting.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel agrees that the original language in the NEC 2008 is appropriate and rejects the original proposal.
Panel Statement: The panel agrees with the negative comment that Knob and Tube wiring is an obsolete wiring method and is restricted in use. The 2008 language in Section 394.12 "uses not permitted" (4) restricting knob and tube from hazardous locations is appropriate.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 396 — MESSENGER SUPPORTED WIRING

7-61 Log #1562 NEC-P07 **Final Action: Reject**
(396.12)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-155
Recommendation: Accept the proposal.
Substantiation: See the Explanation of Negative Vote for Proposal 7-9, 320.12(1) in the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 7-2.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-62 Log #2593 NEC-P07 **Final Action: Reject**
(396.30(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 7-158
Recommendation: Accept the proposal.
Substantiation: The panel statement is not responsive. In Article 225, 225.4 Exception will only allow a bare messenger to be used as a grounded circuit conductor if another NEC location specifically recognizes this use. Article 250 does not meet this criterion because although 250.32(B) Exception allows a regrounded neutral in a limited circumstance, nothing in that wording permits the neutral to be uninsulated. That brings us to 396.30(B) which goes back to 225.4 Exception. If the messenger were insulated (obviously not practical) one could make the argument that 396.30(C) would allow the messenger for this purpose because 250.32(B) is mentioned, but for an uninsulated messenger we are left with no literal permission in the NEC. The proposal solves the problem once and for all with a simple declarative sentence.
Panel Meeting Action: Reject
Panel Statement: The panel agrees with the original proposal that the language in 225.4 allowing a bare neutral is actually contained within the exception. That exception does indicate that bare neutrals are only allowable if specifically mentioned in other parts of the Code. Article 250.32 (B) "Exception" allows such installations and is specific to existing premises wiring systems. The existing language in 396.30(B) is sufficient. If a reference to 250.32(B) Exception is necessary then such a reference should be located in the language of the exception to 225.4.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 399 — OUTDOOR, OVERHEAD CONDUCTORS, OVER 600 VOLTS

7-63 Log #125 NEC-P07 Final Action: Accept
(399)

TCC Action: The Technical Correlating Committee advises that article scope statements are the responsibility of the Technical Correlating Committee and agrees with the panel's suggested revision to the Article scope.

The Technical Correlating Committee revises the panel's action on new Article 399 to comply with 3.1.3, 3.2.1, and 3.3.5 of the NEC Style Manual with the text to read as follows:

"Article 399 Outdoor, Overhead Conductors, Over 600 Volts, Nominal

399.1 Scope. This article covers the use, and installation for outdoor, overhead conductors, over 600 volts, nominal.

399.2 Definition.

Outdoor Overhead Conductors. Single conductors, insulated, covered, or bare, installed outdoors on support structures.

399.10 Uses Permitted. Outdoor overhead conductors, over 600 volts, nominal, shall be permitted only for systems rated over 600 volts, nominal as follows:

(1) Outdoors
(2) For service conductors, feeders or branch circuits

Informational Note: For additional information on outdoor overhead conductors over 600 volts, see ANSI/IEEE C2-2007, National Electrical Safety Code.

399.12 Uses Not Permitted. Overhead conductors, over 600 volts, nominal shall not be permitted to be installed indoors.

399.30 Support.

(A) Conductors. Documentation of the engineered design by a licensed professional engineer engaged primarily in the design of such systems for the spacing between conductors shall be available upon request of the authority having jurisdiction and shall include the following:
(1) Applied voltage.
(2) Conductor size.
(3) Distance between support structures.
(4) Type of structure.
(5) Wind loading.
(6) Ice loading.
(7) Surge protection.

(B) Structures. Structures of wood, metal, concrete or combinations of those materials shall be provided for support of overhead conductors, over 600 volts, nominal. Documentation of the engineered design by a licensed professional engineer engaged primarily in the design of such systems and the installation of each support structure shall be available upon request of the authority having jurisdiction and shall include the following:
(1) Soil conditions.
(2) Foundations and structure settings.
(3) Weight of all supported conductors and equipment.
(4) Weather loading and other conditions such as ice, wind, temperature, and lightning.

(5) Angle where change of direction occurs.
(6) Spans between adjacent structures.
(7) Effect of dead end structures.
(8) Strength of guys and guy anchors.
(9) Structure size and material(s).
(10) Hardware.
(C) Insulators. Insulators used to support conductors shall be rated for all of the following:
(1) The applied phase to phase voltage.
(2) Mechanical strength required for each individual installation.
(3) Impulse Withstand BIL in accordance with Table 490.24.
Informational Note: 399.30 (A), (B), and (C) may not be all inclusive lists."
Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 7-162
Recommendation: The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the panel action.

In addition, the Technical Correlating Committee assigns this material as Article 399.

The Technical Correlating Committee directs that the panel clarify the panel action on this proposal relative to the NEC Style Manual and statements expressed in the ballots.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel accepts the removal of the wording "Over 600 Volts" from the definition.

The panel revised 399.10 Uses Permitted (2) as follows: For service conductors, feeders or branch circuits
Panel Statement: The panel recommends that the TCC revise the scope as follows:
This article covers the use, and installation ~~and construction specifications~~ for outdoor, overhead conductors, over 600 volts.

The panel has reviewed the negative comments and provided changes in the panel action.
The panel does not agree with the negative comment No.4 with regard to 399.12. Conductors over 600 volts installed indoors are covered elsewhere in the NEC.

See panel action on Comment 7-67 for concerns on 399.30(A), (B), and (C).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:

FAHRENTHOLD, C.: Article 90.1 (C) clearly states that the NEC is not intended as a design specification.

7-64 Log #1390 NEC-P07 **Final Action: Reject**
(399)

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 7-162
Recommendation: Please reconsider and reject this proposal.
Substantiation: The proposal provides benefits for the inclusion of medium and high voltage substation and premises wiring installation requirements in the NEC. However, bringing NESC requirements into the NEC without the context of NESC basic provisions that are considered necessary for the safety of qualified personnel and the public under the specified conditions will result in an incomplete or unsafe installation.

We recommend and it may be more appropriate to create a task force to consider these items in a general area such as Article 110. For example, requirements for an electric substation apply to both outdoor and indoor applications and do not fall under the scope of Article 225. These requirements should be considered in a more general area.

We recommend a new article be written for Chapter 1 (possibly Article 120, entitled "Requirements for Electrical Installations over 600 Volts") that incorporates these concepts and integrates existing NEC text.
Panel Meeting Action: Reject
Panel Statement: The panel was assigned Article 399 by the TCC.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:

RAY, J.: EEI believes it is beneficial to provide medium and high voltage premises substation and wiring installation requirements in the NEC. Although the TCC has directed the work from the High Voltage Task Force be added as a new article, it would be appropriate to consider other options for including these recommendations in the NEC. Including these requirements in a general area such as Chapter 1 should be considered.

7-65 Log #1975 NEC-P07 **Final Action: Accept in Part**
(399)

Submitter: Neil F. LaBrake, Jr., National Grid USA
Comment on Proposal No: 7-162
Recommendation: Delete 399.30 of the proposed article and add an informational note to 399.10 as follows.
Informational Note: For additional information on outdoor overhead conductors over 600 volts, see ANSI/IEEE C2-2007, *National Electrical Safety Code*.
Substantiation: Making National Electrical Safety Code (NESC) performance requirements into prescriptive requirements of the NEC is counterproductive. High voltage installations require engineering supervision. Informational note references to the NESC are suggested as a means to guide installers and inspectors upon plan review of engineered designs for high voltage installations. For further information regarding this comment, please refer to the article on "Connecting Premises Wiring to Supply Lines" published by the International Association of Electrical Inspectors in their September/October 2009 magazine (http://www.iaei.org/magazine/?p=4329#more-4329) on page 93.
Panel Meeting Action: Accept in Part

The panel accepts the informational note inserted after 399.10 as follows:
Informational Note: For additional information on outdoor overhead conductors over 600 volts, see ANSI/IEEE C2-2007, *National Electrical Safety Code*.
Panel Statement: The panel accepts the addition of the informational note and rejects the remainder of the comment. See the panel action and statement on comment 7-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:

RAY, J.: See statement on comment 7-64.

7-66 Log #2594 NEC-P07 **Final Action: Accept in Principle**
(399 (New))

TCC Action: The Technical Correlating Committee advises that article scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the panel action.

See the Technical Correlating Committee action on Comment 7-63.

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 7-162
Recommendation: Accept the proposal in principle.and make the following changes:

1. Combine the scope and the definition by deleting 399.2 and rewording the scope as follows:
399.1. Scope. This article covers the use, installation, and field construction specifications for ~~outdoor, overhead conductors,~~ systems operating over 600 volts using single conductors, whether insulated, covered, or bare, that are installed as open wiring overhead in outdoor locations on support structures.
II. Reword 399.10 to read as follows:
399.10. Uses Permitted. Outdoor, overhead conductors operating over 600 volts shall be permitted ~~only~~ for outdoor overhead service conductors, and for feeders and branch circuits, on systems operating over 600 volts.
III. Reword 399.12 to read as follows:
399.12. Uses Not Permitted. Outdoor, overhead conductors, over 600 volts shall not be extended inside a building unless converted to another wiring method in Chapter 3, or, where accessible only to qualified persons, continued as open wiring, all in accordance with 300.37.
IV. Insert parent language in 399.30 ahead of the three subsections reading as follows:
399.30. Support. Outdoor, overhead conductors operating over 600 volts shall meet any specified clearance requirements as applicable in 225.60 and 225.61. The engineering design for the system as covered in (A), (B), and (C) shall be documented and the documentation shall be made available to the authority having jurisdiction.
Then, change the lead-in wording for (A) to read "The spacing design shall demonstrate compliance with accepted national standards." Change the second sentence of the lead-in wording for (B) to read "The structure design and the clearances to be obtained by that design shall demonstrate compliance with accepted national standards."
Substantiation: I. There are numerous problems with the first two sections, especially the definition that defines the term using the term in direct violation of the NEC Style Manual at 2.2.2. The submitter understands that specific approval of the TCC will be required to make this change but it is far more readable and not at all circular. By inserting the word "field" we address the concern in the voting that this is some sort of construction specification for manufactured components, which it is not, but referencing field issues such as how high to build the support structures. The "open wiring" phrase was added to clarify that this article does not regulate single conductors operating outdoors over 600 volts and running overhead in a cable tray or something comparable.

II. The word "only" is problematic because it creates an implication that the use of this type of distribution cannot be used for 600-volt systems and lower. In fact, only the application of this article is limited to over 600-volt systems. The terminology on service work is rephrased to "overhead service conductors" to reflect changes in definitions now occurring under the supervision of CMP 4. The list format is not particularly helpful when it only contains two items and the concepts are easily presented in a simple sentence.
III. The ROP wording makes no sense because outdoor wiring that is not outdoors is not outdoor wiring. It is impossible to violate the section as written. In addition, as pointed out in the voting, forms of this wiring are used indoors. The rewritten text addresses these issues.
IV. The new parent language incorporates the specific clearances required in Part III of Article 225. In addition, it avoids the necessity for repeating the rule for making documentation available to the AHJ. The language suggested for (A) and (B) partially addresses the concern in the voting with respect to enforceability. The terminology "accepted national standards" is taken from the last sentence of 490.24, which involves similar concerns.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 7-67 and 7-63.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
RAY, J.: See statement on comment 7-64.

7-67 Log #1417 NEC-P07 **Final Action: Accept in Principle in Part (399.30)**

Submitter: Dennis A. Nielsen, Lawrence Berkeley National Laboratory / Rep. Institute of Electrical & Electronic Engineers, Inc.
Comment on Proposal No: 7-162
Recommendation: Continue to Accept the Panel Action except for the following indicated revisions.
399.30 Support.
(A) Conductors. Documentation of the ~~qualified~~ engineered design by a qualified engineer for the spacing ~~design~~ between conductors shall be available upon request of the authority having jurisdiction and shall include consideration of the following:
(1) Applied voltage.
(2) Conductor size.
(3) Distance between support structures.
(4) Type of structure.
(5) Wind/Ice loading.
(6) Surge protection
(B) Structures. Structures of wood, metal, concrete or combinations of those materials shall be provided for support of overhead conductors, over 600 volts. Documentation of the ~~qualified~~ engineered design by a qualified engineer and the installation of each support structure shall be available upon request of the authority having jurisdiction and shall include consideration of the following:
(1) Soil conditions.
(2) Foundations and structure settings.
(3) Weight of all supported conductors and equipment.
(4) Weather loading and other conditions (ice, wind, temperature, lightning. etc.),
(5) Angle where change of direction occurs.
(6) Spans between adjacent structures.
(7) Effect of dead end structures.
(8) Strength of guys and guy anchors.
(9) Structure size and material(s).
(10) Hardware.
(C) Insulators. Insulators used to support conductors shall be rated for all of the following:
(1) The applied phase to phase voltage.
(2) Mechanical strength required for each individual installation.
(3) Impulse Withstand BIL in accordance with Table 490.24.
Substantiation: 1. From the panel discussion it is understood that the term "qualified engineered design" is intended to mean designed by a qualified engineer.
2. It is also understood that other factors may need to be considered such as surge protection, lightning protection, etc.
Panel Meeting Action: Accept in Principle in Part
Continue to Accept the Panel Action except for the following indicated revisions.
399.30 Support.
(A) Conductors. Documentation of the ~~qualified~~ engineered design by a licensed professional engineer engaged primarily in the design of such systems for the spacing ~~design~~ between conductors shall be available upon request of the authority having jurisdiction and shall include consideration of the following:
(1) Applied voltage.
(2) Conductor size.
(3) Distance between support structures.
(4) Type of structure.
(5) Wind/Ice loading.
(6) Surge protection
(B) Structures. Structures of wood, metal, concrete or combinations of those materials shall be provided for support of overhead conductors, over 600 volts. Documentation of the ~~qualified~~ engineered design by a licensed professional engineer engaged primarily in the design of such systems and the installation of each support structure shall be available upon request of the authority having jurisdiction and shall include consideration of the following:
(1) Soil conditions.
(2) Foundations and structure settings.
(3) Weight of all supported conductors and equipment.
(4) Weather loading and other conditions such as but not limited to ice, wind, temperature, and lightning.
(5) Angle where change of direction occurs.
(6) Spans between adjacent structures.
(7) Effect of dead end structures.
(8) Strength of guys and guy anchors.
(9) Structure size and material(s).
(10) Hardware.
(C) Insulators. Insulators used to support conductors shall be rated for all of the following:
(1) The applied phase to phase voltage.
(2) Mechanical strength required for each individual installation.
(3) Impulse Withstand BIL in accordance with Table 490.24.
Informational Note: 399.30 (A), (B), and (C) are not all inclusive lists
Panel Statement: The panel agrees in part with the submitter's comment.
The panel accepts parts 399.30(A) (6) and (B) (4) (and other conditions), (lightning). The panel accepts the remainder of the comment in principle; refer to the panel action for revised text.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
FAHRENTHOLD, C.: This proposal should have beeen rejected at the proposal stage. This work is covered by the National Electrical Safey Code which has been adopted by many states and municipalities. This article merely adds volume to the code without any substance and in ROC 7-65 that reference is added in an informational note.
NIELSEN, D.: The Panel should have accepted Comment 7-67 as submitted. The panel's change of the word "qualified" to "licensed professional" introduces a new requirement without public review. The term "licensed professional" is used by the state and or local jurisdiction for regulating the engineering practice. The intent of the original comment was to ensure that the engineer is qualified in providing an engineered design.
RAY, J.: See statement on comment 7-64.

ARTICLE 400 — FLEXIBLE CORDS AND CABLES

6-79a Log #CC602 NEC-P06 **Final Action: Accept (Table 400.4)**

Submitter: Code-Making Panel 6,
Comment on Proposal No: 6-140
Recommendation: Reject the portion of the panel action that removes 12 AWG and associated insulation thicknesses (2.41 mm and 95 mils) for Type HPN.
Substantiation: The panel failed to note that the insulation thickness for #12 AWG HPN is 95 mils (2.41mm) when they acted on Proposal 6-140. The recommendation corrects that oversight.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-80 Log #2180 NEC-P06 **Final Action: Reject (Table 400.4, 400.5(A), and 400.6)**

Submitter: Wayne E. Morris, Association of Home Appliance Manufacturers
Comment on Proposal No: 6-142
Recommendation: The Code-Making Panel should accept Proposal 6-142.
Substantiation: The original substantiation for this proposal provides evidence of the suitability of an SBST cord. Addition of this material to the NEC will allow manufacturers greater options in selecting materials while maintaining safety.
Panel Meeting Action: Reject
Panel Statement: The Submitter has not provided any additional substantiation that addresses the issues that were made in the Panel's Statement on the proposal.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-81 Log #126 NEC-P06 **Final Action: Accept**
(400.5)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 6-145
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal related to the action taken on Proposal 6-150.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel action on Proposal 6-145 modifies the panel action on Proposal 6-150. The ROP draft is correct.
Panel Statement: The panel accepts that the action taken on Proposal 6-150 should have been accept in principle. See action and statement on Proposal 6-145.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-82 Log #2414 NEC-P06 **Final Action: Reject**
(400.8(4))

Submitter: Michael Flegel, Reliance Controls Corporation
Comment on Proposal No: 6-156
Recommendation: Accept the proposal.
Substantiation: I can see where a power supply cord connected to a building is not safe because it always under power. A power cord from a portable generator to a building which is eventually connected to a transfer switch, is not live until the generator is connected. When the cord is not connected to the generator, it has no power. If the cord is damaged and people come into contact with it, they will not be injured.
Panel Meeting Action: Reject
Panel Statement: The panel agrees that there is no technical substantiation to permit cords to be permanently installed as fixed wiring on a building surface.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 402 — FIXTURE WIRES

9-45 Log #1042 NEC-P09 **Final Action: Accept in Principle**
(404.2(C))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 9-95
Recommendation: Revise the accepted text from the panel action as shown below:

(C) Switches Controlling Lighting Loads. Where switches control lighting loads supplied by a grounded general purpose branch circuit, a grounded circuit conductor shall be provided at the switch location.

Exception: The grounded conductor shall be permitted to be omitted from the switch enclosure where either of the conditions in (1) or (2) apply.

(1) Conductors for switches controlling lighting loads enter the device box through a raceway having sufficient space for grounded conductor(s) for each branch circuit and using conductors with sufficient base ampacity to allow the additional grounded current carrying conductors to be installed in the future.
(2) Cable assemblies for switches controlling lighting loads enter the device box through a framing cavity that is open at the top or bottom on the same floor level, or through a wall, floor, or ceiling that is unfinished on one side.
Informational note: The provision for a (future) grounded conductor is to provide power to electronic lighting control devices.
Substantiation: Suggest the addition of an informational note to 404.2(C) to explain the reason for this requirement. If the 404.2(C) is read without the informational note, the rationale for the provision is truly obscure.

404.2(C) Exception (1) as written is incomplete in its requirements. The future installation of grounded conductor(s) also requires space in the raceway(s) for the added conductor(s) and sufficient ampacity in all conductors after derating for the added conductors.

404.2(C) Exception (2) as written is not parallel in its use of terms to (1). Suggest adding the words “loads” and “device” as shown above.
Panel Meeting Action: Accept in Principle

Revise text to read as follows:

In 404.2(C) in the ROP panel action, change “a grounded circuit conductor” to “the grounded circuit conductor for the controlled lighting circuit.”

In (1) of the Exception in the ROP panel action, add the following sentence: “The raceway shall have sufficient cross-sectional area to accommodate the extension of the grounded circuit conductor of the lighting circuit to the switch location whether or not the conductors in the raceway are required to be increased in size to comply with 310.15(B)(2)(a).”

In (2) of the Exception in the ROP panel action, insert the word “loads” as shown in this comment, but do not insert the word “device”. In addition, delete the word “device” from (1).

Revise the informational note by changing “provide power to” to “complete a circuit path for”.
Panel Statement: CMP 9 agrees that the raceway must accommodate the future conductor. This wording avoids the undefined terminology “base ampacity.” The panel wording also clarifies that not just any grounded circuit conductor will do, but only the one for the relevant lighting circuit. In (1) and (2) of the exception, the word “device” is not correct because not all such switch locations occur at device boxes. For example, a 4-in. sq. box with a plaster ring is not a device box. The panel has revised the recommended informational note to be technically correct.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 404 — SWITCHES

9-46 Log #1117 NEC-P09 **Final Action: Reject**
(404.8(A) Exception No. 4 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-102
Recommendation: Accept the proposal with the following revisions:

Exception No. 4: Switching devices identified for only automatic operation by temperature, pressure, flow, movement, proximity, magnetism, light, and the like, shall be accessible, but shall not be required to be readily accessible.
Substantiation: 404.1 states that the article applies to all switching devices. The devices covered in the proposal are switching devices as the panel stated, and are disconnecting means per the definition for “Switching Devices” in Article 100. Disconnecting means are generally required to be accessible. These switching devices can require adjustment and maintenance and should be noted to comply with 110.26.
Panel Meeting Action: Reject
Panel Statement: Although the article does cover such devices, it does not follow that this section covers these other switching devices. This section only covers switches as defined in Article 100, and therefore the exception is unnecessary.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-47 Log #1113 NEC-P09 **Final Action: Reject**
(404.8(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-103
Recommendation: Accept the proposal with the following revisions:

A snap switch, receptacle, dimmer, flanged surface device, pilot light, push button, or other devices shall not be grouped or ganged in enclosures with similar devices unless...(remainder unchanged).
Substantiation: The provision should include other devices where the hazard can be the same.
Panel Meeting Action: Reject
Panel Statement: The proposed language is phrased incorrectly for an article covering switches. The language in 404.8(B) is sufficiently inclusive.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-48 Log #1239 NEC-P09 **Final Action: Hold**
(404.8(C))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 9-106
Recommendation: Continue to accept the proposal but revise 404.8(C) as follows:

(C) Multipole Snap Switches. A multipole, general-use snap switch shall not be permitted to be fed from more than a single circuit unless it is listed and marked as a two-circuit or three-circuit switch. ~~, or unless its voltage rating is not less than the nominal line-to-line voltage of the system supplying the circuits.~~

Substantiation: The addition of the FPN provides important information for the safe use of 2 and 3 circuit switches. However, there is an additional safety concern that needs to be recognized. 404.8(C) as currently written allows for a potentially unsafe installation. If the deleted text shown above remains in the code, a general use multipole snap switch is permitted to be used for multicircuit applications. Listed two and three pole general use snap switches have not been evaluated for use in multicircuit applications. UL guide information, WJQR, states: "Multi-pole, general-use snap switches have not been investigated for more than single-circuit operation unless marked "2-circuit" or "3-circuit."

The reason that this statement appears in the guide information is that there are different test requirements for 2 and 3 pole snap switches and 2 and 3 circuit switches. It is true that some 2 and 3 pole switches on the market today can safely be used in 2 and 3 circuit applications. This is due to the robust design of many of these switches. However, there is no certainty that all 2 and 3 pole snap switches are suitable for use in 2 and 3 circuit applications, unless the switches have been specifically tested and marked in accordance with the ANSI/UL20, the Standard for General Use Snap Switches. The wiring device industry and UL are currently reviewing ANSI/UL20 to insure that the testing and marking of these switches clearly defines and differentiates the intended use of multipole and multi-circuit switches.
Panel Meeting Action: Hold
This action is on Comment 9-48 only.
Panel Statement: In accordance with 4.4.6.2.2(a) of the Regulations Governing Committee Projects, this comment must be held for action in the 2014 NEC cycle. The recommendation and substantiation provided in this comment should have been submitted during the comment period for the 2008 NEC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

HARTWELL, F.: This comment was submitted exactly three years too late. Note that even if it were submitted on a timely basis, or as a proposal, CMP 9 might well have taken some other action, such as including a requirement in the construction part of the article mandating that multipole snap switches be suitable for these applications. The original proposal (in the 2008 NEC cycle) specifically anticipated that the guide card requirements for snap switches would have to be changed if the proposal were accepted, as it was, and such changes generally take place in the context of adjustments being made to the governing product standard. Further, a representative of a major device manufacturer was consulted during the course of the CMP 9 meetings on the 2008 NEC, and he saw no problem with the anticipated wording. If indeed there are some multipole snap switches that do not comply with the applicable requirements for multi-circuit use, they should be upgraded because they are commonly applied in these cases with no one the wiser, as covered in the 2008 substantiation.

With that said, it is encouraging that the device industry is finally showing some signs of attentiveness to this issue. It is to be hoped that by the next gathering of CMP 9 in January of 2012, this question will be academic and no further activity will be necessary in the NEC.

9-49 Log #2307 NEC-P09 **Final Action: Accept**
(404.8(C))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 9-106
Recommendation: Revise the proposed text as follows:
FPN: See 210.7~~(B)~~ for disconnect requirements when more than one circuit supplies a switch.
Substantiation: 210.7 was changed by the accepted proposal 2-59. 210.7 no longer contains any subsections.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-50 Log #1568 NEC-P09 **Final Action: Accept**
(404.9(B) Exception No. 2 (New) and 404.12)

Submitter: Robert D. Osborne, Underwriters Laboratories Inc.
Comment on Proposal No: 9-110
Recommendation: The panel action should be changed to an "accept in principle". The proposed new exception should be written as follows:

"404.9(B) - Exception No. 2: Listed kits or listed assemblies shall not be required to be connected to an equipment grounding conductor if all of the following conditions are met:

(1) The device is provided with a nonmetallic faceplate that cannot be installed on any other type of device,

(2) The device does not have mounting means to accept other configurations of faceplates,

(3) The device is equipped with a nonmetallic yoke, and

(4) All parts of the device that are accessible after installation of the faceplate are manufactured of nonmetallic materials."

Additionally, Section 404.12 should be revised as follows:

404.12, last sentence, should read as follows: "Except as covered in 404.9(B), Exception No. 1, nonmetallic boxes for switches shall be installed with a wiring method that provides or includes an equipment grounding conductor."

Substantiation: While continuing to "accept in principle", the panel should consider modifications to the panel action to address the following concerns: (1) The proposal is specific to snap switches, consideration should be given to whether the exception should apply to all devices identified in the parent rule (including dimmers and similar control switches), (2) Require the device and cover plate to be listed as a kit or assembly - this mirrors the requirement in 406.4(D) for receptacle/faceplate combinations and is consistent with the panels intent that the yoke be designed to interface with a unique faceplate, (3) Include additional verbiage to ensure the yoke does not have mounting means to mount faceplates not provided as part of the listed assembly (i.e. the yoke should not be provided with threads to accept 6-32 screws for the mounting of traditional faceplates), (4) Limit the exception to those devices with all parts accessible after installation to be manufactured of nonmetallic materials (i.e., the switch operator should not be metallic), and (5) Revision to 404.12 to address the renumbering of the existing exception.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-51 Log #1112 NEC-P09 **Final Action: Reject**
(404.11)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-115
Recommendation: Accept the proposal with the following revisions:

A circuit breaker, including power-operated types, shall be permitted to serve as a switch, if it can be opened by an externally manually operable lever or handle.

Substantiation: Power failure should not be the only reason to require manual control of power operated circuit breakers. Control may be distant from the circuit breaker and there can be conditions other than power failure where personnel in the vicinity of the circuit breaker should have provisions for manual operation.
Panel Meeting Action: Reject
Panel Statement: The existing NEC text provides for hand operation in the event of unpowered conditions. It goes without saying that some sort of lever or handle will be required to accomplish this action, and it need not be restated.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-52 Log #2595 NEC-P09 **Final Action: Accept**
(404.14(F) (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-118
Recommendation: Accept the proposal in principle; change the end reference from "as provided in Article 210" to "as provided in 210.21(B)."
Substantiation: The panel overlooked a flagrant violation of the whole-article-cross-reference prohibition in the NEC Style Manual, at 4.1.1. This is the appropriate, and specific, reference.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-53 Log #1111 NEC-P09 **Final Action: Reject**
(404.15 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-120
Recommendation: Accept the proposal.
Substantiation: The same as the proposal. Whether or not current industry practices are causing problems is irrelevant; practices not governed can change. 404.14(D) and (E) require listing for specific switches, 430.109(A)(1), (2), (3), (4), and (5) require listing for switches, circuit breakers, and controllers (defined as making and breaking a circuit - "switching"). Circuit breakers are plainly not beyond the scope of Article 404, since circuit breakers used as switches (404.1) are still circuit breakers.
Panel Meeting Action: Reject
Panel Statement: This sort of marking requirement belongs in Article 240, if anywhere. It should only be considered in the context of other required markings that have to do with topics related to overcurrent protective functions, and therefore this subject should remain within the province of CMP 10. It should be noted that Section 110.21 already requires inclusion of manufacturers name or other identification, and 240.83 requires amperage and voltage ratings to be marked. Also, Section 240.83 already requires circuit breakers used in certain switching applications to be listed. Expansion of listing requirements for breakers should be addressed in Article 240, not Article 404.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-54 Log #1108 NEC-P09 **Final Action: Reject**
(404.19 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-124
Recommendation: Accept the proposal.
Substantiation: 404.1 includes switching devices, a unit that carries or controls (by switching) electric energy.
Panel Meeting Action: Reject
Panel Statement: Although these other devices are within the scope of Article 404, there are no limitations placed on them with respect to hand operation. Such limitations are imposed on "switches" and these are as defined in Article 100; other switching devices as covered in this comment are not covered by those limitations. The proposed text is unnecessary.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

14-2 Log #127 NEC-P14 **Final Action: Accept**
(404.80(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-130
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 14 for action in 504.80(A).
This action will be considered by Code-Making Panel 14 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-3 Log #1091 NEC-P14 **Final Action: Accept in Principle**
(404.80(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-130
Recommendation: Accept the proposal as intended for 504.80(A).
Substantiation: The proposal was mistakenly numbered.
Panel Meeting Action: Accept in Principle
Revise 504.80(A) to read: "Intrinsically safe circuits shall be identified at terminal and junction locations in a manner that is intended to ~~will~~ prevent unintentional interference with the circuits during testing and servicing."
Panel Statement: Panel 14 agrees with the submitter's intent and has revised the text to more clearly explain the requirement.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 406 — RECEPTACLES, CORD CONNECTORS, AND ATTACHMENT PLUGS (CAPS)

18-5 Log #1110 NEC-P18 **Final Action: Reject**
(406.1)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-10
Recommendation: Accept the proposal.
Substantiation: Flanged surface devices are noted in various sections and serve the same purposes as plugs, receptacles, and cord connector bodies and should be included.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any additional information/substantiation for consideration. Flanged Surface devices are intended for installation in equipment (not the premises wiring system) as noted in the substantiation for Proposal 18-10. As such, they are covered by the appropriate product standards and by the product standard covering the flanged device. Placing additional installation requirements in the NEC is not necessary.
It is further noted that "flanged outlet" is by the definition in Article 100 a "receptacle" and already covered in 406.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-6 Log #2717 NEC-P18 **Final Action: Reject**
(406.1(A))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 18-11
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: There are currently no product standard requirements for power safe protector (PSP) protection. The supporting documentation did not include investigation of the ability of this technology to mitigate the hazards associated with wiring device failure mechanisms. Installation of these devices is not currently prohibited by the NEC. There has yet to be an established correlation between over temperature and fire initiation beyond what is in the current receptacle standard.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-7 Log #1107 NEC-P18 **Final Action: Reject**
(406.2(A), (B), (C) and Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-8
Recommendation: Accept the proposal.
Substantiation: The proposal does contain proposed text. Flanged surface devices serve the same purpose as plugs, receptacles and cord connector bodies, and should be included. Flanged surface devices are noted in other NEC sections.
Panel Meeting Action: Reject
Panel Statement: See Panel action and statement on Comment 18-5.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-8 Log #1092 NEC-P18 **Final Action: Reject**
(406.2(A), (B), and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-15
Recommendation: Accept the proposal with the following revisions:
Receptacles, Cord Connector Bodies, Attachment Plugs, and Flanged Surface Devices.
Ratings and Types.
(A) Listing devices covered by this article shall be listed and marked with the manufacturer's name or identification and voltage and ampere ratings.
(B) Ratings. Devices covered by this article shall be rated not less than 15 amperes, 125 volts, or 15 amperes, 250 volts and shall be a type that cannot be used as lampholders.
Exception: Where a lower rating is permitted by 410.62(C)(2).
(C) Aluminum Conductors. Devices covered by this article rated 20 amperes or less and directly connected to aluminum conductors shall be marked CO/ALR.
Substantiation: Flanged surface devices, which perform similar functions should be included in the provisions. 410.62(C)(2) should be noted to avoid conflict.
Panel Meeting Action: Reject
Panel Statement: See Panel action and statement on Comment 18-5. The submitter has provided no example of "conflict".
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-9 Log #1109 NEC-P18 **Final Action: Reject**
(406.2(A), (B), and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-15
Recommendation: Accept the proposal.
Substantiation: Flanged surface devices are noted in various sections and serve the same purposes as plugs, receptacles, and cord connector bodies and should be included.
Panel Meeting Action: Reject
Panel Statement: See Panel action and statement on Comment 18-5.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-10 Log #488 NEC-P18 **Final Action: Accept in Principle**
(406.3(D))

Submitter: James T. Dollard, Jr., IBEW Local Union 98
Comment on Proposal No: 18-30
Recommendation: Continue to accept Proposal 18-30 in Principal, but make changes to address the comments in the voting.
Revise the existing 2008 NEC text in 406.3(D) as follows:
(D) Replacements. Replacements of receptacles shall comply with 406.3(D)(1) through (D)(6) as applicable.
(4) Arc-Fault Circuit Interrupter Protection. Where a receptacle outlet is supplied by a branch circuit that requires arc-fault circuit interrupter protection as specified elsewhere in this code, a replacement receptacle shall be:
(a) a listed outlet branch circuit type arc-fault circuit interrupter receptacle, or
(b) protected by a listed outlet branch circuit type arc-fault circuit interrupter receptacle, or
(c) protected by a listed combination type arc-fault circuit interrupter.
Substantiation: The panel's continued acceptance of this proposal will provide much needed arc fault protection in older homes. This comment is intended to address some of the concerns expressed by panel members. The proposed wording in this comment will allow AFCI protection to be provided by either a circuit breaker AFCI or by a receptacle AFCI when a receptacle is replaced. Both the receptacle and circuit breaker AFCI will provide protection for all receptacles and other outlets that are downstream on the branch circuit. The UL standard for AFCI's, UL1699, covers outlet branch circuit (OBC) type for receptacles. An OBC type AFCI receptacle provides series arcing protection upstream and downstream from its point of installation and parallel arc protection downstream of that point.
As noted in the proposal substantiation, AFCI protection in older homes is likely to be provided only when circuit breakers are replaced or when the service is upgraded. Continued acceptance of this proposal is necessary due to the fact that the replacement of circuit breakers individually or in a complete replacement as in a service upgrade does not require the use of AFCI type circuit breakers. The proposed text provides significant flexibility due to the fact that this addresses only receptacle replacements not the entire branch circuit. For example, receptacles installed on a multiwire branch circuit could easily be protected with a single outlet branch circuit (OBC) type at the first outlet.
Adopting the requirement to provide replacement receptacles with AFCI protection will greatly expand the use of AFCI's in older homes where there is a clear need for AFCI protection. As stated in the substantiation submitted with proposal 18-30 there is no practical reason to limit the level of safety provided by an AFCI to new homes only.
NFPA has published a report titled Home Electrical Fires, by John R. Hall Jr., dated March 2009. The report describes how the age of a dwelling is related to the increased risk of electrical fires. A table in the NFPA report states that the risk ratio for electrical fires is 0.5 for dwellings 11-20 years old, 1.0 for dwellings 21-40 years old and 1.6 for dwellings more than 40 years old. It is apparent that many older homes are at significantly greater risk and would benefit most from additional AFCI protection. There have been a number of reports submitted to CMP 2 in support of the requirement for AFCI protection. Many of these reports also identify a clear correlation between older homes and the increased occurrence of electrical fires. (The NFPA report is available at http://www.nfpa.org/itemDetail.asp?categoryID=423&itemID=18255&URL=Research/Fire%20reports/Major%20causes)
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
(4) Arc-Fault Circuit Interrupter Protection. Where a receptacle outlet is supplied by a branch circuit that requires arc-fault circuit interrupter protection as specified elsewhere in this code, a replacement receptacle at this outlet shall be one of the following.
(1) a listed outlet branch circuit type arc-fault circuit interrupter receptacle.
(2) a receptacle protected by a listed outlet branch circuit type arc-fault circuit interrupter type receptacle.
(3) a receptacle protected by a listed combination type arc-fault circuit interrupter type circuit breaker.
This requirement becomes effective January 1, 2014.
Panel Statement: The panel editorially revised the recommendation to comply with the NEC Style Manual and added the effective date per their action on Comment 18-19. The panel added "type circuit breaker" to (3) to clarify the type of device that is permitted under this option.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-11 Log #1860 NEC-P18 **Final Action: Reject**
(406.3(D)(2))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 18-25
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
(2) Non–Grounding-Type Receptacles. If an equipment grounding conductor is present at the receptacle outlet, a non-grounding-type receptacle(s) shall be replaced with a grounding-type. An equipment grounding conductor shall be installed in compliance with 250.130(C) if an equipment grounding conductor does not exist at the receptacle outlet. ~~Where attachment to an equipment grounding conductor does not exist in the receptacle enclosure, the installation shall comply with (D)(3)(a), (D)(3)(b), or (D)(3)(c).~~
Exception: ~~(a)~~ *If installing an equipment grounding conductor is impracticable, a non–grounding-type receptacle(s) shall be permitted to be replaced with another non–grounding-type receptacle(s).*
~~(b) A non–grounding-type receptacle(s) shall be permitted to be replaced with a ground-fault circuit interrupter-type of receptacle(s). These receptacles shall be marked "No Equipment Ground." An equipment grounding conductor shall not be connected from the ground-fault circuit-interrupter-type receptacle to any outlet supplied from the ground-fault circuit-interrupter receptacle.~~
~~(c) A non–grounding-type receptacle(s) shall be permitted to be replaced with a grounding-type receptacle(s) where supplied through a ground-fault circuit interrupter. Grounding-type receptacles supplied through the ground-fault circuit interrupter shall be marked "GFCI Protected" and "No Equipment~~
Substantiation: The Panel failed to respond to the substantiation in the Proposal related to the violation of listing and labeling created by Section 406.3(D)(3) (Section 406.3(D)(2) in the 2011 NEC ROP Draft). This section creates a conflict with 110.3(B) and 250.114 in that the manufacturers of many small appliances require their equipment to be supplied by a branch circuit having an equipment grounding conductor and 250.114 requires many small appliances to be grounded.

Section 110.3(B) requires that equipment be installed and used in compliance with instructions included in the listing. Installing a grounding-type GFCI receptacle for these small appliances as presently permitted in 406.3(D)(3)(b) is a direct violation of 110.3(B) and cannot be a substitute for an equipment grounding conductor required in 250.114.

Manufacturers of listed equipment rely to a great extent on the installer and user complying with their installation and use instructions covered by 110.3(B). For example, manufacturers of GFCI receptacles require in their instructions that the receptacles be tested monthly. This is not a NEC rule but is covered by 110.3(B)(3). In fact, CMP-2 accepted Proposal 2-77 to require GFCIs to be installed in a readily accessible location to facilitate the testing required. Where is the testing required? In the manufacturer's instructions.

Please take a look at the UL Marking Guide for luminaires. This Guide includes 77 pages of installation and use markings that the installer and user must comply with if included by the manufacturer. Manufacturers of luminaires rely on installers and users complying with these markings for safety in accordance with 110.3(B).

In addition, the present language in 406.3(D)(3)(c) creates a possibly hazardous condition as the user of the grounding type receptacle has a reasonable expectation that an equipment grounding path is provided when a grounding type receptacle is installed. In essence, the practice of installing a grounding type GFCI without an equipment grounding conductor connected creates a "bear trap" of sorts. Since a ground-fault return path is not provided, a ground-fault in an appliance will simply energize the metal frame of the appliance. The unsuspecting user (often a homeowner) completes the fault return path by contacting the faulted appliance and a grounded appliance or ground-fault return path. The owner provides the test path for the GFCI device! This hardly seems appropriate and can be fatal in some instances!

These receptacles often supply electronic equipment through Surge Protection Devices (SPD) that rely on the connection to the equipment grounding conductor for function and safety. Plugging a plug strip (Relocatable Power Taps (XBYS) in the UL White Book) or other SPD device into a receptacle that does not have an equipment grounding conductor connection can be unsafe. The surge protection does not function. Equipment is left without an equipment grounding connection. These receptacles are often referred to as having a "phantom ground." Unfortunately, most people who plug the equipment into these receptacles do not realize their expensive equipment is unprotected, in spite of the little labels furnished by manufacturers of GFCI receptacles.

Replacing ungrounded receptacles with grounding-type through a GFCI without having an effective ground-fault return path defies logic, violates 110.3(B), 250.4(A) and 250.114. Doing so must then be considered unsafe. The NEC should not allow this practice to continue.

Section 250.114 includes a requirement that many cord-and-plug connected appliances are required to be grounded. Supplying these appliances through a GFCI receptacle without an equipment grounding conductor has to be considered unsafe as doing so violates 110.3(B) and 250.114. The NEC should not allow this unsafe practice and CMP-18 should remove the conflict 406.3(D)(3)(c) creates with other sections.

Present Section 250.130(C) provides a practical means of installing an equipment grounding conductor if one does not exist at the receptacle outlet. Granted, this may not be as convenient as installing a GFCI device but should provide a safe installation and allow compliance with 110.3(B) and 250.114. The provision is added to the Comment that adding an equipment grounding conductor at the receptacle outlet is not required if it is impracticable to do so. This allows for hardship cases and allows the electrical inspector to make a judgment in these situations.

Electrical inspectors commonly cite violations of 110.3(B). Manufacturers want them to do so. Inspectors should not have to choose whether to enforce the safety grounding rules in Article 250 and those of appliance manufacturers or permit the relaxed replacement rules in 406.3(D)(3). I am willing to bet that manufacturers do not want to delete 110.3(B)!

Panel Meeting Action: Reject

Panel Statement: The Panel disagrees with the submitter's contention that the present requirement creates a conflict with 110.3(B). The GFCI is required to be marked "No Equipment Ground". If a piece of utilization equipment is required to be connected to a circuit with an equipment grounding conductor and it is not, this is a violation of 110.3(B), not a conflict.

The only alternative provided by the submitter is to install a grounding conductor and a grounding type receptacle and properly ground it or install a non-grounding receptacle. In many older installations an equipment grounding conductor is not present and properly installing a new one is far more difficult than simply installing a non-grounding type receptacle. Requiring that an equipment grounding conductor be installed where a grounding type receptacle is used will result in defaulting to the use of a non-grounding type receptacle and this results in using an adapter or removing the ground prong from the appliance.

The net result is that 110.3(B) is again violated. Worse, there will be no ground fault protection at all. The Panel disagrees with the submitter's statement that the unsuspecting user could be electrocuted. While the user may receive a shock, the very purpose of a GFCI is to protect against such a shock being of a magnitude or duration sufficient to cause electrocution. Further, the submitter seems to suggest that some equipment such as Surge Protective Devices (SPD) might not operate properly. This may be correct. However, the Panel believes providing shock protection to the user outweighs the submitter's concern for the equipment to function properly.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-12 Log #2719 NEC-P18 **Final Action: Reject**

(406.3(D)(2))

Submitter: Michael Baxter, Energy Safe Technologies Inc.

Comment on Proposal No: 18-19

Recommendation: Same as originally submitted.

Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such

as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent

injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-6.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-13 Log #1022 NEC-P18 **Final Action: Reject**

(406.3(D)(3))

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 18-20

Recommendation: The Proposal should be Accepted in Principle in Part.

The proposed changes to 406.3(D)(3)(b) should be Accepted in Principle by adding in the first sentence a hyphen between "circuit" and "interrupter" and deleting "-type of", and in the third sentence, deleting "-type". The revised text would then read:

First sentence: "…with a ground-fault circuit-interrupter receptacle(s)."

Third sentence: "…from the ground-fault circuit-interrupter receptacle to any outlet…".

The proposed changes to 406.3(D)(3)(c) should be Rejected.

Substantiation: The reference to 406.3(D)(3) in the Proposal was correct since both 406.3(D)(3)(b) and (c) were addressed in the Proposal.

The addition of the hyphen between "circuit" and "interrupter" in the first sentence is correct since "circuit interrupter" is an adjective and also correlates with the existing punctuation in the third sentence. Deletion of "-type" in both sentences is appropriate since the receptacle is either a GFCI receptacle or it is not. I do not believe that UL has multiple types of GFCIs.

Panel Meeting Action: Reject

Panel Statement: The panel recognizes that the proper application of the term will be addressed by NFPA editorial staff based on the panel's use of the term in their action on Proposal 18-20.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-14 Log #2720 NEC-P18 **Final Action: Reject**

(406.3(D)(3))

Submitter: Michael Baxter, Energy Safe Technologies Inc.

Comment on Proposal No: 18-22

Recommendation: Same as originally submitted.

Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such

as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent

injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-6.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-15 Log #2887 NEC-P18 **Final Action: Accept in Principle**

(406.3(D)(3) (New))

Submitter: Timothy D. Curry, Curry Electric, Inc.

Comment on Proposal No: 18-24

Recommendation: PLEASE ACCEPT THIS PROPOSAL.

Substantiation: THIS IS A LOGICAL PROGRESSION OF INCREASING SAFETY IN EXISTING HOMES. WE ALREADY REQUIRE GFCI OUTLETS WHEN REPLACING AN OLDER NON GFCI DEVICE THAT WOULD BE REQUIRED BY TODAYS CODE. THE NUMBER OF EXISTING HOMES IS FAR FAR GREATER THAN NEW CONSTRUCTION, SO THIS RULE WOULD HAVE A POTENTIALLY FAR GREATER AFFECT ON SAFETY THAT IF REQUIRED ONLY ON NEW CONSTRCTION.

Panel Meeting Action: Accept in Principle
Panel Statement: The panel acknowledges that the wording accepted by their action on Proposal 18-24 is related to the tamper-resistant requirement in the 2008 NEC. See the panel statement on Proposal 18-24.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-16 Log #1089 NEC-P18 **Final Action: Reject**
(406.3(D)(4))

Submitter: Greg Taylor, City of Knoxville
Comment on Proposal No: 18-30
Recommendation: Delete the following text:
~~**(4) Arc-Fault Circuit-Interrupters.** Listed combination arc-fault circuit interrupter receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this code. Exception: Unless the receptacle is protected by an upstream AFCI.~~
Substantiation: There are currently no listed combination type AFCI receptacles available as of this comment. There are some in development that are being tested under the UL Standard 1699 which uses only modern NM-B cable with a ground. However there is no data available to know whether this new technology will be compatible with all previous wiring methods. Although it is true that GFCI protection is currently required for replacement receptacles, Code Panel 2 did not mandate the use of GFCI receptacles before they were even available. There needs to be more testing performed before requiring an unavailable, untested device to be installed in every home in the country. Also, as written, the new code requirement will be in direct conflict with 406.(D)(3) that allows 2-wire receptacles to be used for replacement purposes. I hope that Code Panel 18 will take another look at this new requirement and allow testing of older wiring methods to be completed before requiring this.
Panel Meeting Action: Reject
Panel Statement: CPSC data indicates that over 90 percent of fires of electrical origin are in homes over 10 years of age. This proposal applies AFCI protection where the majority of fires occur. See the panel action and submitter's substantiation on Comment on 18-10. The panel action on Comment 18-19 has added an effective date of January 1, 2014 for implementation of this requirement.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-17 Log #1391 NEC-P18 **Final Action: Reject**
(406.3(D)(4) (New))

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute/Electric Light & Power NEC Task Force
Comment on Proposal No: 18-30
Recommendation: Please reconsider and reject this proposal.
Substantiation: The Panel should reconsider the proposal based on the negative ballot statements of Mr. Lowrance. There was insufficient technical support in the proposal indicating that concealed interior wiring in homes creates a hazardous installation and that the proposed AFCI receptacle would alleviate this hazard. Additionally, a combination AFCI receptacle is not currently available. When replacing a receptacle, downstream receptacles should be labeled in the same manner as GFCI protected receptacles are labeled.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-16.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-18 Log #1577 NEC-P18 **Final Action: Reject**
(406.3(D)(4))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 18-30
Recommendation: The panel should reconsider and reject the proposal.
Substantiation: The proposal is misplaced and results in a retrofit approach that imposes a requirement that is not even required in new construction. Retrofit requirements have to be approached with great caution in the NEC. The most prominent place where retrofit has been required is in 406.4(D)(2). This provision requires that GFCI protection be provided where receptacles are replaced in areas where GFCI protection is required.

This proposal attempts to equate the GFCI retrofit provision with some type of AFCI retrofit provision.

Here is the problem. The NEC does require GFCI protection of receptacles; the NEC does NOT require AFCI protection of receptacles. AFCI protection is required in 210.12(B) for branch circuits – not receptacles. In essence, CMP 18 has implemented a retrofit requirement that doesn't exist in new construction.

Take the following example:

(1) A receptacle becomes damaged in a bedroom and it is the last receptacle on the circuit.

(2) The new provision from the ROP would require that when that receptacle is changed, AFCI protection must be provided for the receptacle.

(3) So the contractor replaces the receptacle with an AFCI receptacle (assuming one would exist). This gives you AFCI protection for that single receptacle, no protection for the branch circuit. Since 210.12 requires protection for the branch circuit, you have retrofitted a level of protection not even recognized by the current NEC.

CMP 18 has responsibility for receptacles. They do not have responsibility for branch circuits or for the cords that are plugged into receptacles. Given that AFCI is a branch circuit protection issue, how can it be in the purview of CMP 18?

The NEC Technical Correlating Committee also has a significant part of their scope and responsibility at stake in this proposal. CMP 2 has been discussing the possible ways to require retrofitting of AFCIs in the NEC for 5 code cycles and has had more discussions, presentations, technical reports and other data presented on the topic of AFCIs. Each discussion results in further considerations and concerns that must be addressed to make the retrofit viable. As Mr. Wells points out in his affirmative comment on the vote, the trigger for retrofitting AFCIs needs to be looked at more broadly. The appropriate place for this to occur is in CMP 2.

CMP 18 has slid through the back door with a requirement to retrofit a protection they do not have within their scope and have done so in a manner that results in potentially none of the protection that is expected by the basic NEC rules for AFCI.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-16.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-19 Log #2311 NEC-P18 **Final Action: Accept**
(406.3(D)(4) (New))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 18-30
Recommendation: Insert an effective date of January 1, 2014 for this requirement.
Substantiation: AFCI receptacles do not have any track record, and (to the best of *my* knowledge) are not available currently. If this proposal passes, and AFCI receptacles are not available in 2011, there could be some major problems. If this occurs, the only solution is to use AFCI breakers. The problems with this are several. For example, there are currently no 2-pole combination AFCI breakers. If an existing dwelling utilizes multiwire branch circuits, there is no easy way to comply with this new requirement. Also, many older homes have panelboards that will not accept an AFCI breaker. In these cases, changing a receptacle would result in having to perform a complete electrical service change!

By accepting this comment, we can give the manufacturer's the time that they need for research and development, and for mass production, knowing that in 2014 their product will have a market.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-20 Log #2596 NEC-P18 **Final Action: Accept in Principle**
(406.3(D)(4) (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-30
Recommendation: Accept the panel action on the proposal in principle. Fold the exception into the text so as to read as follows: (4) Arc-Fault Circuit-Interrupters (AFCI). Where AFCI protection is not provided ahead of a receptacle being replaced at an outlet for which AFCI protection is required by this Code, the receptacle shall be replaced with a listed combination AFCI receptacle.
Substantiation: This is editorial. As written at the ROP stage, the exception is in violation of the NEC Style Manual, at 3.1.4.1. No enumerated paragraphs in this subsection [406.3(D)] use exceptions, and the proposed exception can be easily avoided, removing the necessity of rewording the exception. The acronym style in this comment is intended to address the 3.2.3 topic in the NEC Style Manual, since this is the first location in the article that will use the terminology.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel action on Comment 18-10 addresses the recommendation.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-21 Log #2721 NEC-P18 **Final Action: Reject**
(406.3(D)(4))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 18-28
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-6.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-22 Log #2884 NEC-P18 **Final Action: Reject**
(406.3(D)(4) (New))

Submitter: Timothy D. Curry, Curry Electric, Inc.
Comment on Proposal No: 18-30
Recommendation: PLEASE REJECT THIS PROPOSAL.
Substantiation: I CAN ONLY SPEAK FROM MY PERSPECTIVE HERE IN CINCINNATI. WE HAVE A VERY LARGE STOCK OF OLDER HOMES WITH 2 WIRE CIRCUITS. IF I WERE REQUIRED TO REPLACE 2 WIRE OUTLETS WITH AFCI OUTLETS (THAT DO NOT EXIST YET) I WOULD NEED ONE THAT ALSO OFFERED ACTUAL GFCI PROTECTION SINCE THAT IS ALSO A REQUIREMENT-THAT IS-WHEN A 2 WIRE DEVICE S REPLACED WITH A 3 WIRE DEVICE IT MUST BE EITHER, REFED WITH A 3 WIRE CIRCUIT, GFCI PROTECTED AND MARKED NO GROUND, OR MUST BE ON THE LOAD SIDE OF A GFCI DEVICE UPSTREAM. WE HAVE ENOUGH PROBLEMS NOW WITH GFCI OUTLETS WITH “STOLED” OR SHARED NeutRALS, AND ALL KINDS OF OTHER WIRING ISSUES, I CAN’T EVEN IMAGINE WHAT KIND OF HAVOC THIS WOULD CAUSE. IF I WERE TO TRY TO EXPLAIN THIS TO A CUSTOMER, I CAN BET THEY WOULD GIVE UP AND GO GET A 49 CENT 3 WIRE OUTLET AND JUST STICK IT IN, THUS ENTIRELY BYPASSING THE PROFESSIONALLY TRAINED ELECTRICIANS. I UNDERSTAND THE LOGIC, I JUST CAN’T RECONCILE THE REALITY AFTER SPENDING 35 YEARS WORKING IN THESE OLDER HOMES.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-16.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-23 Log #2310 NEC-P18 **Final Action: Accept in Principle**
(406.3(D)(4) Exception (New))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 18-30
Recommendation: Revise the exception as follows:
Exception: AFCI receptacles shall not be required where protected by an upstream AFCI.
Substantiation: This comment is intended only to create a complete sentence in the text.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel action on Comment 18-10 addresses the recommendation.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-24 Log #2888 NEC-P18 **Final Action: Accept**
(406.3(D)(5))

Submitter: Timothy D. Curry, Curry Electric, Inc.
Comment on Proposal No: 18-33
Recommendation: PLEASE ACCEPT THIS PROPOSAL.
Substantiation: THIS IS ALSO A LOGICAL EXPANSION OF THE USE OF THESE DEVICES, ESPECIALLY SINCE OUR HOUSING STOCK IS COMPRISED MOSTLY OF EXISTING HOMES, WHERE DEVICES WILL NEED TO BE REPLACED. THESE DEVICES ARE ONLY ABOUT $1.00 MORE THAN A REGULAR OUTLET, YET GIVE US FAR SUPERIOR PERFORMANCE.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-25 Log #2007 NEC-P18 **Final Action: Reject**
(406.4(E))

Submitter: Leo F. Martin, Jr., Martin Electrical & Technical Training Services
Comment on Proposal No: 18-39
Recommendation: This proposal should be accepted.
Substantiation: This requirement should not be limited to dwellings. The same hazards exist in other than dwellings, liquid spills, etc. I believe that 90.1(A), practical safeguarding, would provide the panel with the necessary substantiation for acceptance of this proposal
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any data or incident evidence which was identified by CMP 18 in the Panel Statement of proposal 18-39. The Panel is looking for some incident reports or other specific examples demonstrating the problem.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-26 Log #1094 NEC-P18 **Final Action: Reject**
(406.6(A), (B), and (D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-42
Recommendation: Revise the proposed text as follows:
Listed. Devices covered by this article shall be listed and marked with the manufacturers name or identification and voltage and ampere ratings.
(A) Construction. Devices covered by this article shall be of dead-front construction so that no parts intended to carry current are exposed when energized.
(B) Connection. Devices covered by this article shall be installed so that their prongs, blades, or pins are not energized unless inserted into an energized receptacle, cord connector body, or flanged surface outlet. Delete (D).
Substantiation: (A) should apply to all devices covered by this article. (D) and flanged surface outlets, which are similar in construction and use to receptacles and cord connector bodies. I could not find 18-3 in the proposals for Article 406. The safety requirements of (A), and (B) do not cover flanged surface devices noted in the first paragraph.
Panel Meeting Action: Reject
Panel Statement: See Panel action and statement on Comment 18-5.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-27 Log #1093 NEC-P18 **Final Action: Reject**
(406.7)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-43
Recommendation: Accept the proposal.
Substantiation: See the proposal substantiation. A 20-ampere T-slot receptacle, cord connector body, or flanged surface outlet will accept an attachment plug with a different rating (15-ampere parallel blades). The last sentence is superfluous as non-grounding type receptacles, cord connector bodies, and flanged surface outlets will not accept attachment plugs with a fixed grounding member. A plug with a movable grounding member for use with a non-grounding type can be deemed to be a grounding type when so used.
Panel Meeting Action: Reject
Panel Statement: See Panel action and statement on Comment 18-5.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
WELLS, J.: The last sentence of 406.7 is not superfluous and is the reason for the product standards now requiring a rejection feature.

18-28 Log #1566 NEC-P18 **Final Action: Reject**
(406.8)

Submitter: Robert D. Osborne, Underwriters Laboratories Inc.
Comment on Proposal No: 18-45
Recommendation: The proposal should be accepted in principal, with the text modified to read as follows:
406.8 Receptacles in Damp or Wet Locations.
(A) Damp Locations. A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).
An installation suitable for wet locations shall also be considered suitable for damp locations.

A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All 15- and 20-ampere, 125- and 250-volt nonlocking receptacles shall be a listed weather-resistant type unless they are an integral part of a listed assembly, where the overall assembly has an environmental rating suitable for outdoor applications.

FPN: The types of receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20 in ANSI/NEMA WD 6-2002, National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles.

(B) Wet Locations.

(1) 15- and 20-Ampere Receptacles in a Wet Location. 15- and 20-ampere, 125- and 250-volt receptacles installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. All 15- and 20-ampere, 125- and 250-volt nonlocking receptacles shall be listed weather-resistant type unless they are an integral part of a listed assembly, where the overall assembly has an environmental rating suitable for outdoor applications.

FPN: The types of receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20 in ANSI/NEMA WD 6-2002, National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles.

Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

Substantiation: The original proposal to require "weather resistant" receptacles cited misapplications, poor installation and assembly (of the receptacle and cover plate), intentional or unintentional breaking off the protective covers, and improper installation and reinstallation of outdoor outlets (A2007 ROP: 18-28 and 18-33). The original panel action to require all receptacles to be weather resistant was modified (in response to comment 18-16) to apply only to 15- and 20-ampere, 125- and 250-volt nonlocking receptacles. This comment noted that the substantiation for the original proposal concluded that it is predominately 15- and 20-ampere nonlocking receptacles that are affected by the use and installation practices identified. Similarly, receptacles that are part of a listed device, such as a power outlet, are not subject to the same installation practices, as they are installed at the factory, and are subject the Standards requirements that ensure proper protection of all electrical components (including receptacles).

The problem with the present Code requirements is that it requires all 15- and 20-ampere, 125- and 250-volt nonlocking receptacles to be listed as "weather resistant", but equipment such as a power outlet are likely to include many other receptacle configurations, and circuit breakers. No substantiation was provided, and no requirement was proposed to require protection for other receptacle configurations or other electrical components (which may be immediately adjacent to the 15- and 20-ampere receptacles).

Panel Meeting Action: Reject

Panel Statement: The certification process does not ensure that when installed the listed equipment will continue to provide equivalent protection to that afforded by the receptacle being listed as weather- resistant in accordance with UL 498. For example, the covers of power outlets can be damaged or left open thus exposing the receptacle to the elements.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-29 Log #2597 NEC-P18 **Final Action: Accept**
(406.8(B)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-54
Recommendation: Accept the panel action in principle and revise the new sentence as follows:
For other than one- or two-family dwellings, an outlet box hood ~~when~~ installed for this purpose shall be listed and where installed on an enclosure supported from grade as described in 314.23(B) or as described in 314.23(F) shall be identified as "extra-duty."
Substantiation: The word "when" addresses a condition of time, and this is a condition of place. Normally the word "where" is used, but in this case the sentence reads better without either word. The simple declarative sentence construction "… an outlet box hood installed for this purpose …" is very clear and readable.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-30 Log #1514 NEC-P18 **Final Action: Reject**
(406.8(B)(3) (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-52
Recommendation: Accept the proposal with the following revision:
Other Type Devices. A flanged surface outlet shall comply with 406.8(B)(1) and (B)(2). A cord connector body in wet locations shall be constructed or protected so as to be weatherproof.
Substantiation: These devices are similar in construction and use to receptacles and should be covered and comply with 110.11 and 110.3(A)(1)(8).
Panel Meeting Action: Reject
Panel Statement: See Panel action and statement on Comment 18-5.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-31 Log #1513 NEC-P18 **Final Action: Reject**
(406.8(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-56
Recommendation: Accept the proposal with the following revisions:
Bathtub Spas and Hot Tubs. Receptacles, flanged surface devices, and cord connector bodies shall not be installed within or directly over a shower stall.
Substantiation: Since not presently prohibited these devices should be included. They present the same potential hazard as receptacles.
Panel Meeting Action: Reject
Panel Statement: See Panel action and statement on Comment 18-5.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
WELLS, J.: Flanged devices are meant to be mounted in or on equipment. As such, the submitter has not provided any substantiation on how a piece of equipment incorporating a flanged device would be installed within or directly over a shower stall.

18-32 Log #1512 NEC-P18 **Final Action: Reject**
(406.9(A), (B), and (D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-58
Recommendation: Accept the proposal with the following revisions:
(A) Grounding type receptacles, cord connector bodies, attachment plugs, flanged surface devices, and adapters shall be provided with....(remainder unchanged).
(B) Grounding type receptacles, cord connector bodies, attachment plugs, and flanged surface devices shall have a means...(remainder unchanged).
(D) Grounding type attachment plugs and flanged surface inlets shall be designed...(remainder unchanged).
Substantiation: Flanged surface devices and adapters should be included. Cord "connector" may be deemed to be a clamp or fitting for attachment of a cord such as a cable connector. In (D), cord connector bodies and receptacles do not provide for the grounding connection to be made first; that is provided by the attachment plug with a longer grounding member for the first and last connection. Flanged surface devices are similar in construction and use to attachment plugs and receptacles and the provisions should apply to them.
Panel Meeting Action: Reject
Panel Statement: See Panel action and statement on Comment 18-5.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-33 Log #2598 NEC-P18 **Final Action: Accept**
(406.11)

TCC Action: The Technical Correlating Committee directs the panel action to be revised to read as follows:
"Exception: Receptacles in the following locations shall not be required to be tamper-resistant."
The remainder of the panel action is unchanged.
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-71
Recommendation: Convert the exceptions into a single exception using a list format, as follows:
Exception: Receptacles in the following three locations are not required to be tamper-resistant.
(1) [As in Exception No. 1.]
(2) [As in Exception No. 2.]
(3) [As in Exception No. 3.]
(4) [As in Exception No. 4 from Proposal 18-82].
Substantiation: CMP 18 did an excellent job in framing the scope of these exceptions. This was the entire point of this submitters Proposal 18-76. This comment is editorial, and intended to address a violation of the NEC Style Manual at 3.1.4.1 in that none of the exceptions are written in the form of a

complete sentence. Rather than repeating language about not being required to be tamper resistant three times, this format uses a list that is more economical in terms of wording. The way the panel worded the exceptions makes them qualify perfectly for a list format, as covered in the NEC Style Manual, at 3.3.5. The exception added under Proposal 18-82 is also correctly worded for this list format, and can be added in the same way.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-34 Log #2718 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 18-65
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-6.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-35 Log #2308 NEC-P18 **Final Action: Accept**
(406.12)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 18-87
Recommendation: Revise the text as follows:
Tamper-Resistant Receptacles in Guest Rooms and Guest Suites. All nonlocking type, 125-volt, 15- and 20-ampere receptacles located in guest rooms and guest suites shall be listed tamper-resistant receptacles.
Substantiation: This change is intended only to make the new requirement a more correct sentence. It should be considered editorial in nature.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-36 Log #2309 NEC-P18 **Final Action: Reject**
(406.14 (New))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 18-90
Recommendation: Revise the text as follows:
406.14 Tamper-Resistant Receptacles Child Care Facilities. In all child care facilities, all nonlocking type, 125- volt, 15- and 20- ampere receptacles in child care facilities shall be listed tamper-resistant receptacles.
Substantiation: This change is intended only to make the new requirement a more correct sentence. It should be considered editorial in nature.
Panel Meeting Action: Reject
Panel Statement: The sentence, as structured in the panel action on Proposal 18-90 is editorially correct.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 408 — SWITCHBOARDS AND PANELBOARDS

9-55 Log #1992 NEC-P09 **Final Action: Reject**
(408.3(A)(2))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 9-136
Recommendation: This proposal should be accepted.
Substantiation: Working on energized is a serious safety hazard. It is not possible, in many cases, to have the utility disconnect the service so that an electrician can install a new breaker or do other work in the service equipment. There are no provisions in NFPA 70E or the OSHA rules that will permit the electrician to do this work with the exposed line side service connections energized. If protection for the line side terminations is provided by the manufacturer of the service equipment this work can be done safely and incompliance with the OSHA rules. Without the line side barrier it is not possible to do work in a service panel and be in compliance with the OSHA rules. The safety of the worker should be a primary concern of the NEC.
Panel Meeting Action: Reject
Panel Statement: The equipment cited (panelboards and switchboards) would still require appropriate personnel protective equipment regardless of the inclusion of the barriers as noted, as these barriers do not provide “arc protection”. Equipment should not be worked on while energized unless appropriate precautions are taken.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-56 Log #2774 NEC-P09 **Final Action: Accept**
(408.3(C))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 9-137
Recommendation: Proposal should be rejected.
Substantiation: CMP 4 rewrote the definitions and subsequent requirements for the installation of the service conductors that the submitter is referencing in his proposal. The submitter presented rationale in his substantiation based on the presumption that CMP 4 would accept his proposals to CMP 4, we did not. The submitter is incorrect that under existing NEC requirements all “service drop” and “service entrance” conductors are utility owned, they are not. Utilizing the word “service” in 408.3 will be sufficient whether the recommended changes in Article 430 pass or not.
Panel Meeting Action: Accept
Panel Statement: CMP 9 assumes the article reference in the substantiation is to Article 230.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-57 Log #1511 NEC-P09 **Final Action: Reject**
(408.4)

TCC Action: The Technical Correlating Committee clarifies that the panel action is to “Reject” this comment and continue to Accept the proposal in Part, as noted in the proposal panel action.
Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-143
Recommendation: Accept the proposal.
Substantiation: Motor control centers may not be within the scope of Article 408, but 408.2 specifies circuit breakers shall comply with certain articles that apply; Article 100 does apply. 110.22 requires identification of disconnecting means and a circuit breaker is a disconnecting means.
Panel Meeting Action: Reject
Panel Statement: As previously stated, motor control centers are not within the scope of Article 408, and they are not installed within panelboards or switchboards (as is the case with circuit breakers). The submitter may wish to submit a proposal to Part VIII of Article 430 in the 2014 NEC cycle.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-57a Log #CC900 NEC-P09 **Final Action: Accept**
(408.4)

Submitter: Code-Making Panel 9,
Comment on Proposal No: 9-142
Recommendation: Revise 408.4(B) in the panel action on Proposal 9-142 to read:
(B) Source of Supply. All switchboards and panelboards supplied by a feeder in other than one- or two-family dwellings shall be marked as to the device or equipment where the power supply originates.
Substantiation: This wording will correlate with the final wording of the panel action on Proposal 9-34. That wording requires the identification to show a specific device; a general reference to a location such as “Electrical Room #3” is not sufficient. As indicated in the panel statement on Comment 9-11, CMP 9 concludes that the hazards addressed in Proposals 9-33 and 9-34 are comparable to those addressed in Proposal 9-142 and the final language here should require notation of specific devices. Additionally, in these cases the appropriate notation may be a specific generator or transformer, and the language has been broadened accordingly (“or equipment”) to allow for such references.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-58 Log #1218 NEC-P09 **Final Action: Reject**
(408.4(B) Exception No. 1)

Submitter: David E. Shapiro, Safety First Electric
Comment on Proposal No: 9-142
Recommendation: Revise as follows:
...buildings where served by a single source of power.
Substantiation: I have worked on residences served by multiple sources of power. With these, it would have enhanced safety to have the locations of the sources identified.

Panel Meeting Action: Reject
Panel Statement: The comment recommends additional text to the text that was not accepted by CMP 9. In addition, CMP 9 does not agree that power distribution in one- and two-family dwellings is so complex as to require posting of this information even if multiple sources of supply exist. The identification rules in 230.2(E) and 702.8(A) are sufficient in such cases.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-59 Log #1392 NEC-P09 **Final Action: Reject**
(408.8)

_TCC Action: The Technical Correlating Committee notes that no changes were made by Code-Making Panel 1 relating to work space warning signs as addressed in this comment, therefore, correlation is unnecessary.
Submitter: Russell LeBlanc, The Peterson School
Comment on Proposal No: 9-144
Recommendation: Accept this proposal, but modify the section from 408.8 to 110.17 as follows.

110.17 Work Space Warning Signs

Switchboards and panelboards shall be field marked with a sign or plaque to warn qualified and unqualified persons of the work spaces required to be kept clear by 110.26A(1), (2), (3) or 110.32 as applicable. The sign or plaque shall be located so as to be clearly visible to persons in the workspace and shall be permitted to be on or adjacent to the equipment. The marking shall include the words:
WARNING!
AREA IN FRONT OF ELECTRICAL PANEL MUST BE KEPT CLEAR FOR _____.
The marking shall also include the dimensions of the depth, width, and height required to be kept clear for the workspace.

Substantiation: This requirement may be more appropriate for Article 110 than 408.

This proposal NEEDS to be accepted. Every electrician I know has been put in this dangerous situation where the workspace has been “stolen”. I realize that if the AHJ “enforces” the current language in the NEC then workspaces might be kept clear. The problem with that is the AHJ already DOES “enforce” it... but only at the time of installation unless someone discovers it and reports it after the initial installation. It may be too late by then. Disconnects may be unreachable. Circuit breakers get hidden. Panel doors become impossible to open. All this can add up to a disaster in an emergency. I hope that we don’t wait for a tragedy to finally accept this proposal. Please be “PRO-ACTIVE” on this. You can see the problem in the photos I have provided. This is a real and dangerous situation right now! I also realize that a warning sign is not a guarantee that the workspace will be kept clear. But it may prevent that first tragedy from ever happening. Per section 110.16, we are required to “remind” qualified electricians of the dangers of an arc-flash with a warning sign. My proposal parallels that requirement. The dangers of that arc-flash will be greatly magnified without the proper working space available. Let’s “remind” other people of the need to keep the workspaces clear.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: CMP 9 understands that this Comment has been considered by CMP 1. The action on this comment is not based on technical merit. CMP 9 requests that the Technical Correlating Committee correlate the Final Action on this comment to agree with the action taken by CMP 1.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-149 Log #128 NEC-P01 **Final Action: Accept**
(408.8)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-144
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 1 for Action in Article 110.

This action will be considered by the Code-Making Panel 1 as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the directive of the Technical Correlating Committee to consider Proposal 9-144.

See the panel action on Comment 1-150.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

HICKMAN, P.: See our comment to affirmative on 1-150.

1-150 Log #1392a NEC-P01 **Final Action: Reject**
(408.8)

Submitter: Russell LeBlanc, The Peterson School
Comment on Proposal No: 9-144
Recommendation: Accept this proposal, but modify the section from 408.8 to 110.17 as follows.

110.17 Work Space Warning Signs

Switchboards and panelboards shall be field marked with a sign or plaque to warn qualified and unqualified persons of the work spaces required to be kept clear by 110.26A(1), (2), (3) or 110.32 as applicable. The sign or plaque shall be located so as to be clearly visible to persons in the workspace and shall be permitted to be on or adjacent to the equipment. The marking shall include the words:
WARNING!
AREA IN FRONT OF ELECTRICAL PANEL MUST BE KEPT CLEAR FOR _____.
The marking shall also include the dimensions of the depth, width, and height required to be kept clear for the workspace.

Substantiation: This requirement may be more appropriate for Article 110 than 408.

This proposal NEEDS to be accepted. Every electrician I know has been put in this dangerous situation where the workspace has been “stolen”. I realize that if the AHJ “enforces” the current language in the NEC then workspaces might be kept clear. The problem with that is the AHJ already DOES “enforce” it... but only at the time of installation unless someone discovers it and reports it after the initial installation. It may be too late by then. Disconnects may be unreachable. Circuit breakers get hidden. Panel doors become impossible to open. All this can add up to a disaster in an emergency. I hope that we don’t wait for a tragedy to finally accept this proposal. Please be “PRO-ACTIVE” on this. You can see the problem in the photos I have provided. This is a real and dangerous situation right now! I also realize that a warning sign is not a guarantee that the workspace will be kept clear. But it may prevent that first tragedy from ever happening. Per section 110.16, we are required to “remind” qualified electricians of the dangers of an arc-flash with a warning sign. My proposal parallels that requirement. The dangers of that arc-flash will be greatly magnified without the proper working space available. Let’s “remind” other people of the need to keep the workspaces clear.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The submitter has not adequately demonstrated how such marking would be a benefit or act as a deterrent to unqualified persons. Qualified persons are or should be aware of the required spaces about electrical equipment.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

HICKMAN, P.: We are in general support of the recommendation but recognize that adequate technical substantiation has not been provided. We generally agree with the portion of the panel statement that qualified persons are, or should be, aware of the requirement for these spaces. However, those spaces are often compromised by unqualified persons such as the owner, tenant, custodial, and etc. that may not be familiar with the requirements. The recommendation would raise awareness.

9-60 Log #1510 NEC-P09 **Final Action: Reject**
(408.17)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-150
Recommendation: Accept the proposal with the following revisions:

Switchboards shall be located and installed so as to minimize the probability of igniting combustible material. Open bottom switchboards shall be permitted to be installed over a combustible floor or platform if provided with an approved noncombustible barrier under the switchboard.

Substantiation: “Igniting” includes sparks which may not be deemed the same as “fire”, which is self-sustaining. Location of the barrier should be specified.
Panel Meeting Action: Reject
Panel Statement: Requirement is clear and no substantiation has been provided to indicate the requirement is not being properly applied. The proposed change does not provide more clarity.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-61 Log #467 NEC-P09 **Final Action: Accept**
(408.36 Exception No. 1)

Submitter: Code-Making Panel 4,
Comment on Proposal No: 9-153
Recommendation: This proposal should be rejected.
Substantiation: The submitter is incorrect in his statement that the maximum number of disconnects referred to in 230.71 are feeding loads. The disconnects are to disconnect the source of supply which is the service. 230.71 is stating how many devices may be used as the service disconnecting means, which may be six multipole circuit breakers, or six sets of switches and fuses. 230.71(B) clarifies that the multipole switches or circuit breakers do not have to be factory made assemblies with only one operating handle, such as a two pole or three pole circuit breaker. They may be single pole breakers with identified handle ties or a master handle to make them operate as if they were a factory assembled unit operating all the ungrounded conductors. 408.36 correctly uses the wording from 230.71 in stating that a panelboard may have up to six disconnects which function as the service disconnecting means. The statement that 18 single pole breakers could not act as a the service disconnect is incorrect, in that if they have a master handle or identified handle tie and are the disconnects for a three phase panel, then 18 single pole breakers arranged as six disconnects would meet the requirements of this section. The submitter states that the language in Art. 230.72(B) is vague. He is citing the incorrect code section. Art. 230.71(B) is clear in stating that when "properly equipped with identified handle ties or a master handle to disconnect all conductors of the service with no more than six operations of the hand." then multiple single-pole breakers can be utilized to meet the requirements of Art. 230.71(A).

This comment was developed by a CMP-4 Task Group and balloted through the entire panel with the following ballot results:

12 Eligible to vote
11 Affirmative
1 Abstention (R.W. Preus for R.H. Wills)

The following Affirmative Comment on Vote was received:

W.I. Bower: I agree that the proposal should be rejected. The proposal is providing information already covered by 230.71(A).

R.W. Preus' reason for abstaining was as follows:

"I do not have expertise in this area."

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-62 Log #43 NEC-P09 **Final Action: Accept**
(408.51)

Submitter: Code-Making Panel 5,
Comment on Proposal No: 9-157
Recommendation: CMP-5 recommends this proposal be rejected.
Substantiation: CMP-5 concurs with the negative ballots, and the substantiation provided in those ballots, submitted by Mr. Osborne and Mr. Rupp. The product standard applicable to switchboards is UL 891. Tables 14 and 15 of that standard identifies the size of the equipment-grounding conductor (bus) based on the overcurrent protection device rating for switchboards with a main breaker and of the main bus rating where the switchboard has more than one main overcurrent device. The sizing of the equipment-grounding conductor (bus) is based on NEC Table 250.122 as a connection point of the equipment grounding paths from the feeders and branch circuits to then complete the ground fault current path to the system grounded conductor, via the main or system bonding jumper. This bus is not related to bonding conductors for connecting supply side equipment.

The proposal as submitted is problematic for AHJ enforcement since the product is controlled by the product standard and the sizing of the service conductors and therefore the equipment bonding conductors is an engineering design or field installer decision. Nowhere in National Electrical Code are there equivalent busbar sizes for the various cable sizes used in table 250.66, where 250.102(C) derives minimum conductor sizes. Any change in service entrance conductor sizes in the field due to various reasons could potentially require changing of the equipment grounding busbar to ensure equivalency thereby affecting the listing of the switchboard. Authorities Having Jurisdiction depend on listing of the equipment for conformance to product safety standards and being able to be installed in accordance with the National Electrical Code. It is also noted that equipment grounding busbars are also used in equipment rated as Service Entrance Equipment other than Switchboards, as the proposal would cover, (panelboards, motor control centers, industrial control panels, etc). No substantiation was provided of any problems in the field, and this issue appears to be more a product standard issue properly addressed through that process and not a code issue.

This Comment was developed by a CMP-5 Task Group and balloted through the entire panel with the following ballot results:

16 Eligible to Vote
14 Affirmative (Alternate P.J. LeVasseur for Principal D. Hammel and Alternate P.R. Picard for Principal R. Temblador)
2 Ballots Not Returned (D. Brender and G.S. Harding)
No Comments on Affirmative Vote were received.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-63 Log #129 NEC-P09 **Final Action: Accept**
(408.51)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-157
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the negative comments expressed in the voting and that this proposal be referred to Code-Making Panel 5 for comment.

This action will be considered by Code-Making Panel 9 as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the direction of the Technical Correlating Committee to reconsider its action based on the voting comments and has acted to reject Proposal 9-157 via its action on Comment 9-62.
Panel Statement: Refer to the panel action on Comment 9-62.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-64 Log #1567 NEC-P09 **Final Action: Accept**
(408.51)

Submitter: Robert D. Osborne, Underwriters Laboratories Inc.
Comment on Proposal No: 9-157
Recommendation: The Panel should reject this proposal.
Substantiation: The example used in the substantiation is a Code violation, as 250.80 requires service raceways and enclosures to be bonded to the grounded system conductor, with the method of bonding detailed in 250.92(B). Identifying Section 250-102(C) as the source of requirements for the equipment grounding conductor is incorrect, as this applies to the sizing of supply side enclosure bonding jumpers.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-65 Log #1771 NEC-P09 **Final Action: Accept**
(408.51)

Submitter: Chad Kennedy, Schneider Electric/Square D
Comment on Proposal No: 9-157
Recommendation: This proposal should be rejected.
Substantiation: I agree with the ROP comments by panel members Osborne and Rupp. The NEC requirements should not be revised solely based on the misunderstanding of some users whose current practice for bonding service raceway is not code compliant. The requirements in 250.80 and 250.92 provide very clear requirements on how service raceway is to be bonded.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-66 Log #1861 NEC-P09 **Final Action: Reject**
(408.51)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 9-157
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
408.51 Busbars. Insulated or bare busbars shall be rigidly mounted. Busbars for the supply-side bonding jumper(s) ~~equipment grounding conductor~~ in switchboards listed for use as service equipment shall be sized in compliance with 250.102(C), or the busbar location shall be labeled to prohibit bonding connections associated with service-entrance conductors.
Substantiation: Continue to support including rules in this section to ensure the proper sizing of busbars in switchboards that are identified as suitable for use as service equipment.

The present UL Standard on construction of switchboards (UL 891) allows the busbars installed in these switchboards to be sized based upon Table 250.122 rather than according to 250.102(C). Note that CMP-5 created a new definition of "Supply-Side Bonding Jumper in 250.2 and has used this term for sizing and installing bonding jumpers on the supply side of services and separately derived systems. The sizing rules continue to be located in 250.122(C). The sizing rules did not change though the previous term "Equipment Bonding Jumper" has been changed.

The attached "Analysis of Table 14 of UL 891 for Sizing Supply-Side Bonding Jumper" shows that the equipment grounding conductor or bonding conductor required in UL 891 is deficient for 21 out of the 23 ampere-ratings shown in the Table.

Even though separately derived systems are not mentioned in the rule, the UL White Book in (WEVZ) for deadfront switchboards indicates they are also suitable for separately derived systems. Here's another important reason to include this vital sizing rule in 408.51 – the system bonding jumper is required by 250.30(A)(1) to be sized identically to that shown in the accompanying "Analysis of Table 14 of UL 891 for Sizing Supply-Side Bonding Jumper".

Some are saying these construction requirements do not belong in the NEC but should be in UL 891. CMP-9 has a long history of including construction requirements in the NEC Articles under its jurisdiction. It is fairly safe to say if the construction requirements are included in the NEC, the UL Safety Standards will follow. Many, many, perhaps hundreds of construction requirements are found in the NEC. This one brings a significant safety issue to light and deserves being located in Article 408.

Here are the locations of construction requirements in Article 408 alone: 408.3(A)(1), 408.3(A)(2), 408.3(B) (well about half of the rule!), 408.3(C) (most of this rule deals with the construction of panelboards and switchboards), 408.3(D) (sure looks like construction rules), 408.3(G) (I guess this can be both a construction and installation rule!), and, of course Part IV.

The revised rule will ensure that the equipment grounding busbar in service equipment is sized properly for termination of bonding jumpers and main bonding jumpers. It is very common to terminate bonding jumpers for raceways containing service-entrance conductors on the equipment grounding or bonding busbar. The bonding jumpers are required to be sized in accordance with 250.102(C). The bonding jumpers for main and system bonding jumpers are required to be sized according to 250.28(D) which is identical to the requirement in 250.102(C). If connected to the equipment grounding or bonding busbar, in 21 out of 23 constructions that just meet the UL Standard, it will be too small.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: CMP 9 does not want to second guess CMP 5 regarding a rule that almost exclusively involves sizing requirements for grounding components governed by provisions in Article 250. CMP 5, (see Comment 9-62) unanimously voted to advise that this proposal should be rejected and CMP 9 accepted CMP 5's recommendation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

9-67 Log #2599 NEC-P09 **Final Action: Reject**
(408.51)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 9-157

Recommendation: Continue to accept the panel action on this proposal.

Substantiation: Although the explanations of negative votes are correct relative to the practice cited in the proposal substantiation as being a code violation for the reasons given, it is also correct that the installation practice of landing these bonding jumpers on the equipment grounding bus is very commonly observed in the field. The new labeling will raise field awareness regarding this potential violation. Remember that busbar sizing compliance with 250.102(C) is not readily apparent to an installer because busbars do not have ampacity labeling. Only the manufacturer and the testing laboratory will be in a position to know how this component is sized and for what current capacity. The change will not require the redesign of grounding components in switchboards unless the manufacturer chooses to avoid the label.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 9-66.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

HARTWELL, F.: The panel statement regarding jurisdiction is correct, but the assertion in this comment about field issues is as well. CMP 5 should review this issue in the 2014 cycle.

ARTICLE 409 — INDUSTRIAL CONTROL PANELS

11-1 Log #1067 NEC-P11 **Final Action: Accept**
(409.5)

Submitter: Noel Williams, Herriman, UT

Comment on Proposal No: 11-5

Recommendation: Continue to reject this proposal along with the identical or similar proposals such as 11-4, 11-6, 11-7, 11-8 - all of which are referred by panel statements to this proposal ROP 11-5.

Substantiation: Adding a requirement for approval is entirely redundant as noted in the panel statement. If listing is required of all industrial control panels, then Article 409 becomes essentially worthless and all the rest of Article 409 (all of Part II) should be deleted. Some parts of the UL standards must still be used (such as for determining the short-circuit current rating) even when using Article 409. But if all such panels are required to be listed, the provisions of Part II will not be used as the product safety standard will the the document used for evaluation. A requirement for listing of all control panels would also interfere with the application of NFPA 79 in some respects.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-2 Log #1241 NEC-P11 **Final Action: Accept**
(409.22)

TCC Action: The Technical Correlating Committee directs the proposed text be revised to read as follows since the original text in the comment would have required an industrial control panel at all locations where short-circuit current was not exceeded:

"409.22 Short-Circuit Current Rating. An industrial control panel shall not be installed where the available fault current exceeds its short-circuit current rating as marked in accordance with 409.110(3)."

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 11-9

Recommendation: Revise original proposal text and add new section 409.22 as follows:

409.22 Short-Circuit Current Rating. An industrial control panel shall ~~not~~ be installed ~~at a point on the electrical system~~ where the available fault current does not exceed ~~is in excess of~~ its ~~marked~~ short-circuit current rating as marked in accordance with 409.110(3).

Substantiation: The original proposal should have been accepted in principle, but with revision to place in positive text as was done with proposal 12-177 Log #4406 NEC-P12. This will ensure consistency and avoid ambiguities between application of control panels under Article 409 and those in Article 670.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-3 Log #130 NEC-P11 **Final Action: Accept**
(409.110(3))

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 11-23

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal concerning the use of the word "when" since the NEC Style Manual considers "when" as a condition of time.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel has clarified the NEC Technical Correlating Committee concerns by the action on Comment 11-4.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-4 Log #580 NEC-P11 **Final Action: Accept in Principle**
(409.110(3))

Submitter: Bob Fahey, City of Jamesville

Comment on Proposal No: 11-23

Recommendation: Revise text to read as follows:

(3) ~~When an~~ Industrial control panel~~s~~ ~~is~~ supplied by more than one power source such that more than one disconnecting means is required to disconnect all power within the control panel, it shall be marked to indicate that more than one disconnecting means is required to de-energize the equipment.

Substantiation: The Technical Correlating Committee indicated the word "when" should not be used in this context, therefore I am suggesting removing "when an" from the proposed text, the new revised text does not change the intent of the original proposal as approved by the code panel.

Panel Meeting Action: Accept in Principle

Revise existing text to read as follows:

(3) Industrial control panels supplied by more than one power source such that more than one disconnecting means is required to disconnect all power within the control panel shall be marked to indicate that more than one disconnecting means is required to de-energize the equipment.

Panel Statement: The panel accepts the submitter's recommendation and editorially deleted "it" before "shall" for readability.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 410 — LUMINAIRES (LIGHTING FIXTURES), LAMPHOLDERS, AND LAMPS

18-37 Log #2600 NEC-P18 **Final Action: Reject**
(410.10(C)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-98
Recommendation: Accept the proposal.
Substantiation: The panel statement is not responsive. The submitter knows quite well what "identified" means, which is why the proposal substantiation quoted it. All listed luminaires are, necessarily, identified for a specific purpose. The purpose of this rule, however, is to assure that it will not be necessary to refer to a cut sheet or listing report to determine suitability. These luminaires are marked for this purpose so the suitability is evident in the field during installation and at the time of inspection. The continued retention of the term "identified" is incorrect and meaningless in the context of 410.6.
Panel Meeting Action: Reject
Panel Statement: The product standard that applies to commercial cooking hood luminaires is UL1598, 3rd Edition, Section 12.3. This product standard requires a marking "Suitable for use within commercial cooking hoods" on products that have been evaluated and found suitable for this application. This satisfies the code requirement that the product be identified for the purpose. It is typical for product standards to require markings when the Code specifies that a product be identified for a purpose; the standards development organizations prepare product standards with the intent that product meeting the standards will also satisfy the applicable code requirements.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-38 Log #1520 NEC-P18 **Final Action: Reject**
(410.11)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-101
Recommendation: Revise the panel action as follows:
Combustible material. Luminaires and lampholders that operate with a surface temperature higher than 90° C (194° F) shall be constructed, installed or equipped with approved means to minimize the likelihood of igniting combustible material, or clearly and durable marked to indicate a minimum separation distance from combustible material.
Substantiation: "Installed" so that combustible material is not subject to temperatures in excess of 90° C does not provide specifics and is a judgment, where no means such as shades or guards are provided. Protocols for listed equipment would provide minimum clearance dimensions.
Panel Meeting Action: Reject
Panel Statement: The original proposal did not present data to substantiate that lampholders are creating heating issues. The code already restricts bare lamps in areas that could present heating hazards such as in clothes closets. The issues raised by the submitter regarding the enforcement of the panel action illustrates the complications that the proposed code change would present. Since no problem has been demonstrated, the panel concludes that a code change is not warranted. The suggested rewording places the responsibility for determining whether the means to minimize the likelihood of igniting combustible material on the AHJ. That is what use of the term "approved" accomplishes. The Panel does not agree with this approach.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-39 Log #1519 NEC-P18 **Final Action: Accept in Part**
(410.16(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-106
Recommendation: Accept the proposal with the following revisions:
(A) Only luminaires of the following types shall be permitted in a closet: (remainder unchanged)
Delete (B).
Substantiation: Luminaires are already required to be listed per 410.6. "Permitted to be" is not a requirement per 90.5(B), and therefore not enforceable. Some sections use the word "only" or "limited" where something is restricted.
(B) is superfluuous if "only" is accepted in (A).
Panel Meeting Action: Accept in Part
Accept the recommendation for 410.16 (A) and reject the recommendation for 410.16 (B).
Panel Statement: The panel agrees with the comment that will simplify (A) but concludes that (B) should remain to reinforce the restriction it is intended to convey.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
WELLS, J.: While the submitter may consider (B) superfluous, I consider it essential. It is precisely the type of equipment prohibited that has historically been installed and resulted in fires.

18-40 Log #1518 NEC-P18 **Final Action: Reject**
(410.18)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-107
Recommendation: Accept the proposal with the following revisions:
Space in accordance with 110.26 shall be provided for lamps and equipment installed in covers.
Substantiation: The present wording applies the requirement to all covers, whether or not lighting is installed. "Adequately" and "properly" are terms to be avoided per the NEC Style Manual.
Panel Meeting Action: Reject
Panel Statement: No data demonstrating a problem with the current code language was provided in the submitter's proposal or comment. The panel has concluded that expanding this requirement to lampholders or other equipment is not necessary.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12 \

18-41 Log #2313 NEC-P18 **Final Action: Accept in Principle**
(410.20)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 18-109
Recommendation: Please revise the text to better clarify the requirement.
Substantiation: As currently written, the text does not function as a sentence. I am not quite certain what the panel intended in its text, so I apologize for not being able to offer a real solution to the problem. Perhaps the second occurrence of the word "shall" should be changed to "can" or "may"?
Panel Meeting Action: Accept in Principle
Revise Section 410.20 to read:
Canopies and outlet boxes taken together shall provide sufficient space so that luminaire conductors and their connecting devices are capable of being installed in accordance with 314.16.
Panel Statement: The submitter raises a valid point. It should be noted that the Standard for Safety for Luminaires, UL1598, allows junction boxes and splice compartments that are integral to luminaires to have reduced free volume in respect to the requirements of 314.16. The reason being is that 314.16 applies to general purpose boxes and conduit bodies where installed conductors and devices are variable, whereas the conductors and devices that will be contained within a luminaire junction box are known.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-42 Log #131 NEC-P18 **Final Action: Accept**
(410.24)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 18-112
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal with respect to subdivision titles.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise headings to read as follows:
(A) Independent of the Outlet Box.
(B) Access to Boxes.
Panel Statement: The panel accepts the direction of the Technical Correlating Committee and revises the titles as shown in the 2011 NEC ROP Draft.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-43 Log #1517 NEC-P18 **Final Action: Reject**
(410.24(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-115
Recommendation: Accept the proposal with the following revisions:
Surface mounted luminairs using straight or U-shape fluorescent lamps and mounted over a box shall be provided with approved openings to provide access to wiring in the box.
Substantiation: Some electric-discharge luminaries, such as mercury vapor and sodium vapor, are not supported by an outlet box (chain support) and don't require openings in the back to an outlet box. Outlet boxes are not permitted to be concealed (rendered inaccessible) by 314.29 and 314.72(D).
Panel Meeting Action: Reject
Panel Statement: Chain suspended luminaires are not mounted over concealed outlet boxes. Chain suspended luminaires are provided with a canopy that, as required by the nationally recognized product safety standards, must provide access to the outlet box. The recommendation inappropriately limits this requirement to two specific types of luminaires. Further it ignores a key element in the present requirement related to the fact that these luminaires are not solely supported by the outlet box. The fact that this section requires access to the box is for the very purpose of being correlated with 314.29.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-44 Log #1516 NEC-P18 **Final Action: Reject**
(410.31)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-120
Recommendation: Accept the proposal as intended for 410.64 and referencing 410.65 as follows:
"Except as permitted in 410.65, luminaires shall not be used as a raceway unless listed and marked for such use."
Substantiation: Correlation with 410.65. Conductors such as grounding electrode conductors and cables such as coaxial and optical fiber should be included.
Panel Meeting Action: Reject
Panel Statement: Section 410.65 does not apply to luminaires used as raceways, rather it applies to luminaires connected together. Raceways, as referred to in 410.64, contain conductors that are not associated with the lighting circuit.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-45 Log #2516 NEC-P18 **Final Action: Reject**
(410.36(A))

Submitter: Patricia Barron, Safety Quick Light
Comment on Proposal No: 18-130
Recommendation: Revise text to read as follows:
410.36 (A) Outlet Boxes. Outlet boxes or fittings installed as required by 314.23 and complying with the provisions of 314.27(A) and 314.27(B) shall be permitted to support luminaries. A Luminaire supported by the outlet box shall be supplied with a power plug designed for mating with receptacle in accordance with 314.27(A).
Substantiation: Statement of Problem - There are a significant number of electrocutions and accidents occurring during luminaire installations, which result in substantial numbers of **injuries and cases of death.**
Substantiation for Comment: The proposed Power Plug for luminaires is based on the same concept of a standard wall receptacle and plug. Replacing the existing mounting method for luminaires, with the power plug and the pre-installation of the receptacle method **will eliminates 100% of all shock hazard risks**, while installing Luminaires. Luminaires will be safely plugged in or out, to the ceiling or wall. (The power plug UL and CSA Certified, has passed a 200 pound load test and can be used for all luminaries up to 50 pounds).The plug **makes luminaire installations as safe as plugging in a table lamp to the wall**. Luminaries can be plugged or unplugged for bulb replacement, painting, or other, free of risk and **without touching any energized circuits**. An outlet box, without a fixture, but with the receptacle is completely enclosed and safe - exactly like a standard wall receptacle. **When using the proposed power plug and receptacle, all luminaire associated wiring risks are completely eliminated.**
For a video demonstration go to: www.safetypowerplug.com
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The code does not prohibit this product, with the understanding that it is listed.
As indicated in the ROP panel statement "Installation of this device has the same level of risk as installing a luminaire". The comment does not include any data or statement that disproves this fact. Incorrect wiring connections to this device will create the same hazards associated with incorrect wiring connections to a luminaire. Reversed polarity connections are not precluded by this product. There is no indication that the product has been evaluated for inductive loads, voltages greater than 120V, current in excess of 5A. Accordingly, the device is not suitable for use with all luminaires. Additionally, physical size of the unit will not fit all outlet box mounted luminaire designs. The panel reiterates concern that this product has the potential to expose conductors and splices in the outlet box to untrained individuals. There is a single configuration of the mating components that does not preclude connecting luminaires with a voltage rating that is incompatible with the voltage available at the outlet. If this product is intended for use at all boxes intended for connection of luminaires it is necessary to have configurations that are similar to the requirements of 406.3(F).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-46 Log #1862 NEC-P18 **Final Action: Accept**
(410.42, 410.44, and 410.46)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 18-122
Recommendation: Revise the existing text of the 2008 NEC as follows:
410.42 ~~Exposed~~ Luminaire(s) ~~(A)~~ With Exposed Conductive Parts.
Exposed metal parts shall be connected to an equipment grounding conductor or insulated from the equipment grounding conductor and other conducting surfaces or be inaccessible to unqualified personnel. Lamp tie wires, mounting screws, clips, and decorative bands on glass spaced at least 38 mm (11/2 in.) from lamp terminals shall not be required to be grounded.
410.44 Methods of Grounding. Luminaires and equipment shall be mechanically connected to an equipment grounding conductor as specified in 250.118 and sized in accordance with 250.122.
Exception No. 1: ~~(B) Made of Insulating Material.~~ Luminaires made of insulating material that are directly wired or attached to outlets supplied by a wiring method that does not provide a ready means for grounding attachment to an equipment grounding conductor shall be made of insulating material and shall have no exposed conductive parts.
Exception No. 2 ~~1~~: Replacement luminaires shall be permitted to connect an equipment grounding conductor from the outlet in compliance with 250.130(C). The luminaire shall then comply with 410.42(A).
Exception No. 3 2: If ~~Where~~ no equipment grounding conductor exists at the outlet, replacement luminaires that are GFCI protected shall not be required to be connected to an equipment grounding conductor.
410.46 ~~410.44~~ Equipment Grounding Conductor Attachment. Luminaires with exposed metal parts shall be provided with a means for connecting an equipment grounding conductor for such luminaires.
~~**410.46 Methods of Grounding.** Luminaires and equipment shall be mechanically connected to an equipment grounding conductor as specified in 250.118 and sized in accordance with 250.122.~~
Substantiation: The rules on grounding of luminaires need to be re-organized into a proper sequence. The present requirement in 410.46 is a primary rule and should be located before 410.42(B). Then the present 410.42(B) must be located after the primary rule that requires grounding of luminaires and become an exception as, in reality, the existing (B) provides an exception to 410.46.
Section 3.3.4 of the NEC Style Manual states that "where" should not be used to mean "when" or "if." This Comment intends to use the word "if" where appropriate.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept
Panel Statement: The panel notes that the submitter's recommendation does not include any proposed text based on Proposal 18-126.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-47 Log #1515 NEC-P18 **Final Action: Reject**
(410.62(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-132
Recommendation: Accept the proposal with the following revisions:
Cord-connected adjustable luminaries and lampholders that are secured in place, shall not be required to be equipped with an attachment plug, if the cord is an extra-hard or hard usage type that complies with 400.3, contains an equipment grounding conductor, and is not longer than necessary for maximum adjustment of the lluminaire or lampholder.
Substantiation: Cords should be identified for the use, e.g., wet locations, sunlight resistance, and specified to contain an EGC.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any data to support that a problem or safety hazard exists with cords not being identified. The current requirement addresses cord-connected adjustable luminaires. Equipment grounding conductors and environmental considerations are addressed by the applicable product safety standards.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-48 Log #2601 NEC-P18 **Final Action: Reject**
(410.62(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-134
Recommendation: Accept the proposal in principle and reword as follows:
(C) Electric-Discharge Luminaires. Electric discharge luminaires shall comply with (1), and also with (2) or (3) or both as specifically apply to the application.
(1) Cord-Connected Installations. Luminaires in compliance with any of the conditions in (a) through (c) shall be permitted to be cord connected provided the luminaire is located directly below the outlet or busway and the cord is visible over its entire length and not be subject to strain or physical damage.
(a) Plug-Connected. A luminaire shall be permitted to be connected with a cord terminating in a grounding-type attachment plug or busway plug.
(b) Strain Relief and Canopy Provided. A luminaire assembly equipped with a strain relief and canopy shall be permitted to use a cord connection between the luminaire assembly and the canopy. The canopy shall be permitted to include a section of raceway not over 150 mm (6 in.) in length and intended to facilitate the connection to an outlet box mounted above a suspended ceiling.
(c) Manufactured Wiring Systems. Listed assemblies incorporating manufactured wiring system connectors in accordance with 604.6(C), shall be permitted to be cord connected.
[No changes to (2) or (3).]
Substantiation: The submitter appreciates the clarifications of intent as expressed in the panel statement, and has adjusted the wording accordingly. The parent text now specifically requires compliance with (1) in all cases, with (2) and/or (3) as apply to the application at hand. The submitter disputes the statement that the location material was omitted. The location requirement was and is in the parent text of (1). The visibility rule was omitted, and is now included in the parent text of (1) because it applies in all cases. The submitter apologizes for this oversight.
Panel Meeting Action: Reject
Panel Statement: The proposal and comment reflects an opinion that the current language is not user friendly but the panel has not received any additional comments from users supporting the submitter's original recommendation. The panel has received no substantiation identifying how the current requirement is misunderstood and the resultant problems or hazards. Additionally, the submitter has not substantiated the removal of "for listed assembly" in 410.62(C)(1).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-49 Log #1523 NEC-P18 **Final Action: Reject**
(410.64)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-136a
Recommendation: Accept the proposal with the following revisions:
Luminaires as Raceways. Luminaires shall not be used as junction points for through wiring except as permitted in 410.64(B), or as raceways unless they comply with 410.64(A), (B), or (C).
Substantiation: Junction points should be covered, also where used as raceways for other than circuit conductors such as grounding electrode conductors, coaxial and fiber optic cables.
Panel Meeting Action: Reject
Panel Statement: The term "junction point" is not defined in the NEC. While the term is used in other parts of the Code (i.e., 230.6, 300.15 & 517.19(D)), the submitter has not presented a compelling reason to include it in this article. Grounding electrode conductors, coaxial & fiber optic cables are already addressed by the Code.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-50 Log #1522 NEC-P18 **Final Action: Reject**
(410.68)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-142
Recommendation: Accept the proposal with the following revisions:
Feeder and a branch circuit conductors within 75 mm (3 in) of a ballast shall have an insulation temperature rating not lower than 90° C (194° F) unless the ballast or luminaire containing the ballast is marked for use with conductors with a higher insulation temperature rating.
Substantiation: The basic rule is for 90 degree insulation rating, which should be a minimum since ballasts or luminaries with a lower temperature designation may be replaced and not suitable for lower than 90° C.
Panel Meeting Action: Reject
Panel Statement: The temperature marking referenced by the current code is based on product listing criteria. Ballast replacement should be accomplished with a direct replacement ballast or a ballast provided as part of a listed or classified retrofit kit.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-51 Log #1521 NEC-P18 **Final Action: Reject**
(410.82(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-155
Recommendation: Accept the proposal with the following revisions:
Where used with Edison-base lampholders the grounded circuit conductor shall be connected to the screw shell and the terminal of the attachment plug identified in accordance with 200.10(B).
Substantiation: "Identified" for the grounded conductor is superfluous; 200.6 and 200.7 already apply. "identified blade" can apply to the blades that are identified for use with the ungrounded conductor(s) (shorter or different configuration). Some plugs have prongs, not blades. The grounded conductor should clearly be the circuit conductor; an equipment grounding conductor is also a grounded conductor. Where molded plugs are involved the grounded circuit conductor will be connected to the proper blade or prong.
Panel Meeting Action: Reject
Panel Statement: Neither the proposal nor the comment have identified a problem with the current code language nor a compelling reason to revise the language. This requirement is addressed by the appropriate product safety standard, UL153. The Panel carefully read the substantiation and fails to understand what the problem is. How is the present wording being misunderstood? What hazard results from such misunderstanding? How does the proposed rewording correct the situation?
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-52 Log #1531 NEC-P18 **Final Action: Accept in Principle**
(410.96)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-161
Recommendation: Accept the proposal.
Substantiation: The panel statement regarding 334.12(B)(4) did not consider the definition in Article 100 of Location, Dry, which states a temporary damp location can still be considered as a dry location.
Panel Meeting Action: Accept in Principle
Revise 410.96 to read as follows:
Lampholders in Wet or Damp Locations. Lampholders installed in wet locations shall be listed for use in wet locations. Lampholders installed in damp locations shall be listed for damp locations or shall be listed for wet locations.
Panel Statement: The panel action clarifies the use of lampholders based on where they are installed. The panel did consider all of the definitions associated with "location" in Article 100. UL496 required environmental markings are "wet' or "damp" location for lampholders. While "weatherproof" is addressed by this standard, the required identification would be "wet" or "damp".
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-53 Log #2312 NEC-P18 **Final Action: Reject**
(410.116(A)(1))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 18-167
Recommendation: Please revise the text to by changing the word "off" to "of", as follows:
The points of support and the trim finishing off the openings in the ceiling, wall, or other finished surface shall be permitted to be in contact with combustible materials.
Substantiation: There seems to be a typo in the panel's revised text.
Panel Meeting Action: Reject
Panel Statement: The panel intended to use "finishing off". This term is used in the current code and no problem with the term has been identified in the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-54 Log #1530 NEC-P18 **Final Action: Reject**
(410.117(A), (B), and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-169
Recommendation: Accept the proposal with the following revisions:
Delete (B)
(C) Where the branch circuit conductors are not rated for the temperature encountered, tap conductors rated for the temperatures encountered shall be run from the luminaire or lampholder connections to a box or conduit body located at least 300 mm (1 ft) from the luminaire or lampholder terminal connections. Such tap conductors shall be at least 450 mm (18 in.) in length.
Substantiation: (B) is covered by (A) which covers all conductors including insulated equipment grounding conductors. The provision should also apply to lampholders. "Permitted" is not a requirement and cannot be enforced. Any suitable wiring method should be permitted for the tap conductors. If fixture wires are used for the tap, they should be permitted in lengths as specified in 240.5(B)(2). Taps should be permitted from a conduit body.
Panel Meeting Action: Reject
Panel Statement: Section 410.117(B) is fundamental and ensures that supply conductors have temperature rating sufficient for the application. Section 410.117(A) is provided as direction to the product safety standard to ensure that manufacturer installed wiring is suitable for the application temperatures the submitter has provided no compelling argument, nor statement of problem, to delete 410.117(B). This requirement is specific to luminaires and the submitter has not provided a compelling argument nor statement of problem with the current code to justify the proposed text revision. "Shall be permitted" has a clear meaning as a permissive rule in 90.5(B).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-55 Log #2408 NEC-P18 **Final Action: Accept**
(410.130(G)(1))

Submitter: Brian E. Rock, Hubbell Inc.
Comment on Proposal No: 18-180
Recommendation: If the Panel revises its previous Panel Action to Reject for any reason, revise any proposed text in proposed Exception No 2 to replace "twist-lock type photocell or shorting cap" with "locking-type photocell or shorting cap".
Substantiation: "Twist-Lock", as proposed by the Submitter of P18-180, is a registered trademark (U.S. Patent & Trademark Office Nos. 565,872, 1,800,509, and 1,845,454) of Hubbell Incorporated for receptacles, attachment plug caps, cable connectors, and inlets (motor attachment plug caps) of the locking-blade construction, and for enclosures employing similar. If the Panel revises its Panel Action for any reason and decides to include the P2-87 Submitter's new text, change to generic "locking-type photocell or shorting cap".
Panel Meeting Action: Accept
Panel Statement: The panel notes that the original action on Proposal 18-180 will remain unchanged because the panel has received no other comments on this action. The panel understands the concern expressed in the submitter's recommendation and substantiation and will be cognizant about not using the cited term in future panel actions or statements.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-56 Log #1050 NEC-P18 **Final Action: Reject**
(410.130(H))

Submitter: Gregory P. Bierals, Samaritan's Purse World Medical Mission
Comment on Proposal No: 18-182
Recommendation: Accept this proposal to add text as follows:
The ballasts of fluorescent luminaries and high intensity discharge luminaries shall be protected against fault current in accordance with their limited short-circuit withstand rating.
Substantiation: These ballasts have a limited short-circuit withstand rating (normally, 200 amperes) and unless a circuit's design takes this into consideration, a serious hazard may exist. Section 110.1 is quite vague in this regard and cannot be relied upon to prompt the installer to provide supplementary protection where necessary.
Panel Meeting Action: Reject
Panel Statement: Section 110.10 does cover the submitter's concern. The submitter has not provided technical substantiation or data indicating that 110.10 does not adequately address the issue cited in the original recommendation and substantiation for Proposal 18-182.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-57 Log #2602 NEC-P18 **Final Action: Reject**
(410.135)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-183
Recommendation: Accept the proposal.
Substantiation: The panel statement objects to the uncertainty relative to whether equipment may still be listed in this category. This seems very unlikely. If such luminaires were being listed, surely the UL guide card information would reflect this, as well as the UL Luminaire Marking Guide. The rule requires that luminaires with open circuit voltages above 300 not be used in dwelling units unless certain construction features are present. Those features, as described in the NEC, would normally be the subject of provisions in a product standard and then result in a marking. If a member of the public walks into a building supply store frequented by both commercial patrons and homeowners, how else would they know what luminaire was unsuitable for residential use? It is simple common sense that if this were a relevant limitation, there would be some evidence of it having been applied in the existing product mix.
This rule has been in the NEC for about 65 years without modification. The submitter archives UL guide card information over the last 25 years, and to the best of his knowledge no indication of a marking has appeared in any of those publications. It is generally correct to be suspicious of any attempt to change the NEC if there is no record of loss experience. However, if this provision has been without observable force and effect for decades, it is time to seriously review its technical relevance. The body best equipped to do that is CMP 18, and that review should now occur.
The proposal substantiation made the argument that the requirement was obsolete. The panel statement refers to 4.3.3.d of the Regulations, requiring a statement of a problem. Therefore it can be logically established that according to CMP 18, an obsolete requirement is not a problem. This submitter is the senior member of CMP 9 and in his entire time of service he cannot recall a single instance when CMP 9 failed to act on the merits of a proposal of this nature. If any member of the public submitted a proposal suggesting that a provision within CMP 9's purview was obsolete, one of two things would happen, and by the end of the code cycle. Either the provision would be modernized, or a very compelling argument would be made in a panel statement, during the ROP period so there would be opportunity for rebuttal, explaining exactly why the requirement needed to stay in place.
Panel Meeting Action: Reject
Panel Statement: This section should be retained because 410.135 is still used as a basis for product safety requirements applicable to cold cathode electric discharge lighting systems that are listed for installation in dwelling units. The submitter has not provided any data demonstrating that products with open-circuit voltage exceeding 300 volts are obsolete. This provision also provides direction for new lighting technologies.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-58 Log #1529 NEC-P18 **Final Action: Reject**
(410.140(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-188
Recommendation: Delete.
Substantiation: This provision doesn't correlate with Article 100 definition of live parts, i.e., energized. Literal wording requires terminals of an electric-discharge lamp in a shipping carton to be considered live.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided a statement of problem with the current requirement. It is obvious that a lampholder in a shipping carton is not energized.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-59 Log #2603 NEC-P18 **Final Action: Reject**
(410.140(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-189
Recommendation: Accept the proposal.
Substantiation: Statement of problem: The existing NEC text uses the term "live part" in a manner inconsistent with the definition of the term in Article 100. An energized lamp terminal is obviously live and unworthy of a code requirement to state the obvious. Consideration of an energized lamp terminal for enforcement purposes as an uninsulated live part is not obvious and certainly worthy of a specific rule.
When the live part definition first entered Article 100 (1996 NEC) it applied to uninsulated or exposed parts that presented a shock hazard, and this rule fully comported with that definition. When the definition changed to its present form in the 2002 NEC, this section failed to correlate with that change. This proposal provides that correlation, and certainly does comply with the Regulations Governing Committee Projects.
Panel Meeting Action: Reject
Panel Statement: The panel concludes that changing "live part" to "uninsulated live part" is not necessary based on the current product listing requirements that address the accessibility to live parts concern. The panel refers the submitter to the requirements of 410.142.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-60 Log #132 NEC-P18 **Final Action: Accept**
(410.141(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 18-190
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered by Code-Making Panel 18 based upon the action of Code-Making Panel 1 taken on Proposal 1-63.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the direction of the Technical Correlating Committee to review it's action on Proposal 18-190 and rejects the proposal.
Panel Statement: Since Proposal 1-63 was rejected, the term "lockable disconnecting means" is not an appropriate substitute for the text of 410.141(B).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-61 Log #1528 NEC-P18 **Final Action: Reject**
(410.141(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-191
Recommendation: Accept the proposal with the following revisions:
The switch or circuit breaker shall be readily accessible, and within sight from the luminaire(s) or lamp(s) or provided with an approved permanent integral means for locking in the open (off) position.
Substantiation: Locking means should be permanent and integral to the disconnecting means. It is not reasonable to assume makeshift methods (defined as crude and temporary) to be as effective, as the panel stated. Open position should be designated "off" to differ from an open door or cover.
Panel Meeting Action: Reject
Panel Statement: The panel does not find any substantiation for the inclusion of "integral". Several manufacturers make add-on means that are just as effective and permanent as those integral with the disconnect.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-62 Log #2604 NEC-P18 **Final Action: Reject**
(410.141(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-190
Recommendation: Continue to accept the panel action, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110: "**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement to Comment 18-60 which was submitted by the Technical Correlating Committee. CMP 1 has not included a definition for "lockable disconnecting means" in their comment actions.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-63 Log #1527 NEC-P18 **Final Action: Reject**
(410.145)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-192
Recommendation: Accept the proposal.
Substantiation: See Explanation of Negative Vote on Proposal 7-9, 320.12(I) of the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: The Panel notes that the negative comment was inconsistent with the views of 11 of the 12 members of CMP 7. The Panel agrees with the majority statement of CMP 7 in their rejection of Proposal 7-9. The panel reaffirms it's statement on Proposal 18-192.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-64 Log #1526 NEC-P18 **Final Action: Accept**
(410.147)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-194
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual (4.1) states: do not use a reference if the requirement is already covered by 90.3. Does this apply to the panels?
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 422 — APPLIANCES

17-4 Log #1525 NEC-P17 **Final Action: Reject**
(422.13)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-9
Recommendation: Accept the proposal.
Substantiation: Continuous load contributes to perhaps excessive heating of terminals of feeder and service conductor overcurrent devices also. Continuous load is applied to feeder and service conductors in Examples (D)(3) and (D)(3)(a) in Annex D. If they are not to be included, the examples should be changed to avoid confusion.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided additional documentation to justify this change in the code. The examples of Annex D, examples (D)(3) and (D)(4) do not specifically address water heaters. CMP 17 has determined that the heating elements of a storage type water heater are not typically continuously energized for more than 3 hours as defined for continuous loads per Article 100.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-5 Log #1952 NEC-P17 **Final Action: Accept in Principle**
(422.15(C) (New))

Submitter: Thomas V. Blewitt, Underwriters Laboratories Inc.
Comment on Proposal No: 17-11
Recommendation: Revise text to read as follows:
(C) An equipment grounding conductor shall be used where the central vacuum outlet assembly has accessible noncurrent-carrying metal parts, likely to be energized. Parts that are not considered likely to be energized are metal screws or rivets in polymeric enclosures or faceplates, external metal springs used on a self-closing polymeric cover, and the like.
Substantiation: As noted in my negative ballot, the Panel Action did not provide inspectors with clarity on whether the small parts of the vacuum outlet assemblies required grounding. The proposed additional text provides that

guidance to inspectors and is consistent with text in the soon to be published 8th edition of product safety Standard UL1017 (Vacuum Cleaners, Blower Cleaners and Household Floor Finishing Machines). See text from standard that has achieved consensus.

8.2.6 All accessible noncurrent-carrying metal parts of a central vacuum cleaner's electrified wall valve assembly (outlet assembly) that are likely to be energized shall be connected to the equipment grounding conductor or equipment grounding terminal of the valve assembly. Parts that are not considered likely to be energized are metal screws or rivets in polymeric enclosures or faceplates, external metal springs used on a self-closing polymeric cover, and the like. Electrified wall valves connected to an extra-low voltage circuit are excluded from this requirement.

Panel Meeting Action: Accept in Principle

Revise 422.15(C) to read as follows:

(C) Accessible non-current-carrying metal parts of the central vacuum outlet assembly likely to become energized shall be connected to an equipment grounding conductor in accordance with 250.110. Incidental metal parts such as screws or rivets installed into or on insulating material shall not be considered likely to become energized.

Panel Statement: The panel agrees with the recommendation in principle but has revised the language for clarification and to comply with the manual of style. Also metal parts "likely to BE energized" are not non-current-carrying. "Likely to BECOME energized" is the appropriate wording for non-current-carrying conductive parts, as used in 250.110.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

17-6 Log #2182 NEC-P17 **Final Action: Accept in Principle**
(422.15(C) (New))

Submitter: Wayne E. Morris, Association of Home Appliance Manufacturers
Comment on Proposal No: 17-11
Recommendation: The change CMP-17 made to the text of proposal 17-11 is not acceptable. Instead, AHAM suggests "C. Grounding, if needed, shall be in compliance with 250.110".
Substantiation: The change CMP-17 made to the text will not correct the issue. Some local inspectors have interpreted the requirements of section 422.15 (C) of NEC 2008 as requiring the all metal parts, such as screws or springs, be grounded. Grounding should not be required for such parts that are not likely to be energized. There was debate at the CMP 17 meetings about using the term "likely to be energized," but Section 250.110 includes the phrase "Likely to be energized".

The Association of Home Appliance Manufacturers represents manufacturers of central vacuum cleaners. We believe confusion is created by the current verbiage in the 2008 NEC:

"(C) Accessible non-current carrying metal parts of the central vacuum outlet assembly shall be connected to an equipment grounding conductor."

Mr. Ralph Guinn suggested alternate wording in a 2011 NEC Proposal:

"(C) An equipment grounding conductor shall be used where the central vacuum outlet assembly has accessible noncurrent-carrying metal parts, likely to be energized."

It is my understanding that the CMP 17 did not agree with the use of "likely to be energized" and found it difficult to work with this proposal as it did not start from the wording in the 2008 NEC.

CMP 17 proposed alternate wording in the ROP meeting January 20-24, 2009: "Accessible non-current carrying metal parts of the central vacuum outlet assembly shall be grounded in accordance with 250.110."

[Note that if you go to 250.110, it uses "likely to be energized..."].

We believe that this proposed change language to 422.15 (C) still has some problems.

Final home inspectors are unfamiliar with CVS inlets.

The central vacuum outlet assembly is composed of a backing plate that is screwed to a wall stud (plastic body with metal flange for support) and the actual wall valve plate that has a spring-loaded door cover. The visible wall valve plate has two metal screws to affix this part to the backing plate.

Some wall valves have low voltage supplied from the vacuum cleaner power unit in the basement/garage. This low voltage is isolated and approved by UL as class 2 power. The low voltage is actuated from a switch on the power head unit (connector, hose, wand, and floor nozzle). Some of these low-voltage assemblies also make available a 120V separate cord that is connected to a nearby standard 120V wall receptacle to power the motor in the power head.

Some wall valves have a 120V connection in the visible wall valve plate. This connection consists of a UL recognized connector permanently molded to a 2-wire "Romex"™ wire that is connected in the wall to a standard receptacle. The screws that affix the visible wall valve plate and cover to the backing plate appear to be the issue with inspectors.

Many inspectors see the assemblies for the first time already fully installed in a home. Upon reading the code, they assume the mounting screws should be grounded. A quick continuity check obviously shows that they are not. The inspector will then hold final clearance of the house. This causes much undo stress and cost to the builder, home owner, sub-contractor and manufacture. A quick removal and deeper inspection of the product would reveal there is no need to ground anything contained in a CVS electrified inlet assembly.

The valves in question are indeed safe and do not require grounding of the mounting screws. The screws are either more than 2 inches from the incoming electrical power or protected by 2 or more layers of insulation including over one half inch of air space. Underwriters Laboratories has created a section covering valves for this use within their standard UL1017. As they will now list or recognize products to this standard, evaluation to the separation of circuits and grounding has been completed. We believe that UL does not require the screws to be grounded.

Manufacturers of Central Vacuum Systems that include listed electrical vacuum inlet assemblies need clarification for the final inspectors that the accessible metal screws on the currently available 2 styles of valves, do not need be grounded. The current and proposed text does not fulfill this need.

A recommendation might be to omit the grounding statement for this section. This may not be feasible, and therefore we suggest that it be changed to the following:

"C. Grounding, if needed, shall be in compliance with 250.110."

This text provides for an easier to maintain code as there will not be redundant messages that would require future changes to take place in multiple locations. This will also push the true intent of the statement to the article within the code that is intended to cover the need.

The above statement also helps to highlight that the valves may not need to have the screws grounded and direct the inspector to the correct place to make that determination.

For the above reasons, we are asking members of the CMP 17 to consider voting "No" on Proposal 17-11, Log #1559 and allow the CMP to work on this language in December 2009 at the ROC stage.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 17-5.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-7 Log #133 NEC-P17 **Final Action: Accept**
(422.16(B)(4)(5))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-16
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal as the proposal does comply with the NFPA Regulations Governing Committee Projects.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC and continues to reject Proposal 17-16. See panel statement on Comment 17-8.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-8 Log #2276 NEC-P17 **Final Action: Accept**
(422.16(B)(4)(5))

Submitter: Brian Myers, IBEW Local Union 98
Comment on Proposal No: 17-16
Recommendation: Continue to reject.
Substantiation: The requirement is for possible replacement by a microwave oven and not intended for hard wired appliances. 90.1(B) is a warning to installers to let them know that meeting the minimum requirements of the NEC may not allow for future expansion of the installation; it is not a limitation on the Code for establishing minimum requirements for installations.
Panel Meeting Action: Accept
Panel Statement: The panel concurs with the comment submitter's rationale for continued rejection of Proposal 17-16.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-9 Log #2314 NEC-P17 **Final Action: Reject**
(422.16(B)(4)(5))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 17-16
Recommendation: Accept the proposal as submitted.
Substantiation: Obviously the proposal contained new text in legislative format, as required by 4.3.3(c) of the
Regulations Governing Committee Projects. It is understood that the panel has much to do and simply missed this.
The proposal has much merit, in that provides relief to a real issue in the field.
Panel Meeting Action: Reject
Panel Statement: The requirement is for possible replacement by a microwave oven and not intended for hard wired appliances. 90.1(B) is a warning to installers to let them know that meeting the minimum requirements of the NEC may not allow for future expansion of the installation; it is not a limitation on the Code for establishing minimum requirements for installations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-10 Log #2605 NEC-P17 **Final Action: Accept**
(422.16(B)(4)(5))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-16
Recommendation: The proposal should be rejected.
Substantiation: Although the proposal clearly does comply with the Regulations, it should be rejected on its merits. Receptacles as covered in the proposed exception are permitted to be installed on small appliance branch circuits through 210.52(B)(2) Exception No. 2. These circuits are subject to wide varieties of intermittent loading, and the small amounts of power consumed will not affect the operation of those circuits. On the other hand, the potential microwave circuits are increasing in the amount of power consumed (see, for example, the comment on vote on Proposal 17-15). This is a fixed load and should be reserved as currently required.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-11 Log #134 NEC-P17 **Final Action: Accept**
(422.16(B)(4) and (5))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-17
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal as the proposal does comply with the NFPA Regulations Governing Committee Projects.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: CMP 17 accepts the direction of the TCC to act on Proposal 17-17, and the panel continues to reject the proposal.
Cord and plug connected microwave ovens are being installed and plugged into existing receptacles that have been previously installed under previous permits. When installing a hardwired microwave oven, a permit would be required, which will allow the inspector to verify the loading on the branch circuit. Subsection 90.1(B) is a warning to installers to let them know that meeting the minimum requirements of the NEC may not allow for future expansion of the installation; it is not a limitation on the Code for establishing minimum requirements for installations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-12 Log #1524 NEC-P17 **Final Action: Reject**
(422.21 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-19
Recommendation: Accept the proposal.
Substantiation: 550.15(E) has a similar provision. If not necessary for other type occupancies, it should not be necessary for mobile homes.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide any additional documentation that would justify accepting this comment. See original panel statement to Proposal 17-19.
The submitters suggestion for 550.15(E) is not under the purview of CMP 17.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-13 Log #1534 NEC-P17 **Final Action: Accept in Principle in Part**
(422.30)

TCC Action: The Technical Correlating Committee revises the panel's action in 680.23(F)(2) to comply with 2.6 and 3.1.4 of the NEC Style Manual regarding exceptions and directs that the text will read as follows: "Other than listed low-voltage luminaires not requiring grounding, all...".
Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-20
Recommendation: Revise the panel statement as follows:
An approved means shall be provided to simultaneously disconnect all ungrounded conductors of each branch circuit supplying an appliance in accordance with the following sections of Part III. If an appliance is supplied by more than one circuit the disconnecting means shall be grouped and durably marked to identify the appliance controlled.
Substantiation: Appliances may be supplied by more than one circuit from the same source, such as a panelboard, transformer, or service.
Panel Meeting Action: Accept in Principle in Part
Revise 422.30 to read as follows:
422.30 General.
A means shall be provided to disconnect simultaneously each appliance from all ungrounded conductors in accordance with the following sections of Part III. If an appliance is supplied by more than one branch circuit or feeder, these disconnecting means shall be grouped and identified as the appliance disconnect.
Panel Statement: CMP 17 accepts the submitters substantiation but rejects the proposed revised text. Adding the word "approved" to the first sentence of this section does not add any substantial improvement to this section. The process of approving something is already covered in Section 110.2 And the term "Approved" is defined in Article 100. The panel modified the text to more clearly state the "source" as "branch circuit or feeder." The panel also added text to clarify the identification of the disconnecting means. The panel chose not to use the term "durably" because the AHJ determines the suitability of marking means, dependent on the location.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-14 Log #2606 NEC-P17 **Final Action: Accept**
(422.31 and 422.32)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-21
Recommendation: Accept the proposal in principle.
Change the beginning of the new (C) to read as follows: "(C). Motor-operated Appliances Rated Over 1/8 Horsepower. For permanently-connected motor-operated appliances with motors rated over 1/8 horsepower, the branch-circuit switch … [as in the proposal].
Substantiation: The relevant criterion that should govern wither a remote lock-out is acceptable should be whether the equipment is capable of sudden movement. By placing the "motor-operated" criterion into this section the correct application is clarified. With respect to the comments in the voting, a 1/8 horsepower motor will run in the vicinity of or somewhat above 300 VA, so the confluence of the two criteria is correct.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 11 Negative: 2
Explanation of Negative:
MORRIS, W.: AHAM has continued to remind the CMP 17 that motors are not rated and marked in HP and as long as the code will require this, inspectors will be looking for these markings. This causes confusion. Industrial motors may be marked in HP but not usually household appliances.
PANNOCK, J.: Appliance motors are not typically rated and marked in HP. The code should not refer to HP as it creates confusion for the inspectors who will be looking for these markings.

17-15 Log #1533 NEC-P17 **Final Action: Reject**
(422.31(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-23
Recommendation: Accept the proposal.
Substantiation: If locking means are permanent, integral and part of listed equipment have been evaluated by the listing agency. It is not reasonable to assume makeshift methods are as suitable or effective.
Panel Meeting Action: Reject
Panel Statement: There is no substantiation provided to show the current section is inadequate or being misinterpreted. The section already requires that the provision for locking remain in place with or without the lock installed. Where the disconnecting means is a switch or circuit breaker, the provision for locking is permanently affixed to the enclosure (switch's faceplate or circuit breaker's panelboard) rather than directly to either the switch or circuit breaker itself. The provision for locking, although permanent, is not necessarily integral

to the disconnecting means itself.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-16 Log #2607 NEC-P17 **Final Action: Reject**
(422.31(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-22
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110: "**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
Panel Meeting Action: Reject
Panel Statement: CMP 1 has not accepted this definition.
Should CMP 1's action be reversed, it is recommended that the TCC consider "holding" this proposal and comment for the next cycle.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-17 Log #1532 NEC-P17 **Final Action: Reject**
(422.33(A) and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-27
Recommendation: Accept the proposal with the following revisions:
(A) Where the separable cord connector body, plug, receptacle or flanged surface outlet are not readily accessible, cord and plug connected appliances shall be provided with disconnecting means in accordance with 422.31(C). The rating of an attachment plug, receptacle, cord connector body, and flanged surface device shall not be less than the rating of any appliance connected thereto.
Substantiation: Cord and plug connections are not permitted to be not accessible (permanently closed in by the structure). Flanged surface devices with construction and uses similar to receptacles and attachment plugs should be included.
Panel Meeting Action: Reject
Panel Statement: CMP 17 does not accept the submitter's substantiation. The definition the submitter refers to is for "Accessible (as applied to wiring methods)". The definition for this disconnecting means for an appliance should refer to the definition of "Accessible (as applied to equipment)". The definition of "equipment" includes appliances.
A flanged surface outlet is already addressed either as a separable connector or a receptacle.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-18 Log #1021 NEC-P17 **Final Action: Accept**
(422.49)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 17-29
Recommendation: The Proposal should continue to be rejected.
Substantiation: The Panel is correct on the hyphenation. I overlooked the distinction and thank the Panel for bringing it to my attention.
This Comment also applies to the Actions taken on all the other Proposals that I submitted to CMP-17 on this issue.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-19 Log #2711 NEC-P17 **Final Action: Reject**
(422.49)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 17-30
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any additional documentation to show that this product has been listed. The companion proposals for neither 422.49 [Proposal 17-30] nor the associated Article 100 Power Safe Protector definition [Proposal 2-27] do not establish limiting safe values for any protection parameters. Any device with a current-interrupting feature and red and green indicator lights could purport to provide power safe protector protection. As such, the proposed requirement is unenforceable.
The additional documentation does not provide sufficient data to show the PSP device will add any greater level of safety in regards to mitigating electrocution hazards than the currently required GFCI devices provide. The UL Research Report clearly states that its scope was to "assess the ability of the Energy Safe Technologies Power Safe Protector (PSP) receptacle design to prevent overheating and thereby mitigate the likelihood of ignition of the electrical wiring system." The requirement for using GFCI protection in this code section is to prevent electrocution where electricity is being used in wet locations. The report clearly states that "An evaluation of this "Power Off" paradigm was not included in this research investigation".
The submitter has not addressed prohibited use of a proprietary trademarked name in mandatory Code requirements (Annex A.14, Guide for Officers of Technical Committees and Technical Correlating Committees of the NFPA). U.S. Patent & Trademark Office shows a live application [USPTO Serial Number 77633351] for registration of "POWERSAFE" by the submitter's corporation Energy Safe Technologies Inc.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 424 — FIXED ELECTRIC SPACE-HEATING EQUIPMENT

17-20 Log #135 NEC-P17 **Final Action: Accept**
(424.3(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-39
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement of this proposal to identify what was not accepted and the reason it was not accepted.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Accept in part Proposal 17-39: accept the addition of "and motors" and reject the remainder of the recommendation.
Panel Statement: The panel accepts the direction to provide clarification.
In Proposal 17-39, the panel accepts the addition of "and motors" and rejects the remainder of the recommendation. The reason for rejection is that the submitter has provided no definitive substantiation to show that the requirements of 430 Part II should not apply.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-21 Log #2277 NEC-P17 **Final Action: Accept**
(424.3(B))

Submitter: Brian Myers, IBEW Local Union 98
Comment on Proposal No: 17-39
Recommendation: Continue to Accept in Part.
Substantiation: The submitter has provided no definitive substantiation to show that the requirements of 430 part 2 should not apply.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-22 Log #1535 NEC-P17 **Final Action: Reject**
(424.12(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-40
Recommendation: Accept the proposal.
Substantiation: See Explanation of Negative Vote on Proposal 7-9, 320.12(1) of the 2010 ROP. If "likely" is not acceptable, it should be removed in over 80 places in the NEC.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided justification acceptable to the panel to justify this change. The submitter referred to the explanation of negative vote on Proposal 7-9 of the 2010 ROP, of which the panel would refer the submitter to the action of that proposal.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-23 Log #1541 NEC-P17 **Final Action: Reject**
(424.19)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-43
Recommendation: Accept the proposal with the following revisions:
Disconnecting Means. An approved disconnecting means that simultaneously disconnects all ungrounded conductors shall be provided for each branch circuit supplying fixed electric space heating equipment. The disconnecting means shall be provided with an approved integral means for locking in the open (off) position. Where the equipment is supplied by more than one circuit, the disconnecting means shall be grouped and durably marked to indicate the equipment controlled. Where a switch is used as the disconnecting means for combination loads, it shall comply with 430.110(C).
Substantiation: "Approved" will cover switch ratings and other requirements. Simultaneous disconnection of ALL conductors is not practical where there is more than one supply circuit. Disconnecting means should be durably marked to specifically indicate the equipment controlled. Switches should comply with 430.110(C). All disconnecting means such as circuit breakers and molded case switches are not limited to 80 percent of the load. The 125 percent factor for disconnecting means is somewhat unusual and generally relates to conductors to minimize heating at overcurrent device terminals; not disconnecting devices which are rated to carry and interrupt their rated current. 430.110 indicates 115 percent for motor circuit switches and 100 percent for molded case switches. "Off" should be noted after "open" since open can apply to a door or a cover.
Panel Meeting Action: Reject
Panel Statement: The editorial changes have not added further substance or clarity. The panel reaffirms its reason for rejection of Proposal 17-43. The panel also rejects the proposal to eliminate the 125 percent increase in total rating of the disconnect since a major concern is that the heater continue to work during freezing weather. The panel also rejects the proposal to add the requirements locking disconnects in the open (off) positions in this section since they are already individually addressed in sections 424.19(A)(1)(2), 424.19(A)(2)(2) and 424.19(B)(1).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-24 Log #2608 NEC-P17 **Final Action: Reject**
(424.19)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-42
Recommendation: Accept the proposal in part, contingent on the companion comment to this being accepted by CMP 1. Reject the modifications to 424.19(A)(2), but accept the remainder of the proposal.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:
"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
The wording proposed for 424.19(A)(2) should be rejected because the wording accepted under Proposal 17-44 does not specifically contain a lockable disconnect requirement, and therefore that portion of the proposal is now moot. Note that as stated the proposal omits the "1/8" size that should appear ahead of "Horsepower" in the titles of 424.19(A)(1) and 424.19(A)(2). This should be corrected by staff.
Panel Meeting Action: Reject
Panel Statement: CMP 1 has not accepted this definition.
Should CMP 1's action be reversed, it is recommended that the TCC consider "holding" this proposal and comment for the next cycle.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-25 Log #1542 NEC-P17 **Final Action: Accept in Principle in Part**
(424.19(B)(1))

TCC Action: The Technical Correlating Committee notes that the panel's action on this comment to revise 424.19(A)(2)(2) is in conflict with the panel action on Proposal 17-44.
The Technical Correlating Committee directs that 424.19(A)(2) be revised in accordance with the action taken on Proposal 17-44.
Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-45
Recommendation: Accept the proposal with the following revisions:
...or has approved integral provisions for locking in the open (off) position.
Substantiation: Locking provisions should be part of the disconnecting means evaluated by listing protocols; and clearly specify the off position, not an open door or panel of the device.
Panel Meeting Action: Accept in Principle in Part
In 424.19(A)(1)(2), 424.19(A)(2)(2) and 424.19(B)(1) add "(off)" after the word "open."
Panel Statement: CMP 17 accepts the proposal to clarify use of the word "open" by adding "(off)" after it, but also proposes to add it to 424.19(A)(1)(2) and 424.19(A)(2)(2). The panel continues to reject the rest of the proposed changes as originally rejected in the ROP.
Where the disconnecting means is a switch or circuit breaker, the provision for locking is permanently affixed to the enclosure (switch's faceplate or circuit breaker's panelboard) rather than directly to either the switch or circuit breaker itself. The provision for locking, although permanent, is not necessarily integral to the disconnecting means itself.
It is recommended that the TCC consider making similar clarifications throughout the Code for correlation and consistency.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

17-26 Log #366 NEC-P17 **Final Action: Accept**
(424.44(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-57
Recommendation: The proposal should be accepted in principle and in part. Accept the principle that the text should agree with the title in format. Reject the use of slash marks in this wording as currently used in the text, and revise the text to agree with the title, as follows: "Constant wattage heating cables shall not exceed 54 watts per linear meter (16½ watts per linear foot) of cable."
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.
The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 426 — FIXED OUTDOOR ELECTRIC DEICING AND SNOW-MELTING EQUIPMENT

17-27 Log #1647 NEC-P17 **Final Action: Accept**
(426.20(C)(3))

Submitter: Paul Crivell, CDM Inc.
Comment on Proposal No: 17-71
Recommendation: Revise 426.20(C)(3) follows:
Equipment that has been ~~specially investigated~~ listed for other forms of installation shall be installed only in the manner for which it has been identified ~~investigated.~~

Substantiation: The proposal 17-71 should be accepted in part and principle for the following reasons:

The word "investigated" is not defined and is therefore subjective and not enforceable. The purpose of 426.20(C)(3) is to allow embedded deicing and snow-melting resistance heating elements to be installed with different cover than prescribed in 426.20 (C)(1) and 426.20(C)(2). It is not too restrictive to require that the heating elements be listed and for listing to "*identify*" alternate installation requirements which do not comply with those prescribed in 426.20(C)(1) or 426.20(C)(2).

The heating elements are not necessarily "listed" for a manner of installation, but more accurately its listing could "identify" a manner of installation other than that prescribed in 426.20(C)(1) or 426.20(C)(2).

The following panel statement could be used to Accept in Part and Principle:

The heating elements are not necessarily "listed" for a manner of installation, but more accurately its listing could "identify" a manner of installation other than that prescribed in 426.20(C)(1) or 426.20(C)(2).

426.20(C)(3) and the wording proposed in 17-71 should be revised as follows:

Equipment that has been ~~specially investigated~~ listed for other forms of installation shall be installed only in the manner for which it has been identified ~~investigated~~.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

17-28 Log #136 NEC-P17 **Final Action: Accept**
(426.22(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-72
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement of this proposal to identify what was not accepted and the reason it was not accepted.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Revise 426.22(B) to read as follows:

(B) Raceways. All but 25 mm to 150 mm (1 in. to 6 in.) of nonheating leads not having a grounding sheath shall be enclosed in a rigid metal conduit, electrical metallic tubing, intermediate metal conduit, or other raceways within asphalt or masonry. The distance from the factory splice to raceway shall not be less than 25 mm (1 in.) or more than 150 mm (6 in.).

Panel Statement: The panel accepts the direction of the TCC.

CMP 17 accepts the addition of the term "metal" and the deletion of "Type TW and other approved types" as proposed, but does not accept the proposed change of adding the words "of conductors" because it would be redundant. The panel also does not accept the need to add the word "identified." Note that the submitter shows the word "approved" as being deleted and replaced with "identified," but the term "approved" is not in the current code section and no substantiation was provided for the change. The panel also made an editorial change to make the last phrase a separate sentence.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

17-29 Log #1369 NEC-P17 **Final Action: Reject**
(426.32)

Submitter: Neal Fenster, Thermo Systems Technology, Inc.
Comment on Proposal No: 17-78
Recommendation: Revise text to read as follows:

Unless protected by ~~a ground-fault circuit-interrupter protection for personnel~~ ground fault protection the secondary winding of the isolation transformer connected to the impedance heating elements shall not have an output voltage greater than 30 volts ac.

Where ~~ground-fault circuit-interrupter protection for personnel~~ ground fault protection is provided, the voltage shall be permitted to be greater than 30 but not more than 80 volts.

Substantiation: The higher operating current levels of electrical impedance heating systems are not compatible with a Class A type protection system.

An impedance system "looks" like a pair of insulated conductors running parallel to ground. Normally when you have a pair of conductors running parallel to ground, the electrical fields cancel and there is very little, to no inductive and capacitive coupling to ground. Due to the geometry of even a very well designed impedance system (one of the insulated conductors is a large insulated pipe) the electrical fields do not cancel locally. The result is a small percentage of the current "leaks" to ground due to inductive and capacitive coupling.

While it is a small percentage, impedance systems run "high" currents (100-1000 amps), and a small percentage of leakage is still significant. The leakage current is distributed along the pipe, and as it is capacitive and inductive coupled, it does not present a danger to personnel; however, a ground fault device "sees" the summation of the leakage currents. This summation will almost always exceed the 5 ma trip setting of a personnel level ground fault. This will result in "false" trips.

Unfortunately, in my experience, field personnel will disable a device that is causing false trips. This will result in an unsafe operating condition, as no ground fault protection will be functional.

For this reason, equipment level ground fault should be specified.

Panel Meeting Action: Reject
Panel Statement: The requirement for GFCI protection is only for those systems that have greater than 30 volts AC on the secondary side of the isolation transformer. If the voltage exceeds 30 volts AC at 100 – 1000 amperes, GFCI protection should certainly be provided for the protection of personnel at these voltages. The submitter is seeking to protect personnel with a device that is not meant for personnel protection.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 427 — FIXED ELECTRIC HEATING EQUIPMENT

17-30 Log #1370 NEC-P17 **Final Action: Reject**
(427.27)

Submitter: Neal Fenster, Thermo Systems Technology, Inc.
Comment on Proposal No: 17-86
Recommendation: Revise text to read as follows:

Unless protected by ~~a ground-fault circuit-interrupter protection for personnel~~ ground fault protection the secondary winding of the isolation transformer connected to the impedance heating elements shall not have an output voltage greater than 30 volts ac.

Where ~~ground-fault circuit-interrupter protection for personnel~~ ground fault protection is provided, the voltage shall be permitted to be greater than 30 but not more than 80 volts.

Substantiation: The higher operating current levels of electrical impedance heating systems are not compatible with a Class A type protection system.

An impedance system "looks" like a pair of insulated conductors running parallel to ground. Normally when you have a pair of conductors running parallel to ground, the electrical fields cancel and there is very little, to no inductive and capacitive coupling to ground. Due to the geometry of even a very well designed impedance system (one of the insulated conductors is a large insulated pipe) the electrical fields do not cancel locally. The result is a small percentage of the current "leaks" to ground due to inductive and capacitive coupling.

While it is a small percentage, impedance systems run "high" currents (100-1000 amps), and a small percentage of leakage is still significant. The leakage current is distributed along the pipe, and as it is capacitive and inductive coupled, it does not present a danger to personnel; however, a ground fault device "sees" the summation of the leakage currents. This summation will almost always exceed the 5 ma trip setting of a personnel level ground fault. This will result in "false" trips.

Unfortunately, in my experience, field personnel will disable a device that is causing false trips. This will result in an unsafe operating condition, as no ground fault protection will be functional.

For this reason, equipment level ground fault should be specified.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-29.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

17-31 Log #2609 NEC-P17 **Final Action: Reject**
(427.56)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-87
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110: "**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

Panel Meeting Action: Reject
Panel Statement: CMP 1 has not accepted this definition.
Should CMP 1's action be reversed, it is recommended that the TCC consider "holding" this proposal and comment for the next cycle.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

17-32 Log #1548 NEC-P17 **Final Action: Reject**
(427.56(C)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-88
Recommendation: Accept the proposal with revised (D)(3) as follows:
Be provided with approved permanent integral means for locking the open (off) position.
Substantiation: Temperature actuated devices are controlled by temperature, not smoke. Locking means should be approved permanent and integral with the device.
Panel Meeting Action: Reject
Panel Statement: The proposal would establish conflicting requirements for combined switching devices (427.56(D)) and for temperature control with the "off" position (427.56(A)). The panel understands that comment reference is to 427.56(D)(3) not 427.56(C)(1).
The submitter has not provided substantiation for requiring an integral means for locking either in the proposal or comment. Adding the word "approved" does not add clarity.
The panel also reaffirms its reason for rejection of Proposal 17-88.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 430 — MOTORS, MOTOR CIRCUITS, AND CONTROLLERS

11-5 Log #2852 NEC-P11 **Final Action: Hold**
(430.2)

TCC Action: The Technical Correlating Committee directs that the Chair of Code-Making Panel 11 appoint a Task Group including members from Code-Making Panels 3 and 11 to address the issues raised in Proposal 11-25 and Comments 11-5 and 11-35 for correlation of applications of Class I, 2, and 3 power limited circuits supplying small motors.
Submitter: Paul Guidry, Fluor Enterprises Inc
Comment on Proposal No: 11-25
Recommendation: Add FPN No. 2 to existing definition of Valve Actuator Motor (VAM) Assemblies in 430.2 to read:
Valve Actuator Motor (VAM) Assemblies. A manufactured assembly, used to operate a valve, consisting of an actuator motor and other components such as controllers, torque switches, limit switches, and overload protection.
FPN No. 1: VAMs typically have short-time duty and high-torque characteristics.
FPN No. 2: Small motors associated with electrically operated valves used as control circuit devices are not included in this definition. The motors may or may not be an integral part of the valve. For more information see UL 429, Electrically Operated Valves.
Substantiation: The definition of VAMs as defined in Art. 430 applies to valve actuator motors used on pipelines and process piping.
Small Electrically Operated Valves used for water, wastewater, and HVAC applications (for example) can contain motors, but could also be operated in some other fashion. These small valves are not intended to be in the scope of Art. 430 and are not considered to be VAMs as defined in Art. 430.
Panel Meeting Action: Hold
Panel Statement: The panel "holds" the proposal and comment in accordance with NFPA Regulation Governing Committee Projects Section 4.4.6.2.2(c) because the proposed changes could not be handled within the timeframe for processing the report. The panel understands that the application of some small motors may fall under the requirements of Article 725 if they are supplied by Class 1, 2 or 3 circuits. However, more information is needed to allow full consideration of this issue before making changes to clarify which applications clearly fall in this category. The panel suggests that the NEC Technical Correlating Committee appoint a joint task group with CMP 3, as correlation may be needed with the requirements of Article 725.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
TODD, L.: I believe that this could have been handled as follows:
Accept in Principal
Revise the text to add Information Note No 2: Motors integral to listed electrically operated valves are not included in this definition.
Panel Statement: UL 424 covers Electrically Operated Valves. These can contain motors, but could also be operated in some other mode. They would be considered listed products and are not obvious that they even have motors in them other than the ratings in the technical data, which is not required to be marked on the unit. In the NEC, 430.2 Definition for Valve Actuator Motor, it indicated that this is an assembly, used to operate a valve.... So there is a valve and then a motor used to actuate it. It is these motors used to actuate a valve that are intended to be covered by this definition. In the case of a product listed to UL 424, you do not have a motor actuating a valve, but a valve that might have a motor in it as part of it.

11-6 Log #137 NEC-P11 **Final Action: Accept**
(430.7(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 11-31
Recommendation: The Technical Correlating Committee directs that the panel reconsider its action with reference to (kilovolt-amperes (kVA)/horsepower, since this would result in the kVA divided by the horsepower rather than multiplied.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee. See the panel action on Comment 11-8.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-7 Log #138 NEC-P11 **Final Action: Accept**
(Table 430.7(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 11-32
Recommendation: The Technical Correlating Committee directs that the panel reconsider its action with reference to (kilovolt-amperes (kVA)/horsepower, since this would result in the kVA divided by the horsepower rather than multiplied.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee. See the panel action on Comment 11-9.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-8 Log #367 NEC-P11 **Final Action: Accept**
(430.7(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-31
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. As the TCC noted, in this case it potentially inverts the meaning of the phrase. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.
The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-9 Log #368 NEC-P11 **Final Action: Accept**
(Table 430.7(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-32
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. As the TCC noted, in this case it potentially inverts the meaning of the phrase. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.

The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-10 Log #139 NEC-P11 **Final Action: Accept**
(Table 430.10(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 11-35
Recommendation: The Technical Correlating Committee directs that the panel reconsider its action with reference to "Wires/Terminal*", since this would result in a division of the wires by the number of terminals.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee. See the panel action on Comment 11-11.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-11 Log #369 NEC-P11 **Final Action: Accept**
(Table 430.10(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-35
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. As the TCC noted, in this case it potentially inverts the meaning of the phrase. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.

The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-12 Log #451 NEC-P11 **Final Action: Accept**
(430.11)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 11-36
Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:
Suitable guards or enclosures shall be provided to protect exposed current-carrying parts of motors and the insulation of motor leads installed directly under equipment or in other locations where dripping or spraying oil, water, or other liquid ~~may~~ is capable of occurring, unless the motor is designed for the existing conditions.
Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.

However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms may or can shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term may shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."

Since the use of the term may in this Section does not meet these either of these criteria, it should be changed.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-13 Log #1547 NEC-P11 **Final Action: Reject**
(430.11)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-36
Recommendation: Accept the proposal.
Substantiation: See Explanation of Negative Vote for Proposal 7-9, 320.12(1) of the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: The submitter's substantiation is based on Proposal 7-9 where the use of "likely to" was rejected. CMP 11 agrees with Panel 7 and continues to reject this change to the text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-14 Log #370 NEC-P11 **Final Action: Accept**
(Table 430.12(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-38
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-15 Log #371a NEC-P11 **Final Action: Accept**
(Table 430.12(C)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-39
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-16 Log #1544 NEC-P11 **Final Action: Reject**
(430.16)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-43
Recommendation: Accept the proposal with the following revisions:
In locations where dust or other material is or likely to be collected on a motor(s) in quantities to interfere with the ventilation or cooling of the motor(s) and cause temperature for which the motor is not rated, an approved enclosure shall be provided which minimizes the entrance of dust or other material and does not cause overheating of the motor(s).
Substantiation: Some motors may be designed or rated for dust accumulations or elevated temperatures. "Likely" is a term used many times in the NEC. (502.125(A), 503.125, Exception).
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any substantiation to indicate that the section is unclear or is causing problems in the field. The term "suitable" as used in this section is not unenforceable or vague, therefore is not prohibited by Section 3.2.1 of the NEC Style Manual. Furthermore, the panel disagrees the term "likely" is used in Section 502.125(A).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-17 Log #1546 NEC-P11 **Final Action: Reject**
(430.16)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-42
Recommendation: Accept the proposal.
Substantiation: The panel response is partially correct; "identified" is also defined as "suitable for the specific purpose, function, use, environmental application and so forth." Listing is an example, not a requirement.
Panel Meeting Action: Reject
Panel Statement: The term "suitable" is not unenforceable or vague as used in this context. The submitter has not provided any technical substantiation that there are any field problems indicating that a change is needed.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-17a Log #CC1101 NEC-P11 **Final Action: Accept**
(430.22(G))

Submitter: Code-Making Panel 11,
Comment on Proposal No: 11-50
Recommendation: Revise 430.22(G) to read as follows:
(G) Conductors for small motors. Conductors for small motors shall not be smaller than 14 AWG unless otherwise permitted in 430.22(G)(1) or 430.22(G)(2).
(1) 18AWG copper. Where installed in a cabinet or enclosure, 18 AWG individual copper conductors, copper conductors that are part of a jacketed multiconductor cable assembly, or copper conductors in a flexible cord shall be permitted, under either of the following sets of conditions:
(1) Motor circuits with a full-load ampacity greater than 3.5 amperes or less than or equal to 5 amperes provided all the following conditions are met:
a. Circuit is protected in accordance with 430.52
b. Circuit is provided with maximum Class 10 overload protection in accordance with 430.32
c. Overcurrent protection is provided in accordance with 240.4(D)(1)(2).
(2) Motor circuits with a full-load ampacity of 3.5 amperes or less provided all the following are met:
a. Circuit is protected in accordance with 430.52
b. Circuit is provided with maximum Class 20 overload protection in accordance with 430.32
c. Overcurrent protection is provided in accordance with 240.4(D)(1)(2).
(2) 16 AWG Copper. Where installed in a cabinet or enclosure, 16 AWG individual copper conductors, copper conductors that are part of a jacketed multiconductor cable assembly, or copper conductors in a flexible cord shall be permitted under either of the following sets of conditions:
(1) Motor circuits with a full-load ampacity greater than 5.5 amperes and less than or equal to 8 amperes provided all the following conditions are met:
a. Circuit is protected in accordance with 430.52
b. Circuit is provided with maximum Class 10 overload protection in accordance with 430.32
c. Overcurrent protection is provided in accordance with 240.4(D)(2)(2).
(2) Motor circuits with a full-load ampacity of 5.5 amperes or less provided all the following are met:
a. Circuit is protected in accordance with 430.52
b. Circuit is provided with maximum Class 20 overload protection in accordance with 430.32
c. Overcurrent protection is provided in accordance with 240.4(D)(2)(2).
Substantiation: The panel has modified the language accepted by Proposal 11-50 to incorporate the changes accepted in the actions on Comments 11-18, 19 and 20. The panel has included additional revisions for clarity.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
DESJARLAIS, J.: The revisions made by the panel change the intent of the original proposal. The original proposal provided a means by which 18AWG and 16 AWG cable assemblies and cord could be used outside of enclosures. The verbiage in its present form restricts the use of cable assemblies and cords to the interior of enclosures only. The use of cord and cable assemblies is already adequately addressed in Clauses 400.7 and 400.8. In addition, no exception was made for listed equipment that may employ internal motor conductors smaller than 18 AWG.

11-18 Log #1242 NEC-P11 **Final Action: Accept in Principle**
(430.22(G))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 11-50
Recommendation: Revise Panel accepted text as follows:
G(1) 18 AWG Copper. ~~[~~18 AWG Copper shall be permitted if part of a jacketed multiconductor cable assembly or flexible cord, or if individual conductors are used in a cabinet or enclosure, under either of the following conditions:~~]~~
G(1)(1) Motor circuits with a full-load ampacity ~~of~~ greater than 3.5 and less than or equal to 5 amperes ~~or less~~ provided all the following conditions are met:
G(1)(2)(b) Circuit is provided with Class 10 or Class 20 overload protection in accordance with 430.32.
G(2) 16 AWG Copper. 16 AWG Copper shall be permitted if part of a jacketed multiconductor cable assembly or flexible cord, or if individual conductors are used in a cabinet or enclosure, under either of the following conditions:~~]~~
G(2)(1) Motor circuits with a full-load ampacity ~~of~~ greater than 5.5 and less than or equal to 8 amperes ~~or less~~ provided all the following conditions are met:
G(2)(2)(b) Circuit is provided with Class 10 or Class 20 overload protection in accordance with 430.32.

Substantiation: These proposed changes provide clarification of the intent of the article.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel accepted in principle the submitter's recommendation and made revisions for clarity. See Comment 11-17a.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
DESJARLAIS, J.: I agree with the panel's action regarding this specific proposal however I disagree with the panel's overall revisions regarding the use of cable assemblies and cord. See substantiation in 11-17a.

11-19 Log #2814 NEC-P11 **Final Action: Accept in Principle in Part (430.22(G))**

Submitter: Jay Tamblingson, Rockwell Automation
Comment on Proposal No: 11-50
Recommendation: Revise accepted new text as follows:
(G) Conductors for Small Motors. Conductors for small motors shall not be smaller than 14 AWG unless otherwise permitted in 430.22(G)(1) or 430.22(G)(2).
(1) 18AWG Copper. 18 AWG Copper shall be permitted if part of a jacketed multiconductor cable assembly or
flexible cord, or individual conductors used in a cabinet or enclosure, under either of the following sets of conditions:
(1) Motor circuits with a full-load ampacity of 5 amperes or less provided all the following conditions are met:
(a) Circuit is protected in accordance with ~~430.52~~Article 430 Part IV
(b) Circuit is provided with Class 10 overload protection in accordance with 430.32
(c) Overcurrent protection is provided in accordance with 240.4(D)(1)(2).
(2) Motor circuits with a full-load ampacity of 3.5 amperes or less provided all the following are met:
(a) Circuit is protected in accordance with ~~430.52~~Article 430 Part IV
(b) Circuit is provided with Class 20 overload protection in accordance with 430.32
(c) Overcurrent protection is provided in accordance with 240.4(D)(1)(2).
(2) 16AWG Copper. 16 AWG copper shall be permitted if part of a jacketed multiconductor cable assembly or flexible
cord, or individual conductors used in a cabinet or enclosure, under either of the following sets of conditions:
(1) Motor circuits with a full-load ampacity of 8 amperes or less provided all the following conditions are met:
(a) Circuit is protected in accordance with ~~430.52~~Article 430 Part IV
(b) Circuit is provided with Class 10 overload protection in accordance with 430.32
(c) Overcurrent protection is provided in accordance with 240.4(D)(2)(2).
(2) Motor circuits with a full-load ampacity of 5.5 amperes or less provided all the following are met:
(a) Circuit is protected in accordance with ~~430.52~~Article 430 Part IV
(b) Circuit is provided with Class 20 overload protection in accordance with 430.32
(c) Overcurrent protection is provided in accordance with 240.4(D)(2)(2).
Substantiation: The proposed changes add clarity as follows:

1. Add missing comma after "flexible cord," in 430.22(G)(1)as it in 430.22(G)(2)to clarify that the requirement for use in a cabinet or enclosure only applies to individual conductors. It appears this was inadvertently deleted when accepted text was written
2. Change "under the following conditions" to "under either of the following sets of conditions" in 430.22(G)(1)and (2) to clarify that both sets are not required for smaller ampacity (3.5A or less) circuits.
3. Change reference from "430.52" to "Article 430 Part IV" to ensure that compliance to all pertinent provisions for branch circuit protection under Part IV are required.

Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel rejects "Article 430 Part IV" in four places. The panel does not agree with the substantiation that the requirement for use in a cabinet or enclosure only applies to individual conductors and hence the addition of the comma in the main paragraph of (1) is rejected. The panel accepts in principle the remainder and has revised it for clarity. See the recommendation of Comment 11-17a.
The panel intends that these small conductors comply with the specific Code requirements of Section 430.52 and not necessarily other Sections in Part IV. Referral to "Part IV" would not conform to the style manual as it does not refer to a specific section.
The panel maintains that the requirements in 430.22(G)(1) and (G)(2) apply to all conductors, not just individual conductors. It is intended that the requirements being addressed apply to conductors used within a cabinet or enclosure. Wiring methods for application outside the enclosure are covered by other parts of the Code, for example Article 400.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
DESJARLAIS, J.: See my Explanation on Negative on 11-17a.

11-20 Log #1424 NEC-P11 **Final Action: Accept in Principle (430.22(G)(1)(2))**

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 11-50
Recommendation: Revise 430.22(G)(1)(2)b, within the proposal to read as follows:
b. Circuit is provided with Class 10 or Class 20 overload protection in accordance with 430.32.
Substantiation: As worded, only Class 20 overloads are permitted. Faster acting Class 10 overloads, common with IEC-type equipment, will provide the same or better protection.
An alternate wording could be: "maximum Class 20 overload protection". But the problem with that is that it could be misinterpreted to mean the maximum level of protection is Class 20 – thus allowing Class 30 overloads because they offer less protection.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 11-17a.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
DESJARLAIS, J.: I agree with the panel's action regarding this specific proposal however I disagree with the panel's overall revisions regarding the use of cable assemblies and cord. See substantiation in 11-17a.

11-21 Log #1543 NEC-P11 **Final Action: Accept in Principle in Part (430.24 Exception No. 3)**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-51
Recommendation: Accept the proposal with the following revisions:
Where the circuitry is interlocked to prevent simultaneous operation of the motors or other load, the conductor ampacity shall be permitted to be based on the summation of 125 percent of the largest motor or continuous load, whichever is larger, and the current of all other loads to be operated simultaneously.
Substantiation: "Simultaneously" is the term usually used in the NEC. "At the same time, can literally be 1:00 PM on Monday and 1:00 PM on Tuesday. Proposal clarifies that the 125 percent applies only to the largest of the motor or continuous load. Applying the factor to both results in a 250 percent factor which is excessive and not needed to reduce the heating effects at termination of overcurrent devices.
Panel Meeting Action: Accept in Principle in Part
The panel agrees to add the terms "simultaneous" and "simultaneously" as suggested by the submitter. The panel rejects the remainder of the suggested changes.
Revise Exception No. 3 to read as follows:
Exception No. 3: Where the circuitry is interlocked so as to prevent simultaneous operation of selected motors or other loads, the conductor ampacity shall be permitted to be based on the summation of the currents of the motors and other loads to be operated simultaneously that results in the highest total current.
Panel Statement: It is the panel's intent to require 125 percent of the largest motor, plus 125 percent of the continuous load for those loads operating simultaneously. No technical substantiation has been provided to the panel for only requiring 125 percent for the largest of the motor or the continuous load.
The panel disagrees with the submitter's substantiation that the total factor applied would be 250 percent and directs the submitter to see Proposal 11-50a which was accepted.
The panel has made revisions for clarity.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-22 Log #1243 NEC-P11 **Final Action: Reject**
(430.28)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 11-55
Recommendation: Accept the proposal, revised as follows:
430.28
Exception: Feeder tap conductors applied in accordance with 430.28(1) shall be permitted to terminate in more than one branch-circuit protective device, connected in a parallel arrangement, either by:
a) Use of a bus-bar wiring accessory listed for such use, with a single set of line-side terminals for connection to the feeder tap conductors and more than one set of load-side bus connections for attachment to branch-circuit protective devices intended to be mounted directly to the bus-bar wiring accessory or
b) Use of conductors connected between line-side terminals of branch-circuit protective devices where the total length of the initial tap conductor and all interconnecting conductors to the additional branch-circuit protective devices does not exceed 3m (10 ft).
Substantiation: As noted in the NEMA negative comment to the Panel statements, the reasoning for the statements is not supported by the Code wording. The proposed additions to the Code cannot result in overloading of the tap conductors; Section 430.24 addresses the ampacity of the tap conductors for these applications. The revised wording provides an exception permitting the use of bus-bar wiring accessories and connections between line-side terminals. The use of the bus-bar accessories results in fewer connections, and a reduction of the possibility of arc-flash hazards.
For clarification of the intentions of the proposal, a drawing illustrating the existing permissions of 430.28(1) and the proposed permissions is provided.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 11-23.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
DESJARLAIS, J.: I support 11-23 in lieu of this proposal. See substantiation for 11-23.
WRIGHT, J.: The Panel should have accepted the Comment, which would have accepted Proposal 11-55, as modified by the Comment. The proposed wording does not advocate tapping a tap, other than as permitted by 240.21, which states: "*Conductors supplied under the provisions of 240.21(A) through (H) shall not supply another conductor except through an overcurrent protective device meeting the requirements of 240.4.* Taps CAN be tapped under these conditions.
The concept of the bus-bar wiring accessory proposed in part (a) of the exception to 430.28 meets the requirements of 240.21, in that the conductor from the feeder ends in multiple branch-circuit protective devices; any conductors from that point on are supplied through an overcurrent protective device meeting the requirements of 240. The busbars within the listed busbar wiring accessory have been evaluated for current-carrying capacity and short-circuit withstandability as part of the listing.
The concept of the "daisy-chaining" proposed under part (b) of the exception to 430.28 was not intended to advocate tapping a tap. The entire length of the tap, which lands on multiple branch-circuit protective devices within the tap, is restricted to a maximum of 10 feet, and was intended to represent one tap from the feeder. All wiring leaving the load side of each branch circuit protective device attached to the tap meets the requirements of 240.21.

11-23 Log #1285 NEC-P11 **Final Action: Reject**
(430.28)

Submitter: James R. Wright, Siemens Industry, Inc.
Comment on Proposal No: 11-55
Recommendation: Accept the proposal, revised as follows:
430.28
Exception: Feeder tap conductors applied in accordance with 430.28(1) shall be permitted to terminate in more than one branch-circuit protective device, connected in a parallel arrangement, either by:
a) Use of a bus-bar wiring accessory listed for such use, with a single set of line-side terminals for connection to the feeder tap conductors and more than one set of load-side bus connections for attachment to branch-circuit protective devices intended to be mounted directly to the bus-bar wiring accessory or
b) Use of conductors connected between line-side terminals of branch-circuit protective devices where the total length of the initial tap conductor and all interconnecting conductors to the additional branch-circuit protective devices does not exceed 3m (10 ft). All conductors, from the tap to the final connection to the last branch-circuit protective device, shall have the same ampacity.
Substantiation: As noted in the NEMA negative comment to the Panel statements, the reasoning for the statements is not supported by the Code wording. The proposed additions to the Code cannot result in overloading of the tap conductors; Section 430.24 addresses the ampacity of the tap conductors for these applications. The revised wording provides an exception permitting the use of bus-bar wiring accessories and connections between line-side terminals. The use of the bus-bar accessories results in fewer connections, and a reduction of the possibility of arc-flash hazards.
For clarification of the intentions of the proposal, a drawing illustrating the existing permissions of 430.28(1) and the proposed permissions is provided.
Note: This comment contains the same material as the NEMA comment on the proposal, with the addition of the last sentence under (b).
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: Acceptance of the comment would allow a tap to be made to a tap which is specifically prohibited by 240.21. CMP 10 actions on proposal ROP 10-56 of the 1999 edition of the NEC specifically prohibited tapping a tap. The panel intends that tap conductors be terminated into a single overcurrent device.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
DESJARLAIS, J.: The proposed verbiage cannot result in overloading of the tap conductors. Section 430.24 addresses the ampacity of the tap conductors for these applications. The revised wording provides an exception permitting the use of bus-bar wiring accessories and connections between line-side terminals. The use of the bus-bar accessories results in fewer connections and a reduction in the possibility of arc-flash hazards.
WRIGHT, J.: See NEMA Negative vote on Comment 11-22.

11-24 Log #1553 NEC-P11 **Final Action: Accept**
(430.31)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-56
Recommendation: Accept the proposal with the following revisions:
These provisions shall not require overload protection where a power loss would cause a hazard such as in the case of fire pumps.
Substantiation: Proposal is similar to 240.4(A) and does not use the term "might" which is to be avoided per the NEC Style Manual.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-25 Log #371 NEC-P11 **Final Action: Reject**
(Table 430.37)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-60
Recommendation: The proposal should be accepted in part. Accept only the removal of the hyphen from the word "conductors". Reject the remainder of the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Reject
Panel Statement: The panel action taken on the original proposal provides more precise language and clarity to the Table.
Note that the hyphen was only added due to the change in line for text processing and would not occur if the word appeared on a single line.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-26 Log #2315 NEC-P11 **Final Action: Accept**
(430.42(C))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 11-63
Recommendation: Delete the new informational note.
Substantiation: The added informational note is not necessary; due to the fact the rule now specifically addresses the issue. Even if 210.50(A) did not exist, this rule would still be the same. Needlessly referring the Code user to other sections of the Code does not really accomplish anything, other than making the Code book a little longer.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-27 Log #2610 NEC-P11 **Final Action: Accept**
(430.42(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-63
Recommendation: Accept the proposal in principle; change the end reference from "as provided in Article 210" to "as provided in 210.21(B)."
Substantiation: The panel overlooked a flagrant violation of the whole-article-cross-reference prohibition in the NEC Style Manual, at 4.1.1. This is the appropriate, and specific, reference.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-28 Log #1244 NEC-P11 **Final Action: Accept**
(430.53(D)(2))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 11-70
Recommendation: Revise accepted text as follows:
No conductor to the motor shall have an ampacity less than one-third that of the branch-circuit conductors, with a minimum in accordance with 430.22, the conductors to the motor overload device being not more than 7.5 m (25 ft) long and being protected from physical damage by being enclosed in an approved raceway or by use of other approved means.
Substantiation: Revise accepted text to clarify that "other approved means" is meant to correspond to "being protected from physical damage" rather than "being enclosed". This clarifies that, for example, approved means such as using TC-ER cable protected by struts and angles as permitted under 336.10(7) for industrial establishments meets the requirements for physical protection of the conductors.
In addition, the panel commented that the accepted text was consistent with similar requirements in 240.21, 430.28, and 430.53(D). The proposed revised language improves consistency with 240.21(B)(2)(3) and 430.28(2) 25ft tap rules. Although 430.43(D) requires the taps to be enclosed, this requirement is expected to be more onerous as the taps are 10ft or less and can be 1/10 of the branch circuit conductor (rather than 1/3).
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-29 Log #1245 NEC-P11 **Final Action: Accept in Part**
(430.63)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 11-75
Recommendation: Modify proposed new text to say "not less than that required for the sum of the other load(s)"
Keep the FPN in the original proposal.
Substantiation: The proposed wording change would permit the feeder overcurrent device to be rated for any single other load and the motor load(s). The requirement should be for the feeder overcurrent device to be rated for the sum of the other loads plus the motor load(s).
Continuous loads can be a factor in feeder short circuit and ground fault selection. Hence the inclusion of the FPN.
Panel Meeting Action: Accept in Part
The panel accepts the additional language "sum of". The panel rejects the addition of the fine print note. Revised text to read:
430.63 Rating or Setting – Motor and Other Loads.
Where a feeder supplies a motor load and other load(s), the feeder protective device shall have a rating not less than that required for the sum of the other load(s), plus the following:
(Retain the listed items from the committee action on the original proposal. The exception is unchanged.)
Panel Statement: NEC style manual section 4.1 prohibits the use of fine print notes where the information is redundant, the fine print note adds redundancy and does not add clarity to this Code section.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-30 Log #750 NEC-P11 **Final Action: Accept**
(Table 430.72(B))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 11-76
Recommendation: The Proposal should be Accepted in Principle with the following revisions:
In Note 2, change "Table 310.17" to "Table 310.15(B)(17)".
In Note 3, change "Table 310.16" to "Table 310.15(B)(16)".
Substantiation: This will correlate with the Panel Action on Proposal 6-52.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment contingent upon Panel 6's action on Comment 6-21. This action is to be referred to the Technical Correlating Committee for review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-31 Log #2214 NEC-P11 **Final Action: Accept**
(430.72(C))

Submitter: Vincent J. Saporita, Cooper Bussmann
Comment on Proposal No: 11-78
Recommendation: Reject the proposal.
Substantiation: The text of 430.72(A) General specifically states that the motor control circuit shall be permitted to be protected by either a supplementary or branch-circuit overcurrent protective device(s). Part (C) provides protection requirements for the control circuit transformer. Note well that the text of 430.72(C)(1),(2),(3),(4), and (5) is application specific referring to other NEC sections or to performance requirements. 430.73(C)(1), (2),(3), (4) and (5) are not product specific. If a manual motor protector is suitable for control circuit transformer protection then its use is already covered in 430.7(C)(5). Other Means, then use of a manual motor protector for control circuit transformer protection is, in fact, a product standard issue and would be part of the product safety standard UL508 and verified by product listing after appropriate testing. Inclusion of product specific requirements in 430.72(C) will lead to field misapplication.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
DESJARLAIS, J.: Rather than leading to possible field misapplication, the verbiage in the original proposal in ROP 11-78 would prevent possible field rejection of equipment listed for this specific application.
WRIGHT, J.: The Panel should have Rejected this comment. The Commenter's substantiation is incorrect, as follows:
1. The statement that "all other permitted protective means presently in the Code are not product-specific is wrong; the permitted protective means in the Code are product-specific, in that Fuses, Circuit Breakers, and Supplementary Protectors are permitted. The Proposal would add another Product, Manual Motor Controllers Suitable for Tap Conductor Protection.
2. While the concept may be covered under the existing 430.72(c)(5) Other Means, what may or may not be acceptable under "Other Means" is vague. The purpose of the Proposal was to clarify that the additional product, when used as specified, is permitted.
3. The statement that this becomes a Product standards issue and would only be acceptable after proper testing and listing is in itself valid. The Proposal includes the requirement that the product be listed for this application. However, listing alone does not guarantee that the Product will be accepted. While many AHJs will accept the product because it is listed, there are some AHJs who may not accept it. The product may be rejected because the AHJ does not understand that the listing also extends to the use as protection for a control transformer. The product may also be rejected simply because the Code does not specifically permit its use in this application.
4. The statement that the inclusion of product-specific requirements will lead to misapplication is incorrect, in that the purpose of the proposal was to do just the opposite. The Code contains many product-specific requirements for a multitude of products in order to prevent misapplication of the products.

11-32 Log #1246 NEC-P11 **Final Action: Accept**
(430.74)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 11-86
Recommendation: Change from "so that an ground-fault" to "so that a ground-fault".
Substantiation: Editorial.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-33 Log #452 NEC-P11 **Final Action: Accept**
(430.75 Exception No. 2)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 11-87
Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:
Exception No. 2: The motor control circuit disconnecting means shall be permitted to be remote from the motor controller power supply disconnecting means where the opening of one or more motor control circuit disconnecting means ~~may~~ is capable of resulting in potentially unsafe disconnecting conditions for personnel or property and the conditions of items (a) and (b) of Exception No. 1 are complied with.
Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.
However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms may or can shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term may shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."
Since the use of the term may in this Section does not meet either of these criteria, it should be changed.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-34 Log #1551 NEC-P11 **Final Action: Accept in Principle**
(430.75 Exception No. 2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-87
Recommendation: Change the word "may" to "would".
Substantiation: Correlation with 240.4(A). Per the NEC Style Manual, "may" is a term relating to discretion of the Authority Having Jurisdiction.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel has used different terminology that resolves the manual of style concern in the action on Comment 11-33.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-35 Log #2173 NEC-P11 **Final Action: Hold**
(430.81(C) and FPN (NEW))

TCC Action: See the Technical Correlating Committee Note on Comment 11-5.
Submitter: Jeff M. Goldsmith, General Electric Company
Comment on Proposal No: 11-25
Recommendation: Change the proposed modification of a definition in 430.2 to the addition of a new subsection (C) in 430.81, to read:
(C) Small Valve Actuator Motor (VAM) Assembly. A listed VAM controlled by an industrial control panel shall be permitted to be classified as a control circuit load, wired as an Article 725 remote-control circuit.
FPN: Listed valve actuators comply with the UL 429 Standard for Electrically Operated Valves.
Substantiation: ln response to the panel statement on my proposal:
UL 429 section 25.3 includes "The temperature rise attained by the motor of a motor-operated valve. lf stalling the motor is not part of the normal operation,... the motor, when stalled or otherwise operated with a blocked valve system, shall not show any manifestation of a risk of fire," UL 429 does apply to motor-operated valves, and to motor-operated valve actuators that are one of the two principal components.
UL 50BA section 46.1.1 says: "A control circuit load shall comply with... b) An electrically-operated valve shall comply with... UL 429". The opposite of a UL 508A control circuit is a power circuit, which UL 508A defines as "Conductors and components of branch and feeder circuits." Therefore, UL 508A says that a motor-operated valve control circuit is not necessarily a branch circuit or a motor branch circuit.
The Control Circuit definition in Article 409 includes "carries the electric signals directing the performance of the controller". A motor-operated valve actuator directs the fluid switching performance of a valve. Adding a word to the Remote-Control Circuit definition "Any electrical circuit that controls any other [fluid] circuit through a relay or an equivalent device" shows that valve actuator circuits are essentially 725.41(B) Class 1 Remote-Control and Signaling Circuits.
UL 508A defines limits for control circuit loads, and section 51 requires load rating markings on a listed panel. So "controlled by an industrial control panel" works in 430.81 that "is intended to require suitable controllers for all motors".
Panel Meeting Action: Hold
Panel Statement: See panel action and statement on Comment 11-5.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
TODD, L.: See comment on Comment 11-5. The change in definition is the better place to put this change in my opinion.

11-36 Log #1550 NEC-P11 **Final Action: Reject**
(430.82(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-89
Recommendation: Accept the proposal.
Substantiation: The panel statement is partially correct; the definition of "identified" may relate to listing, but the definition is "recognized" as suitable for the specific purpose, function, use, etc.
Panel Meeting Action: Reject
Panel Statement: The term "capable" is defined in Webster's 11th Collegiate Dictionary, the official NFPA dictionary as, "having traits conducting to or admitting of". The present code text contains clear language and is more specific than the proposed language. Furthermore no technical substantiation has been submitted to indicate problems exist with the existing language.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-37 Log #2778 NEC-P11 **Final Action: Accept**
(430.95)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 11-93
Recommendation: Proposal should be rejected.
Substantiation: CMP 4 rewrote the definitions and subsequent requirements for the installation of the service conductors that the submitter is referencing in his proposal. The submitter presented rationale in his substantiation based on the presumption that CMP 4 would accept his proposals to CMP 4, we did not. The submitter is incorrect that under existing NEC requirements all "service drop" and "service entrance" conductors are utility owned, they are not. Utilizing the word "service" in 408.3 will be sufficient whether the recommended changes in Article 430 pass or not.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-38 Log #140 NEC-P11 **Final Action: Accept**
(430.102)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 11-95
Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal and correlate with the action taken on Proposal 1-63.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the technical correlating committee direction. See panel action and statement on Comment 11-39.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-39 Log #2611 NEC-P11 **Final Action: Reject**
(430.102)

Based on the Code-Making Panel's action on Comment 1-46, the Technical Correlating Committee directs that Comment 11-39 be reported as "Reject".
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-95
Recommendation: Continue to accept the proposal in the form the panel accepted it, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:
"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
Note that the provisions in this language for local modifications of the rule protect the minor changes CMP 11 included in their action.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation contingent upon CMP 1's acceptance of the proposed definition of "Disconnecting Means, (Lockable)" (Comment 1-46). This action is to be referred to the technical correlating committee for review. In addition, the panel continues to accept the panel action taken on the original proposal 11-95.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-40 Log #1549 NEC-P11 **Final Action: Reject**
(430.103)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-99
Recommendation: Accept the proposal and revise the first sentence as follows:
The disconnecting means shall simultaneously open all ungrounded branch circuit conductors.
Substantiation: Presumably, the provision is for branch circuit conductors. "Supply" conductors includes feeders and service conductors.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no documentation that existing language is misleading or causing problems in the field. The use of the word "supply" is not ambiguous in the context of this section.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-41 Log #1555 NEC-P11 **Final Action: Reject**
(430.110(A) Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-103
Recommendation: Revise as follows:
The disconnecting means for motors rated 600 volts, nominal, or less, supplying a single motor shall have an ampere rating not less than 115 percent of the nameplate full-load current rating of the motor of the full-load current rating specified in Tables 430.247 through 430.250, whichever is greater, and for motors with overload protection, not less than the applicable trip values specified in 430.32(1), (2), and (4).
Substantiation: Full-load nameplate current ratings may be different from Table values which specify speed, normal torque, typical, usual, belted, conditions. The 125 percent, 170 percent of 430.32(A) and 430.32 (A)(4) temperature rise slightly less than that marked on the nameplate, can permit a current greater than 115 percent for a duration that can overhear heat terminals and exceed an ampere rating of 115 percent. This provision should apply to a single motor since (C)(1) generally requires higher ratings.
Panel Meeting Action: Reject
Panel Statement: The present language requires the values in the tables be used to size the disconnecting means. This requirement and value consistently guarantees the disconnect is properly and safely sized for the present motor and future replacement motors. The existing language in this section applies to a single motor, as the last word "motor" is singular and not plural.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-42 Log #1554 NEC-P11 **Final Action: Reject**
(430.110(C)(2) Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-105
Recommendation: Accept the proposal with the following revisions:
A motor circuit switch without fuseholders having a horsepower rating not less than the equivalent horsepower of the combined loads determined in accordance with 430.110(C)(1) shall be permitted to have an ampere rating less than 115 percent, but not less than 100 percent of all full-load currents.
Substantiation: Less than 115 percent does not establish a lower limit; 50 percent is less than 115 percent. Nonfused does not prohibit fuseholders with jumpers or copper tubes which one manufacturer states current capabilities of their switches can be attained in switches where fuses are replaced with copper bars.
Panel Meeting Action: Reject
Panel Statement: Listed motor circuit switches are rated in horsepower, therefore the switch would be sized properly due to the horsepower rating and calculation as required in 430.110(C)(1). The less than 115 percent of the full load ampere rating is permitted due to the horsepower rating of the switch. Listed nonfused motor circuit switches are manufactured without fuseholders, therefore copper tubes or jumpers are unable to be installed.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-43 Log #1540 NEC-P11 **Final Action: Reject**
(430.113 and Exception No. 1 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-106
Recommendation: Accept the proposal with the following revisions:
More Than One Supply Circuit. Motors and motor-operated equipment supplied by more than one branch circuit shall be provided with a disconnecting means for the supply circuit(s) on or immediately adjacent to the equipment served. Where more than one disconnecting means is provided, a durable sign shall be provided on or immediately adjacent to each disconnecting means indicating the equipment controlled.
Exception: The disconnecting means shall not be required to be on or immediately adjacent to the motor(s), if a disconnecting means is provided to disconnect the controller(s) and is provided with an approved permanent means for locking in the open(off) position.
Substantiation: "Source" may be construed as (and in many times) as a panelboard. Transformer, service, or separately derived system. The provision should clearly indicate "circuit". The present second sentence is covered by the first sentence. Present warning sign requirement doesn't indicate what is to be warned.
Panel Meeting Action: Reject
Panel Statement: Substantiation has not been provided that the present requirements are unclear or are presenting a hazard. The use of "source" is clear in this context.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-43a Log #CC1100 NEC-P11 **Final Action: Accept**
(430-123)

TCC Action: The Technical Correlating Committee directs that in Exception No. 1, the words "as permitted in" be inserted preceding "430.52(C)(5)", and the brackets be removed, from the section reference to comply with the NEC Style Manual.

The Technical Correlating Committee further directs that in (B) the word "if" be replaced with the word "where" in 2 places to comply with the NEC Style Manual.

Submitter: Code-Making Panel 11,
Comment on Proposal No: 11-107a
Recommendation: Revise 430.123 to read as follows:

430.123 Branch Circuit Short-Circuit and Ground Fault Protection.

(A) Drive Protection and Markings. The branch circuit short-circuit and ground-fault protection for a circuit supplying an adjustable-speed drive system shall be of a type and ampere rating or setting not exceeding that specified by the manufacturer's instructions provided with the adjustable-speed drive system. If the instructions do not specify a type and ampere rating or setting, a branch-circuit fuse or inverse-time circuit breaker shall be used and shall be sized in accordance with 430.52 based upon the input current rating of the adjustable-speed drive system. The rating or setting of the overcurrent protective device shall not exceed that allowed by 430.52.

Exception No. 1: Additional branch circuit short-circuit and ground-fault protection for an adjustable-speed drive system is not required if the adjustable-speed drive system is provided with integral branch circuit rated protection such as an inverse-time circuit breaker, branch-circuit fuses, or semiconductor fuses [430.52(C)(5)].

Exception No. 2: Unless specified in the manufacturer's instructions supplied with the adjustable-speed drive system, "common dc bus" adjustable-speed drive system designed as part of a single integrated drive system shall not be required to have individual branch circuit protective devices installed in the dc input conductors.

(B) Drive and Bypass Protection. If a branch circuit short-circuit and ground-fault protective device provides protection for both the adjustable-speed drive system and a bypass circuit, the specific branch circuit protective device and its ratings or settings shall not exceed those specified by the manufacturer's instructions provided with the adjustable-speed drive system. If the bypass circuit requires different branch circuit short-circuit and ground-fault protection, separate branch circuit short-circuit and ground-fault protection shall be provided for both the adjustable-speed drive system and the bypass circuit.

Substantiation: The panel has modified the language accepted by Proposal 11-107a to incorporate the changes accepted in the actions on Comments 11-44, 45, 46 and 47. The panel has included additional revisions for clarity.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-44 Log #1240 NEC-P11 **Final Action: Accept in Principle in Part**
(430.123)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 11-107a
Recommendation: The following statement should be added as the last sentence for the paragraph under (A):

"In no event shall the rating or setting of the overcurrent protective device exceed that allowed by 430.52."

Exception 2 should be deleted.

Substantiation: This will prevent manufacturers from specifying oversized overcurrent devices that will not provide the protection for the conductors required by 430.52. It reinstates the proposed sentence from proposal 11-110 for the end of article 430.130 (A).

Exception 2 should be deleted on the basis that a single large power supply could supply a "common dc bus" that supplies an unspecified number of drives controllers that have no individual protection on the dc bus. This exception is essentially creating a group motor installation without any of the protection requirements for a group motor installation. It is also a concern that the inclusion of Exception 2 would permit an installer, or others, to build an assembly without being required to undergo the appropriate testing for protection coordination.

Panel Meeting Action: Accept in Principle in Part - The panel accepts in principle the addition of the sentence "In no event shall the rating or setting of the overcurrent protective device exceed that allowed by 430.52." The panel has rejected the recommendation to delete Exception No. 2.
Panel Statement: See recommendation on Comment 11-43a.

Relative to rejection to delete Exception no. 2, common adjustable-speed drive system topography utilizes multiple "cell" technology which converts drive input AC to DC which is isolated in each individual cell and protected by cell DC bus protection that trips the short circuit protective device feeding the drive in the event of a short circuit or other DC "out of limit" value such as overvoltage or undervoltage. This technology feeds a single motor and not multiple motors.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-45 Log #1715 NEC-P11 **Final Action: Accept in Principle in Part**
(430.123)

Submitter: Lori L. Tennant, Schneider Electric North America
Comment on Proposal No: 11-107a
Recommendation: The following statement should be added as the last sentence for the paragraph under (A):

"In no event shall the rating or setting of the overcurrent protective device exceed that allowed by 430.52."

Exception 2 should be deleted.

Substantiation: This will prevent manufacturers from specifying oversized overcurrent devices that will not provide the protection for the conductors required by 430.52. It reinstates the proposed sentence from proposal 11-110 for the end of article 430.130(A).

Exception 2 should be deleted on the basis that a single large power supply could supply a "common dc bus" that supplies an unspecified number of drives controllers that have no individual protection on the dc bus. This exception is essentially creating a group motor installation without any of the protection requirements for a group motor installation. It is also a concern that the inclusion of Exception 2 would permit an installer, or others, to build an assembly without being required to undergo the appropriate testing for protection coordination.

Panel Meeting Action: Accept in Principle in Part
Panel Statement: See panel action and statement on Comment 11-44.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-46 Log #2612 NEC-P11 **Final Action: Accept**
(430.123)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-107a
Recommendation: Accept the proposal in principle.

Change "must" to "shall" in 430.123(B).

Substantiation: This is a NEC Style Manual issue; "shall not exceed" is the correct terminology.
Panel Meeting Action: Accept
Panel Statement: See recommendation on Comment 11-43a.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-47 Log #2813 NEC-P11 **Final Action: Accept in Principle in Part**
(430.123)

Submitter: Jay Tamblingson, Rockwell Automation
Comment on Proposal No: 11-107a
Recommendation: Revise accepted new text as follows:

430.123 Branch Circuit Short-Circuit and Ground Fault Protection.

(A) Drive Protection and Markings. The branch circuit short-circuit and ground-fault protection for a circuit supplying power conversion equipment shall be of ~~the~~a type and maximum size specified by the manufacturer's instructions provided with the power conversion equipment, with the size not to exceed that permitted under Article 430 Part IV for the type of device selected. When the instructions do not specify ~~the~~a type and size, a branch-circuit fuse or inverse-time circuit breaker shall be used and shall be sized in accordance with Article 430 Part IV based upon the input current rating of the power conversion equipment ~~multiplied by the percentage from Table 430.52~~.

Exception No. 1: Additional branch circuit short-circuit and ground-fault protection is not required for power conversion equipment where provided with integral branch circuit rated protection such as: an inverse-time circuit breaker, branch-circuit fuses or semiconductor fuses, as provided in section 430.52(C)(5), in all ungrounded input conductors.

Exception No. 2: ~~Unless specified in the manufacturer's instructions supplied with the power conversion equipment,~~ Listed "common dc bus" power conversion equipment ~~is not~~ shall not be required to have individual branch circuit protective devices installed in the dc input conductors where not required by product listing and installed as specified in the manufacturer's instructions supplied with the power conversion equipment.

(B) Drive and Bypass Protection. For an adjustable speed drive system that includes a bypass device, ~~Where~~ a common branch circuit short-circuit and ground-fault protective device shall be permitted to provide~~s~~ protection for both the ~~adjustable speed drive system~~ power conversion equipment and a~~t~~he bypass circuit~~,~~ where the specific branch circuit protective device and its ratings or setting~~s~~ is selected ~~must~~ not to exceed ~~those marked on the adjustable speed drive controller~~that permitted under 430.123(A) for the power conversion equipment and that permitted under Article 430 Part IV for the bypass circuit. ~~Where the bypass circuit requires a different branch circuit short-circuit and ground-fault protective device, ratings or settings other than those marked on the adjustable speed drive controller, then separate branch circuit short-circuit and ground-fault protection shall be provided for both the adjustable speed drive controller and bypass circuit.~~

Substantiation: The proposed changes clarifies the following issues:

1. The type and size of protection specified by the manufacturer shall not exceed that permitted under Part IV to ensure branch circuit conductors are adequately protected. In addition, editorial comments to improve readability and indicate that more that one type of protection and maximum size is specified.

2. When the type and size is not specified, sizing of the fuse or circuit breaker is done in accordance with Part IV. The modification permits use of text which is not present in Table 430.52 as is currently written.

3. Exception 2 was rewritten to default to protection being required unless specified by product listing. This addresses concerns that listed products that utilize a common dc bus (e.g. multi-motor drives)often incorporate protection of individual amplifier modules as part of the product listing and do not require additional protection.

4. Protection for drive bypass was rewritten to provide reference to 430.153(A) and Article 430 Part IV to ensure consistency of application between drives with and without bypass. In addition, the text was rewritten to address only the use of a common protective device for both circuits, as separate protection is by default required under 430.123(A) and Part IV.

Panel Meeting Action: Accept in Principle in Part - The panel rejects the proposed references to Part IV in 430.123(A) and (B), and the language associated with "Listed common dc bus" in Exception No. 2. The panel accepts in principle the remainder of the recommendation with revisions for clarity.

Panel Statement: See recommendation on Comment 11-43a.

The panel rejected the reference to "430 Part IV" as the sizing of the short circuit and ground fault protection is specifically given in 430.52, the remainder of Part IV is not pertinent to the sizing requirements required by this Code section.

The panel rejected the language associated with "Listed common dc bus" in Exception No. 2 because those products are not always listed and drive topography does not always require additional dc bus overcurrent protection.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-48 Log #141 NEC-P11 **Final Action: Accept**
(430.227)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 11-114
Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal and correlate with the action taken on Proposal 1-63.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the Technical Correlating Committee. See panel action and statement on Comment 11-49.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-49 Log #2613 NEC-P11 **Final Action: Reject**
(430.227)

TCC Action: Based on the Code-Making Panel's action on Comment 1-46, the Technical Correlating Committee directs that Comment 11-49 be reported as "Reject".

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-114
Recommendation: Continue to accept the proposal, contingent on the companion comment to this being accepted by CMP 1.

Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:

"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation contingent upon CMP 1's acceptance of the proposed definition of "Disconnecting Means, (Lockable)" (Comment 1-46). This action is to be referred to the Technical Correlating Committee for review.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

COLE, T.: The current language is clear and is consistent with other sections of the code. The proposed language is a step backwards for safety in that a disconnect could be lockable, the locking device could be rendered unusable if a cover is taken off. The original code made it very clear the intent of the locking device.

11-50 Log #2614 NEC-P11 **Final Action: Accept in Principle**
(430.245)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-117
Recommendation: Accept the panel action in principle.

Change the end phrasing "shall be connected to them in the manner specified in Article 250" to "shall be bonded to them in accordance with 250.96(A)."

Substantiation: This language uses the more precise term "bonded" and avoids the whole-article reference prohibition in the NEC Style Manual at 4.1.1.

Panel Meeting Action: Accept in Principle

Accept the comment in principle to read:

250.245(A) Grounding Through Terminal Housings.

Where the wiring to motors is metal-enclosed cable or in metal raceways, junction boxes to house motor terminals shall be provided, and the armor of the cable or the metal raceways shall be connected to them in the manner specified in 250.96(A) and 250.97.

Panel Statement: The panel agrees the submitters substantiation and made revisions to include circuits of 250 volts or less and over 250 volts to ground.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 440 — AIR-CONDITIONING AND REFRIGERATING EQUIPMENT

11-51 Log #751 NEC-P11 **Final Action: Accept**
(440.6)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 11-120
Recommendation: The Proposal should be Accepted in Principle and revised as follows:

Change "Table 310.16 through Table 310.19" to "Table 310.15(B)(16) through Table 310.15(B)(19)".

Substantiation: This will correlate with the Panel Action on Proposal 6-52.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the comment contingent upon Panel 6's action on Comment 6-21. This action is to be referred to the Technical Correlating Committee for review.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-52 Log #1425 NEC-P11 **Final Action: Reject**
(440.9)

The Technical Correlating Committee directs that Proposal 11-129 and Comment 11-52 both be reported as "Reject" since the Code-Making panel with jurisdiction over the individual wiring method is the panel that decides the necessity of an equipment grounding conductor.

The Technical Correlating Committee directs that the Chairs of Code-Making Panels 7, 8 and 11 form a Task Group to develop proposals for the 2014 edition of the NEC to correlate this issue.

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 11-129
Recommendation: Revise proposed new 440.9 as follows:
~~Any wiring method employed shall contain~~ All branch circuits shall be supplemented by an equipment grounding conductor in accordance with 250.118(1).

Substantiation: This comment addresses two issues.

First, the proposed wording does not indicate that the requirement applies only to branch circuits and not to feeders or services. It takes a bit more scholarship that that used by most code users to notice that Section 440.1 does limit the scope of the article to air conditioning and refrigeration branch circuits. Making it explicit here, will simply make the code clearer.

Second, calling the equipment ground a "supplemental equipment grounding conductor" should help avoid issues of creating conflicts with issues that are under the prevue of CMP's 5 or 7. Other articles of the code, such as Articles 517, 547,555, and 680 have requirements for a wire-type equipment grounding conductor to be included with circuits.

Panel Meeting Action: Accept in Principle

Panel Statement: The panel agrees in principle with the concept of "supplemental" and "branch circuit".

The panel has not added "supplemental" specifically to the requirement because it would suggest that two internal equipment grounding conductors be installed in some wiring methods per the requirements of 250.118. Only a single internal equipment grounding conductor is intended. The concept of branch circuit is already addressed in the scope of 440. See the panel action on Comment 11-60.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

DESJARLAIS, J.: See my explanation of negative on 11-60.

WRIGHT, J.: See NEMA Negative vote on Comment 11-59.

11-53 Log #142 NEC-P11 **Final Action: Accept**
(440.14, FPN (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 11-126
Recommendation: The Technical Correlating Committee directs that the panel reconsider its action on this proposal since there is no need to duplicate 110.26 in accordance with 4.1 of the NEC Style Manual.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has reconsidered the panel action on proposal 11-126 as directed by the Technical Correlating Committee. The panel concurs that 110.26 applies in accordance with 90.3. The panel also realizes conflicting interpretations do occur with respect to nonfused disconnects. The panel intends that 110.26 apply regardless of the type of disconnect installed.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-54 Log #143 NEC-P11 **Final Action: Accept**
(440.14 Exception No. 1)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 11-127
Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal and correlate with the action taken on Proposal 1-63.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the proposed revision contingent upon CMP 1's acceptance of Comment 1-46. This action is to be referred to the Technical Correlating Committee for review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-55 Log #1536 NEC-P11 **Final Action: Reject**
(440.14 Exception No. 1)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-128
Recommendation: Accept the proposal with the following revisions:

Where the disconnecting means provided in accordance with 430.102(A) has approved permanent means for locking in the open (off), and the refrigeration or air conditioning equipment is essential to a process in a facility with written safety procedures, and where only qualified persons install and service the disconnecting means shall not be required to be within sight of the equipment. The exception should also apply to nonindustrial processes such as commercial, institutional, governmental, military, where the NEC is enforced. 508.20 does not specify occupancy type.

Substantiation: The exception should also apply to nonindustrial processes such as may be located in commercial, institutional, government and military premises where the NEC is enforced. Safety procedures and qualified persons should be the criteria, not occupancy. 408.20 does not specify occupancy.
Panel Meeting Action: Reject
Panel Statement: The present code text contains clear language and is more specific than the proposed language. It is not the intent of Panel 11 to reduce the level of safety by expanding the exception for other than industrial installations. There is no correlation between section 408.20 and the exception to 440.14. Section 408.20 are the requirements for the location of switchboards with exposed live parts and 440.14 are rules for the location of required air-conditioning and refrigerating equipment disconnects.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-56 Log #1539 NEC-P11 **Final Action: Reject**
(440.14 Exception No. 1)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-128
Recommendation: Accept the proposal with the following revisions:

Where the disconnecting means provided in accordance with 430.102(A) has permanent approved means for locking in the open (off) position, and the refrigeration or air conditioning equipment to a process in a facility with written safety procedures, and where only qualified persons install and service the equipment, the disconnecting means shall not be required to be within sight of the equipment.

Substantiation: This exception should apply to nonindustrial processes, such as commercial, institutional, governmental, and military. Where the NEC applies, safety procedures and qualified persons should be criteria, not the type of occupancy. 408.20 does not specify occupancy type.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 11-55.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-57 Log #2615 NEC-P11 **Final Action: Reject**
(440.14 Exception No. 1)

TCC Action: Based on the Code-Making Panel's action on Comment 1-46, the Technical Correlating Committee directs that Comment 1-57 be reported as "Reject".

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-127
Recommendation: Continue to accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110: "**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation contingent upon CMP 1's acceptance of the proposed definition of "Disconnecting Means, (Lockable)" (Comment 1-46). This action is to be referred to the Technical Correlating Committee for review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-58 Log #500 NEC-P11 **Final Action: Reject**
(440.15 (New))

Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 11-129
Recommendation: Reject this proposal.
Substantiation: I agree with the negative vote by the committee. The substantiation does not verify that an enclosed EGC would have prevented the accident. When an electrical installation is damaged, and not repaired, shock hazards can and do occur. The single report of metal raceway in the Chicago incident cited was related to poor maintenance or improper supporting and securing. Requiring an additional green wire would likely not solve this safety issue. The broken down conduit would likely cause the enclosed EGC to be broken as well or circuit conductors insulation to be cut and continuity of one or both ground return paths may be interrupted which would prevent the overcurrent device from operating or a separated raceway to becoming energized and presenting the shock hazard.

The National Electrical Code (NEC) can never consider all of the issues that may come up in an installation during its lifetime. Good code rules must only consider compliant installations at the time of the new installation. All scientific studies including the Soares' Tables and the Georgia Tech studies (GEMI) of equipment grounding conductor performance has shown the steel circular raceway to be the superior low impedance return path. Please reject this proposal.
Panel Meeting Action: Reject
Panel Statement: The panel recognizes wiring methods installed outdoors are more susceptible to being damaged and/or compromised. History has proven the integrity of the wiring method to provide an effective ground-fault return path is sometimes jeopardized. The panel does not agree with the substantiation that the broken down conduit would likely cause the enclosed equipment grounding conductor to be broken as well. See panel action and statement on Comment 11-60.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
DESJARLAIS, J.: See my explanation of negative on 11-60.
TODD, L.: As identified by the submitter of this comment, the substantiation in the original proposal showed that maintenance was not performed on this specific installation. If outdoor locations, other than the specific circumstances noted in the proposal submitters substantiation, are not protected by current requirements in Article 250, then that article should be revised for all outdoor equipment and not limited to equipment covered by Article 440.
WRIGHT, J.: See NEMA Negative vote on Comment 11-59.

11-59 Log #578 NEC-P11 **Final Action: Reject**
(440.15 (New))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 11-129
Recommendation: Oppose the Panel Action and delete the proposed new section.
~~Add new section 440.9 to read as follows: Any wiring method employed shall contain an equipment grounding conductor in accordance with 250.118(1).~~
Substantiation: The substantiation provided does not indicate whether or not an equipment grounding conductor in accordance with 250.118(1).was used in these installations. There is also no substantiation provided that the equipment grounding conductor types permitted by 250.118 do not provide safe grounding required by the NEC.
Since the submitter has not provided details of the accidents he cites in his substantiation, there is no evidence that an insulated EGC would have prevented any of these accidents. There are many reasons for accidents to occur. The overcurrent device may have been selected incorrectly, the installations may not have been code compliant or branch circuit wiring may have been damaged. Without the specific details it is impossible to assess the benefit that this change would make.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 11-58.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
DESJARLAIS, J.: See my explanation of negative on 11-60.
WRIGHT, J.: The substantiation submitted with proposal 11-129 was insufficient to justify this requirement for a supplementary grounding conductor in all outdoor wiring methods. The CPSC data only reflects the number of incidences, not the cause. There were just 2 photos submitted reflecting what could be installation or maintenance issues.
The Panel Statement in Comment 11-60 that "wiring methods installed outdoors are more susceptible to being damaged" is very general and insufficient substantiation for adding this requirement to all types of wiring methods in all types of units in all types of outdoor applications. This should be a design decision based on the type of wiring method used and the unique installation environment in which the equipment is installed.
The Technical Correlating Committee has assigned responsibility for the suitability of a wiring method as an equipment grounding conductor to CMP 7 and 8 and grounding is the responsibility of CMP 5. This comment should be rejected as being outside the scope of Panel 11.

11-60 Log #2535 NEC-P11 **Final Action: Accept in Principle**
(440.15 (New))

TCC Action: See the the Technical Correlating Committee Note on Comment 11-52.

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 11-129
Recommendation: Add new text to read as follows:
440.9 Equipment Grounding. Any wiring method employed shall contain an equipment grounding conductor in accordance with 250.118(1).
Substantiation: I would appeal to the technical committee to put a "hold" on this proposal so additional comments can be reviewed and language clarified for the application. There are concerns for what type of AC unit (commercial or residential) and facility locations that could be hard wired or cord and plug connected. There are still many locations where cord and plug connected AC units are not installed at a structure with a grounding electrode system. An additional issue is this appears to be a maintenance issue that is not uncommon, it may not be safe but it works, the building owner or tenant has a responsibility for equipment. There is also the issue for the installation of an equipment grounding conductor does not guarantee a good fault current path but it is the best first line of defense. No matter what wiring method is installed, many wiring systems cannot take the abuse of standing, stepping, or damaging of a cable or raceway system that an ground path will be assured to be effective and maintained even with a separate equipment grounding conductor. There is concern for the type of equipment this article represents and the added statement under this article "General Scope" would apply to all air conditioning and refrigerating equipment that is installed is that really the intent? Additional substantiation and clarification needs to be addressed and not a across the board one requirement will work in all instances for article 440 installations. This may require a task group from code making panels from 5, 7, 8, and 11 and the affect on those articles to require an equipment grounding conductor.
Panel Meeting Action: Accept in Principle
Revise 440.9 to read as follows:
440.9 Equipment Grounding. Any wiring method installed outdoors shall contain an equipment grounding conductor in accordance with 250.118(1).
Panel Statement: The panel agrees in principle with the recommendation but has added the words "installed outdoors" to limit the requirement to situations where physical damage occurs. Wiring methods installed outdoors are more susceptible to being damaged and/or compromised.
The panel notes that the submitter's substantiation does not support his recommendation. The panel does not agree with the submitter's suggestion that the committee "hold" the proposal (and comment). A need for this change has been demonstrated as noted in Proposal 11-129.
The modification clarifies the requirement as to the intended applications.
The panel clarifies that this requirement is intended to supplement other recognized types of equipment grounding conductors.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 11 Negative: 4
Explanation of Negative:
DESJARLAIS, J.: The danger from a potential shock hazard is of major concern and must be rigorously addressed in all installations. With that in mind however it should be noted that EMT is permitted as a suitable grounding means in clause 250-118 (4). The substantiation and cited case histories in the original proposal, ROP 11-129, for accepting the revised verbiage proposed by the panel can most likely be traced to abuses to the overall equipment occurring either after installation or possibly due to incorrect initial installation. If a particular installation has the potential for the EMT to be subjected to heavy abuse clause 358.12 (1) is already in place to address such concerns. Whether or not clause 358.12 (1) is applicable for a given installation should be determined at the time of installation by the AHJ. The proposal in its current form removes the ability of the AHJ to make this decision for AC and Refrigeration type equipment. In addition this proposal removes the ability to use Rigid Metal Conduit as an alternate grounding means if a given situation substantiates 358.12 (1). Furthermore, if it is the panel's opinion that EMT, Rigid Metal Conduit and other means currently permitted by clause 250.118 are inadequate as grounding means for outdoor installations then it would be more appropriate if this restriction were implemented on a wider scale and proposed to be adopted by CMP 5 in article 250.118.
MISSILDINE, JR., J.: Requiring a conductor for equipment ground rather than use of conduit or other means described in 250.118 is not a substitute for proper conduit application, installation or maintenance. Also, this change would only correct the stated problem for air conditioning and refrigeration equipment, not all rooftop units such as air handling units which would be covered by Article 430. This does not preclude the voluntary use of a conductor for the equipment ground.
TODD, L.: This is the comment used by the panel to revise Article 440 to contain an equipment grounding conductor in the wiring method employed outdoors. As I noted in my negative vote on comment 11-58, grounding means are covered in Article 250 and directions should be made generally to the code and not call out one special type of equipment for this additional requirement. If the situations identified by the panel are true (and they probably are) then they apply to all equipment installed outdoors and not just equipment covered by Article 440. The proper panel covering grounding should consider this issue and determine if current grounding means are adequate considering the poor maintenance records noted that could lead to situations increasing the risk to those coming in contact with the equipment.
WRIGHT, J.: Although the submitter of this comment included the text from Proposal 11-129, it is obvious by his comments that he did not think the Panel should accept this Proposal because there was insufficient substantiation to apply this rule "across-the-board". The submitter asked for the proposal to be held so that additional substantiation could be provided and different types of installations could be considered.
The Technical Correlating Committee has assigned responsibility for the suitability of a wiring method as an equipment grounding conductor to CMP 7 and 8 and grounding is the responsibility of CMP 5. This comment should be rejected as being outside the scope of Panel 11.

11-61 Log #2616 NEC-P11 **Final Action: Reject**
(440.15 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-129
Recommendation: Reject the proposal.
Substantiation: There was zero technical substantiation offered to unwind generations of experience with the entirety of 250.118 and its predecessors. There was zero technical substantiation that provided a basis to treat Article 440 loads different than other comparable loads elsewhere in the NEC. Where will this end? Will we now kill off raceway and cable armor grounding qualification a load at a time throughout the NEC every time there is some random loss experience that might have to do with equipment grounding continuity. CMP 5, in this cycle, just rejected another proposal to disqualify EMT as an equipment grounding conductor. The panel action was extremely irresponsible.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comments 11-58 and 11-60. Adding an equipment grounding conductor in accordance with 250.118(1) will increase the safety of installations under the scope of Article 440 by providing an additional effective ground fault return path.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
DESJARLAIS, J.: See my explanation of negative on 11-60.
WRIGHT, J.: See NEMA Negative vote on Comment 11-59.

11-62 Log #1799 NEC-P11 **Final Action: Reject**
(440.15 Exception (New))

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 11-129
Recommendation: Add new Exception as follows:
Exception: In industrial installations with written safety procedures and where the conditions of maintenance and supervision ensure that only qualified persons service the equipment, provisions of 250.118 shall apply for equipment grounding.
Substantiation: The panel action was an appropriate remedy for an equipment grounding problem that exists with residential and commercial air conditioning installations. The supporting documentation identified a problem that exists with these residential and commercial installations but there was no evidence presented that the existing practices in industrial installations should be modified by this new code section. Typical industrial refrigeration units involve large motors whose installation does not require a local disconnect switch (440.14 Exception No. 1) and, therefore, the cited equipment grounding problem does not exist and the substantiation does not apply. The equipment grounding requirements of 250.118 should continue to apply to industrial installations and the recommended exception should be included.
Panel Meeting Action: Reject
Panel Statement: The panel is concerned that safety practices in all installations (including industrial installations) may not adequately address the concerns being addressed by the new requirement, particularly in outdoor applications.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
DESJARLAIS, J.: See my explanation of negative on 11-60.
GLOVER, W.: The panel action was an appropriate remedy for an equipment grounding problem that exists with residential outdoor air conditioning installations. The supporting documentation in proposal 11-129 identified a problem that exists with these residential installations but there was no evidence presented that the existing practices in industrial installations should be modified by this new code section. The equipment grounding requirements of 250.118 should continue to apply to industrial installations and the recommended exception should be included.
Comment on Affirmative:
COLE, T.: The exception requested is consistent with other parts of the code that allow for oversight by qualified professionals in industrial applications. The substantiation for the code change did not deal with industrial accidents per se in regards to air conditioning and refrigeration units.

ARTICLE 445 — GENERATORS

13-2 Log #497 NEC-P13 **Final Action: Reject**
(445.1)

Submitter: David Flegel, Reliance Controls Corp.
Comment on Proposal No: 13-3
Recommendation: This proposal should be rejected.
Substantiation: This proposed change to 445.1 should be rejected. Acceptance of this proposal would place Article 445 in direct conflict with the scope of the National Electrical Code, and possibly subvert the intended and stated purpose of the Code. 90.2 of the NEC specifically states that the NEC covers the installation of electrical equipment. The article makes no reference to the Code covering the design and construction of equipment. 90.1(C) further states that the Code "is not intended as a design specification." Such parameters as internal overcurrent protection, internal bushing requirements, terminal housings, and so on are obviously design specifications and are not allowed in the Code.
Panel Meeting Action: Reject
Panel Statement: The requirements in Article 445 concerning portable and permanently installed generators do not deal with product design or product specification, any more than similar requirements in Article 430 apply to internal wiring of motors. Marking of a motor nameplate is required in 430.7 and marking for generators is required in 445.11. Overcurrent protection for various types of motors is found in 430.52 and Table 430.52 and 445.12 provides overcurrent protection requirements for various types of generators. Motor terminal housings are covered in 430.12 and for generators in 445.17. The same text for bushing requirements is found in 430.13 for motors as is found in 445.16. The required ampacity for conductors for motors is located in 430.6, 430.22, 430.24, and numerous other locations within Article 430, as similarly covered in 445.13 for generators. Disconnecting means requirements for motors are covered in Part IX in Article 430 and in 445.18 for generators. Proposal 13-3 was intended to detail the various requirements noted within Article 445. Maybe a much simpler way to provide this coverage would be to state as follows: "This article covers generators." Similar to the scope of Article 430 stating that it covers motors.
Many articles in the NEC provide requirements for the design of equipment and construction of equipment, such as the requirements in Part VI covering wiring of luminaires, Part VII covering construction of luminaires, Part IX covering construction of lampholders, and the construction requirements in Articles 312 for cabinets, and Article 314 for boxes and similar enclosures, as well as the Parts dealing with construction requirements for almost all wiring methods in Chapter 3. None of these subvert the intended and stated purpose of the Code or makes the scope of Article 445 too broad as alluded in the substantiation of the Comment.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-3 Log #1201 NEC-P13 **Final Action: Reject**
(445.1)

Submitter: Michael Flegel, Reliance Controls Corporation
Comment on Proposal No: 13-3
Recommendation: Reject the proposal.
Substantiation: This section originally covered large permanently installed generators many of which are assembled on site. This requires details on how to properly install them including such things as wire size. With the addition of Proposal 13-19, this Article moves into portable generators. While it is important to ensure portable generators are installed properly, the NEC should not develop a product standard for portable generators. Changing the scope could open up the article to this kind of activity such as determining the size of the wiring internal to a portable generator. The proposed scope seems to be too broad.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-2.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-4 Log #1600 NEC-P13 **Final Action: Reject**
(445.1)

Submitter: Kurt von Eckroth, Eckroth Engineering, LLC
Comment on Proposal No: 13-3
Recommendation: The proposal should be rejected.
Substantiation: Substantiation for rejecting Proposal 13-3. Acceptance of this proposal would place Article 445 in direct conflict with the scope of the NEC and continue a process of subverting the intended and stated purpose of The Code. 90.2 of the NEC specifically states that the NEC covers the installation of electrical equipment. The article makes no reference to The Code covering the design of equipment. 90.21(C) further states that The Code *"is not intended as a design specification"*. Such parameters as internal over-current protection, internal bushing requirements, terminal housings, and so, on are obviously design specifications and are, therefore, not allowed in The Code.
Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 13-2.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-5 Log #2136 NEC-P13 **Final Action: Reject**
(445.1)

Submitter: Gary L. Olson, Cummins Power Generation
Comment on Proposal No: 13-3
Recommendation: None given.
Substantiation: We are in agreement with the panel recommendation and that the current text is insufficient. Article 445 has not kept up with the many changes in the code that are driven by the fact that many generator installations are much more complex than when the original requirements were written. In particular, it is important that in many installations (such as when parallel generators are used or when a generator serves multiple distribution points) considering the generator as a source leads to inappropriate requirements for protection, wiring provisions, etc.

We suggest to the TCC that the scope of Article 445 should extend to the source distribution point as described and defined for separation purposes in 700.9 (8)(5) and the new rules in article 695. Thus, the alternate power source includes the necessary equipment, conductors, and overcurrent protection to the point where the feeders receive their supply. This will clarify and rationalize the interface of the alternate power system to many other articles, such as those describing service entrance requirements, protection, conductor sizing, and other requirements. For example, in a parallel generator application where the generators are larger than 1000A, ground fault protection is required. However, due to the location of the bonding point in the system it is possible that the ground fault protection will only function when the fault is between the paralleling breaker and the generator set, thus protecting the generator set, and not the downstream devices as is the result when a single source serves a load. 8y considering the generator bus as the source of power for the downstream feeders, the ground fault protection would be started at the feeder(s) rather than the generator paralleling breaker, thus protecting the distribution system and load as is intended, and potentially preventing the total shutdown of the power system due to tripping of the ground fault protection on the generator breakers. In paralleling applications the generator paralleling breakers are often smaller than other downstream devices, which definitely complicates the design process, and may result in unnecessary over-sizing of the paralleling breakers in order to meet requirements that are not necessarily applicable in this situation.
Panel Meeting Action: Reject
Panel Statement: The comment does not comply with Section 4.4.5(c) of the NFPA Regulations Governing Committee Projects because the submitter has not provided a recommendation containing proposed text.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-6 Log #372 NEC-P13 **Final Action: Accept**
(445.11)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 13-9
Recommendation: Continue to reject the proposal.
Substantiation: The preposition “per” in the English language carries the precise meaning of “for each” in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in “Table 3.2.1, Possibly Unenforceable and Vague Terms.” Section 3.3.4 of the same document requires that “NEC language shall be brief, clear, and emphatic.” Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: “Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel.”

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning “in accordance with” and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-7 Log #2875 NEC-P13 **Final Action: Reject**
(445.11)

Submitter: Shawn Booth, Newfields, NH
Comment on Proposal No: 13-10
Recommendation: Revise text as follows:

The Manufacturer’s nameplate shall also include the minimum distance from combustible materials ~~and the minimum distance from doors and window openings.~~
Substantiation: The information of the combustible materials will let the installer and the authority having jurisdiction, which not every generator is the same and some of them can be installed closer than five feet to combustible materials. This will ensure that the generator is listed and has been properly tested to be installed at the distance that is on the manufacturer’s nameplate.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide any technical substantiation to answer the issues raised in the proposal Panel Statement. Generators are built for various types of fuel and various exhaust system configurations. Each different fuel and exhaust configuration may require a different distance from combustible materials so providing manufacturers’ data for all the possible distances would be almost impossible. In addition, the various types of construction may combine noncombustible materials, such as block or brick, with combustible frames for doors and windows. The location of the generator should remain with the installer and the authority having jurisdiction as a field decision based on the construction of any structures as well as the type and amount of fuel stored in or with the generator. NFPA 37,*Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines* contains minimum clearance requirements.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-8 Log #1538 NEC-P13 **Final Action: Reject**
(445.12(A))

TCC Action: The Technical Correlating Committee directs that the term “acceptable” be replaced with the term “identified” in conformance with the NEC Style Manual, Section 3.2.1.
Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-13
Recommendation: Accept the proposal and change “acceptable” to “Approved.”
Substantiation: Acceptable does not specify to whom; “approved” is acceptable to the Authority Having Jurisdiction.
Panel Meeting Action: Reject
Panel Statement: Acceptable applies to the installer, the manufacturer, and the inspector. In addition, approved is already required based on 110.2 as follows:

The conductors and equipment required or permitted by this Code shall be acceptable only if approved. Repeating “approved” here is unnecessary.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-9 Log #569 NEC-P13 **Final Action: Reject**
(445.12(A) and 445.13 Exception)

Submitter: Rick Lorenz, Cummins Power Generation
Comment on Proposal No: 13-11
Recommendation: 445.13 Exception: Where <u>the design and</u> operation of the generator prevents an overcurrent condition. the ampacity of the conductors shall not be less than 100 percent of the nameplate current rating of the generator.
Substantiation: In the past, inherent design generator overload protection was achieved by the use of limited horsepower engines and/or shunt excited generators. Within the power generation industry today these engine and generator factors are no longer common. NEC mandated generator overcurrent protection should be only provided by a listed device so an Authority Having Jurisdiction can positively verify the acceptability of the equipment In addition. no code or technical definition exists for the term “inherent design”. The definition of Overcurrent, per Article 100 of the NEC can result from overload, short circuit or ground fault therefore overcurrent protection is more comprehensive than just overload protection.

445.13 Exception should now reflect overcurrent protection not overload protection.

240.21 (G) Should correlate to 445.12 & 445.13 and reference overcurrent protection.
Panel Meeting Action: Reject
Panel Statement: Inherent protection is still a valid means of protecting some generators. See the panel action and statement on Comment 13-10 which reverts back to the term “overload”.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-10 Log #1597 NEC-P13 **Final Action: Accept in Part (445.12(A) and 445.13 Exception)**

Submitter: Lawrence W. Forshner, Cummins Northeast, Inc.
Comment on Proposal No: 13-11
Recommendation: 445.12(A) Maintain the acceptance of protective relays, and revert overcurrent back to overload.

(A) Constant Voltage Generators. Constant-voltage generators, except ac generator exciters, shall be protected from overload ~~overcurrent~~ by inherent design, circuit breakers, fuses, protective relays, or other acceptable overcurrent protective means suitable for the conditions of use.

445.13 Exception: Change the Exception as follows:

Where the design and operation of the generator ~~prevent overloading~~, incorporates listed overcurrent protection, the ampacity of the conductors shall not be less than 100 percent of the nameplate current rating of the generator.
Substantiation: The partial acceptance of this proposal has created confusion and conflicting text.
Substantiation 445.12(A)
We agree with the panel that "inherent design" is still a valid means of protecting some generators. However, there is significant confusion as to the meaning of "inherent design". We believe that the term relates to a machine that will be protected from overload by the nature of the inherent characteristics of the machine. In other words, "inherent" should not be applied to actions of a control circuit on a generator set, but rather reflective of the response of the machine regardless of how it is controlled. In practice, this would not be appropriate protection for most generators, but would be applicable in some limited cases, such as single phase shunt-excited generators with active voltage regulators. In those cases, a short circuit will cause the voltage and current output of the machine to collapse, since the power supply for the voltage regulator will be eliminated. Because the term "inherent" is not defined, it is subject to interpretation and misuse.

In order to protect a generator from overcurrent, the sensing for excess current could not be made at the output of the generator, but would have to be at the source of the current (for example, on the "star" side of the wye connected stator windings). This is often not possible due to the physical design of the generator, particularly in smaller machines. Therefore "overload" should remain. Also, 240.21(G) will still correlate with the acceptance of this comment, in that it references overload protection located at the load end of the feeder.
Substantiation 445.13 exception:

"445.13 Ampacity of conductors" is a rule for sizing conductors connected to a generator. Present code would allow generator overload protection to be at the load end of the feeder, when terminated in an overcurrent device(s), if the conductors were rated at 115% of the nameplate current rating of the generator. Reducing the conductor ampacity, per the exception, should not be allowed, unless overcurrent protection, recognized in article 240 is provided with the generator.

Depending on the manufacturer, overcurrent protection is provided by protective relays, circuit breakers, and with some fuse applications. Relay schemes, or circuit breakers with electronic trip modules are set to insure generator protection, and aid the designer in their coordination challenges. There is no technical substantiation to allow "inherent design" to justify reducing the ampacity for conductors directly connected to a generator.
Panel Meeting Action: Accept in Part

The panel accepts the recommendation to revert to "overload" and notes that "protective relays" was added by Proposal 13-11. The panel rejects the recommendation for 445.13.
Panel Statement: Relay protection can only provide generator overcurrent protection if the sensing current transformers are located on the supply side of the generator winding, (such as the star side of a wye connected three phase generator.) This may not be physically possible on smaller machines. Therefore overload protection should remain in 445.12(A). Protective relays can provide protection for external faults with steady state and network short circuit current protection, protection against unbalanced loads, protection against internal phase faults. Protective relays are listed under UL category NRGU on page 234 of the 2009 UL White Book and the UL basic standards are UL 508 for Industrial Control Equipment and UL 1053 for Ground-Fault Sensing and Relaying Equipment. The changes to the exception in 445.13 were not accepted because CMP-13 has reversed their action on Proposal 13-11 by replacing "overcurrent" with "overload".
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-11 Log #621 NEC-P13 **Final Action: Accept in Principle (445.13)**

Submitter: Lawrence W. Forshner, Cummins Northeast, Inc.
Comment on Proposal No: 13-14
Recommendation: This proposal should have been accepted in principal. See comment to Proposal 10-57. Taps should be allowed with proper design and protection. To say they should be the same as transformers, however, would not allow a single feeder to be tapped as described in 445.19 and 700.9(B)(5), per 240.21(C).
Substantiation: Conductors from generators prior to 1984, were considered to be, and were installed similar to service conductors. Although not specifically classified and listed in 230.201, they are the only conductors that can be connected to a voltage source with only overload protection at the load end, as is the case with service entrance conductors. They are allowed in 240.21(D) and (G) using similar language. Feeder taps, transformer secondary connections, motor branch circuits, all have some type of upstream ground fault and short circuit protection. Even part VIII of Article 240 with engineering supervision: "Conductors are considered to be protected under short circuit conditions if sized per Table 240.92(B)". When the "Classification of Service Conductors" was removed from the 1984 code, by default, conductors directly connected to generators became feeders. The panel statement supports the argument that when the stator windings of an AC alternator directly supply feeders sized at 115% of the name plate current rating of the generator, the conductors are considered to be protected under short-circuit conditions, in that the alternator thermal damage curve is to the left of the conductor thermal damage curve, causing the alternator to fail before the conductors are damaged. The design described above is very unusual. Generators are not specified void of some type of alternator protection. When a standard inverse/time circuit breaker is selected in the field, it will often not protect the alternator from damage under overload conditions. The level of electrical and electronic sophistication incorporated in a generator control is very advanced. It may have a relay protection that monitors frequency, voltage, and current under all load conditions, or will be specified with a breaker usually with an electronic trip module configured to ensure alternator protection and facilitate coordination. If it is listed and recognized in Article 240 for providing overcurrent protection for the ungrounded conductors, than feeder tap rules should apply. The idea that some designers are creating an installation that intends a generator to go to failure is not practicable. In reality, small events such as a motor single phasing, or a bolted fault occurring after a renovation, seriously shortens the life of the unprotected generator. Then, when it is needed to start a fire pump, smoke evacuation fans, stair pressurization fans, egress lighting, and smoke proof enclosure fans, it may fail because of the damage that occurred collectively by the smaller overcurrent events. I would argue, when considering the available fault currents on some of the larger gen-sets, direct connections, with only overload protection on the load end of the feeder, should only be done with engineering supervision. 240.21(G) is always the topic of debate as to how far conductors from a generator can be run inside a building. My answer would be when engine driven generators are installed within a building; they are required by NFPA 37 to be in a one hour room. Therefore, when the feeders leave the room, they are entering the building, similar to when a transformer secondary leaves a vault, and 225.31 and 225.32 would apply.

I am in agreement with the panel statement. It supports my comment to Proposal 10-57, in that smaller conductors tapped from a feeder or the generator bus could never be considered as being protected from short circuits, without an overcurrent protective devise at the generator.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel action on Comment 13-13 addresses the recommendation of this comment.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-12 Log #1537 NEC-P13 **Final Action: Reject (445.13)**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-15
Recommendation: Accept the proposal with the following revisions:

Neutral conductors of dc generators that must carry ground-fault currents shall have an ampacity not less than the largest conductor.
Substantiation: This provision appears intended to require at least equal ampacity to the negative and positive conductors. If the - and + conductors are 6 AWG copper with an ampacity of 65 and the neutral is a 6 AWG aluminum conductor, the ampacity is 50. Is this the intent?
Panel Meeting Action: Reject
Panel Statement: The size of the conductor is based on the ampacity of the conductor, therefore a 6 AWG aluminum conductor does not correspond to a 6 AWG copper conductor.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-13 Log #470 NEC-P13 **Final Action: Accept in Principle**
(445.19)

Submitter: Lawrence W. Forshner, Cummins Northeast, Inc.
Comment on Proposal No: 13-18
Recommendation: 445.19 Generators Supplying Multiple Loads.

Add the following to the beginning of the sentence:

When the design of a listed generator is provided with overcurrent protection meeting the requirements of 240.15(A), a single generator supplying more than one load, or multiple generators operating in parallel, shall be permitted to supply either of the following:

(1) A vertical switchboard with separate enclosures.

Add second sentence to 445.19(2):

(2) Individual enclosures with overcurrent protection tapped from a single feeder for load separation and distribution. The installation of the tap conductors shall meet the requirements of 240.21(B)(1) through (5).

Add new subsection "a", "b", and "c" after (2):

a. Direct taps from a generator terminal housing that meets the requirements of 445.17, shall be permitted when generators are located outdoors of a building or structure if installed per the requirements of 240.21(B)(5).

b. Direct taps from a generator terminal housing that meets the requirements of 445.17 shall be permitted when generators are located inside a building or structure if installed per the requirements of 240.21(B)(1), (2), (3), and (4).

c. Direct taps from a generator terminal housing, when housed generators are located outdoors of a building or structure, shall comply with 445.19(2)(a) or 445.19(2)(b).

Add new subsection (7) text to 240.4(E)(7) 445.19(2), Generator taps.

Substantiation: This comment is per panel statement to proposal (10-57 2011 ROP). It provides for a generator tap consistent with present wording in 445.19, and references the appropriate sections of Article 240. It is also consistent with new 2008 NEC text in 700.9(B)(5)(b) and 695.4(A), and supported by the substantiation in Proposal 13-8 in the 2008 NEC ROP that created 445.19. It is suggested that this comment be submitted to CMP 10 for information and consideration.

Substantiation: 1st sentence

The Task group that was formed for the 2008 NEC revision cycle with representatives from NFPA 70; NFPA 99; and NFPA 110, should be recognized for eliminating many of the conflicts designers had in trying to design a reliable code compliant feeder arrangement to supply loads from an on-site generator. However they did not fully address generator, feeder, and feeder tap protection. Inherent protection as allowed per 445.12(A) refers to a design in which a short term overcurrent condition causes a collapse of the voltage on the output of the alternator. A single phase fault may not cause the field to collapse until it develops into a line to line failure, causing alternator damage. Other drawbacks to this "shunt-type" design are poor motor starting, and poor (generator) coordination, therefore, they are usually not specified on emergency systems or paralleled systems, but have been historically accepted as providing overload protection. The panel statement in the 2008 ROP (13-118) does recognize that "the exception to 700.9(B)(5)(b) will permit the use of an overcurrent protective device at the source or for the equipment." I would argue, however, that it has to be required at the source, to allow down stream taps. Listed overcurrent protection described in 240.15(A) will provide overcurrent protection for the ungrounded feeder conductors, allow the tap conductors to meet the definition given in 240.2, and because it is provided by the manufacturer with the gen-set, ensures alternator protection. The instantaneous time/current settings whether integral or adjustable, give consideration to the thermal damage curve of the alternator windings, a fully rated feeder, and facilitate reliability by providing optimum coordination. Field installed overcurrent protective devices will not necessarily protect the alternator, and will not facilitate optimum coordinate.

When the generator overload protection required by 445.12(A) is accomplished by a field installed breaker or set of fuses and the generator is cables directly as allowed per 240.21(G), and sized per 445.13, the breaker or fuses could be on the load end of the feeder. The breaker, in this situation, is providing overload protection for the generator, and the feeder. Allowing multiple overcurrent protective devices in separate vertical sections of a switchboard as described in 445.19(1) or taps as described in 445.19(2) without overcurrent protection at the generator would not necessarily protect the generator, excessive current beyond the thermal damage curve of the alternator windings will significantly reduce the life of the generator, or cause complete failure. The common line side bus of a switchboard supplying individual sections, or taps that are described in 445.19(2) and 700.9(B)(5) would conflict with the requirements of 445.12, 445.13, and 240.21(G), if alternator protection is not considered. It also would make it very difficult for the AHJ to enforce 445.12(A). Feeder taps without overcurrent protection upstream as described in 240.15(A), would conflict with the requirements described in 240.21, in that, a direct generator tap with additional down stream taps is a violation of the second sentence in 240.21. Also, the definition for tap conductors in 240.2 recognizes that overcurrent protection is "ahead of its point of supply" but "exceeds the value permitted". To summarize, modern generators employ a listed overcurrent protective device integral with their control, by means of fuses, breakers or protective relays. This design ensures protection of the alternator windings, a fully rated feeder, is designed to facilitate coordination, and makes down stream, or direct tap designs consistent with the definition for tap conductors given in Article 240.

Substantiation for (2) a, b, and c:

To allow for taps and not list conditions and rules for the installation of the taps such as: length, wiring methods, ratings exceeding calculated loads, rules for sizing grounding conductors etc., creates confusion. Referencing the "feeder tap rules" as described in 240.21(B), will eliminate confusion as to how to install the tap conductors. I am in agreement with the first sentence in the "Substantiation" given by the task group (2008 NEC ROP 13-8) that generators are not designed for multiple devices to be located on the generator. However, the generator terminal housing could accept multiple smaller feeders (taps), such as three sets of 3/0's compared to two sets of 400KCM conductors, for example. There is no compromise of electrical safety if the taps described in 445.19(2) were directly tapped from the generator bus or a feeder with an equivalent ampacity, if all the present rules of 240.21(B) were adhered to. It's simply a design choice. Having the ability to use a 25 ft tap rule within a building or in an outdoor walk-in housing is long overdue, and will alleviate the physical constraints of trying to mount multiple breaker enclosures on the side of an alternator.

Panel Meeting Action: Accept in Principle

Revise 445.19 to read as follows:

445.19 Generators Supplying Multiple Loads. A single generator supplying more than one load, or multiple generators operating in parallel, shall be permitted to supply either of the following:

(1) A vertical switchboard with separate sections.

(2) Individual enclosures with overcurrent protection tapped from a single feeder for load separation and distribution if a generator(s) is provided with overcurrent protection meeting the requirements of 240.15(A).

Panel Statement: The panel action clarifies the application of tap conductors where multiple enclosures are supplied from a generator.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:

ODE, M.: While I am voting affirmative to the accept in principle, I recommend the following correction to the suggested text by inserting "the" rather than "a" before "generator" in (2) since the "a" could imply that overcurrent protection is acceptable for conductors from only one generator and not for other multiple generators with conductors supplying individual enclosures. The intent is to require compliance with 240.15 for each generator where tap conductors are then supplying individual enclosures, not just a single generator. The final text would read as follows:

"445.19 Generators Supplying Multiple Loads. A single generator supplying more than one load, or multiple generators operating in parallel, shall be permitted to supply either of the following: (1) A vertical switchboard with separate sections (2) Individual enclosures with overcurrent protection tapped from a single feeder for load separation and distribution, if the generator(s) is provided with overcurrent protection meeting the requirements of 240.15(A)."

13-14 Log #571 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Jeff Heggen, Perhats Wenstrom Associates, Inc.
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: GFCI protection integral to a generator may not necessarily ensure adequate personnel protection. In particular, a poorly grounded bonded-neutral generator may not provide a ground path adequate to allow the GFCI to trip. In such cases, a user would mistakenly be led to believe that he or she was adequately protected when, in fact, they were not. GFCI protection, when required by Code, is best provided independently of the generator.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9

Explanation of Negative:

ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.

BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.

CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.

CURRIN, JR., R.: See my negative statement on comment 13-27.

LITTLE, L.: See our negative statement on comment 13-27.

MOUTON, C.: See explanation for negative vote on Comment 13-27.

ODE, M.: A GFCI receptacle monitors the amount of current that goes out on the ungrounded conductor and then comes back on the neutral conductor and if there is leakage of 6 milliamps or greater that does not come back through the GFCI comparison device, then the GFCI device will trip. GFCIs will trip without the benefit of an equipment grounding conductor path back to the source but obviously having a lower impedance path back to the source is much more desirable since the equipment grounding conductor path back to the frame of the generator and then back to the source on the system bonding jumper to the neutral provides a much lower impedance path.

Section 250.20(B)(1) requires any AC system of 50 volts to 1000 volts to be grounded where the system can be grounded so that the maximum voltage to ground on the ungrounded conductor does not exceed 150 volts. Section 250.20(D) requires any separately derived system, as covered by 250.20(B) to be grounded in accordance with 250.30(A) of which a portable generator would be covered under this section.

"250.20 Alternating-Current Systems to Be Grounded. Alternating-current systems shall be grounded as provided for in 250.20(A), (B), (C), (D), or (E). Other systems shall be permitted to be grounded. If such systems are grounded, they shall comply with the applicable provisions of this article.

(B) Alternating-Current Systems of 50 Volts to 1000 Volts. Alternating-current systems of 50 volts to 1000 volts that supply premises wiring and premises wiring systems shall be grounded under any of the following conditions:

(1) Where the system can be grounded so that the maximum voltage to ground on the ungrounded conductors does not exceed 150 volts"

In addition, 250.34 does not require the frame of a portable generator to be connected to a grounding electrode if the portable generator supplies only equipment mounted on the generator, cord-and-plug-connected equipment through receptacles mounted on the generator, or both.

"250.34 Portable and Vehicle-Mounted Generators.

(A) Portable Generators. The frame of a portable generator shall not be required to be connected to a grounding electrode as defined in 250.52 for a system supplied by the generator under the following conditions:

(1) The generator supplies only equipment mounted on the generator, cord-and-plug-connected equipment through receptacles mounted on the generator, or both, and

(2) The normally non–current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are connected to the generator frame."

In addition, the normally non-current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are required to be connected to the generator frame. This section does not state that floating the neutral in the generator is acceptable since the generator is a separately derived system and must have a system bonding jumper installed from the equipment grounding system in the generator to the grounded or neutral conductor within the generator.

A portable generator, supplying power to any premises, where there is no direct electrical connection to conductors of another power system, is a separately derived system. Section 250.34(C) requires the grounded conductor from the generator to be connected to the generator frame where 250.26 requires the conductor to be grounded.

"250.34 Portable and Vehicle-Mounted Generators.

(C) Grounded Conductor Bonding. A system conductor that is required to be grounded by 250.26 shall be connected to the generator frame where the generator is a component of a separately derived system.

250.26 Conductor to Be Grounded — Alternating-Current Systems.

For ac premises wiring systems, the conductor to be grounded shall be as specified in the following:

(1) Single-phase, 2-wire — one conductor

(2) Single-phase, 3-wire — the neutral conductor"

The equipment grounding conductor must also be connected to the generator frame. Premises wiring would apply to both fixed loads and portable loads, such as drills and other portable electrical equipment and the danger of electrocution applies anywhere electricity is used. Over the many years these issues have been dealt with in the NEC and with OSHA, there has only been one exception to this rule and that exception applied to 5 kW and smaller 2-wire single-phase generators. This exception was removed from the NEC in the 2002 cycle with the intent that all portable generators be required to have GFCI protection, however, OSHA 29 CFR 1926.404(b)(1)(ii) still has the exception. In OSHA, the exception only applies to 5 kW and smaller 2-wire single phase generators. Any 120/240 volt 3-wire generators must have the neutral connected to the frame and must have GFCI protection, based n the NEC and the OSHA requirements. The 5 kW and smaller 2-wire generators were excluded from GFCI protection since 2-wire generators larger than 5 kW could have capacitive coupling or capacitive reactance effects where ac current at 60 hertz could pass between the winding and the case of the generator

OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.

TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-15 Log #654 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Donald J. Karman, Two Rivers, WI
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: This proposal is clearly outside of the scope of the National Electrical Code. The submitter addresses applications of small portable generators such as lighting on camp sites, powering table saws and hand-held tools, and so on. However, 90.2 of the NEC clearly states that the NEC covers the installation of electrical equipment only in premises, yards and lots, parking lots, carnivals, industrial substations, conductors and equipment that connect to the supply of electricity, and installations used by the electric utility. Therefore, the NEC has no authority over generators used in stand-alone applications.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:

ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.

BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.

CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.

CURRIN, JR., R.: See my negative statement on comment 13-27.

LITTLE, L.: See our negative statement on comment 13-27.

MOUTON, C.: See explanation for negative vote on Comment 13-27.

ODE, M.: Section 90.1 states the purpose of the NEC is to safeguard persons and property from hazards arising from the use of electricity. Section 90.2(A)(1) and (3) requires compliance with the NEC for public and private premises and installations of conductors and equipment that connect to the supply of electricity. Articles 210 for branch circuits, 215 for feeders, 445 for generators, 590 for branch circuit and feeder installations for temporary installations, as well as construction sites as provided by 590.6, and 702 for optional standby systems are all pertinent articles within the NEC that cover generator applications.A portable generator, supplying power to any premises, where there is no direct electrical connection to conductors of another power system, is a separately derived system. Section 250.34(C) requires the grounded conductor from the generator to be connected to the generator frame where 250.26 requires the conductor to be grounded. The equipment grounding conductor must also be connected to the generator frame. Premises wiring would apply to both fixed loads and portable loads, such as drills and other portable electrical equipment and the danger of electrocution applies anywhere electricity is used.

OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.

TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-16 Log #1017 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: John Klein, Klein Products
Comment on Proposal No: 13-19
Recommendation: ~~445.20. All 125 volt, single phase, 15- 20-, and 30-ampere receptacle outlets, that are a part of a 15kW or smaller, portable generator, shall have ground fault circuit interrupter protection for personnel integral to the generator or receptacle.~~

Substantiation: A large percentage of portable generators are used for household backup power. Household circuits that are required to have GFCI protection already have it. If there is also a GFCI on the generator and the neutral is floating, it will be non-functional. If the generator neutral is bonded and a GFCI is present, it will make the generator incompatible with most transfer switch systems. The NEC requires transfer switches for this application. It doesn't make sense to make them incompatible with the available generators.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: A GFCI receptacle monitors the amount of current that goes out on the ungrounded conductor and then comes back on the neutral conductor and if there is leakage of 6 milliamps or greater that does not come back through the GFCI comparison device, then the GFCI device will trip. GFCIs will trip without the benefit of an equipment grounding conductor path back to the source but obviously having a lower impedance path back to the source is much more desirable since the equipment grounding conductor path back to the frame of the generator and then back to the source on the system bonding jumper to the neutral provides a much lower impedance path. Stating that GFCI protection on generators makes the generator incompatible with most transfer switches systems is incorrect since two pole or three pole transfer switches are compatible with GFCI protection on generators.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-17 Log #1247 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 13-19
Recommendation: NEMA opposes the Panel Action and recommends that the proposed new section be deleted.
~~**445.20. Ground-Fault Circuit Interrupter Protection for Receptacles on 15-kW or Smaller, Portable Generators.**~~
~~All 125-volt, single-phase, 15- 20-, and 30-ampere receptacle outlets, that are a part of a 15 kW or smaller,~~
~~portable generator, shall have ground-fault circuit interrupter protection for personnel integral to the generator or receptacle.~~
Substantiation: This proposal seeks to add GFCI protection to all 125V generator outlets. In order to establish a functional GFCI configuration on the generator, the generator must be of the bonded neutral variety.
GFCI's are intended to be used only in grounded neutral systems per UL 943. A portable generator by itself does not provide an assured grounding of one of the power conductors. This could result in fault situations in which the GFCI will not provide protection, yet users would assume that they are protected. The portable generators usage in a popular stand alone (125V) application – recreational vehicles - is a good example on how assumed personal protection could lead to accidents in case the grounding is not reliably implemented, a likely occurrence when non-qualified users install the equipment.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-18 Log #1314 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Andrew S. McConnell, Boyle Fredrickson SC
Comment on Proposal No: 13-19
Recommendation: Proposal 13-19 should be rejected.
Substantiation: 90.2 specifically defines the National Electrical Code as an installation code, and Article 90.1(c) specifically indicates the National Electrical Code is <u>not</u> intended as a design specification. However, the proposed change to 590.6 concerns the <u>design</u> of portable generators, not their installation. This is a substantial departure from the historical intent and purpose of the National Electrical Code.
Under conventional and accepted use of the Code for safe installation practices, the NFPA would not have product liability exposures in the event a manufacturer produce a <u>product</u> that possesses some hidden safety flaw,. However, under the proposed <u>product design specification</u> of 590.6, it is possible that the NFPA could be subjected to exposure in product liability litigation. For example, a manufacturer may comply with Code requirements and produce a generator with an on-board GFCI. In the event the configuration has a safety flaw and does not prevent <u>all possible</u> ground faults, resulting in injury or death, the NFPA could be named as a defendant in a product liability lawsuit because the generator was designed to the required <u>design specifications</u> of 590.6.
The NFPA should give careful thought to the significant departure in the intent and purpose of the National Electrical Code reflected by the proposed change to 590.6, and should avoid acting in a manner that could expose it to potential liability resulting from the specification of product design features.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: The requirements for GFCI protection on certain receptacles concerning portable generators does not deal with product design or product specification, any more than requiring a GFCI receptacle for a bathroom receptacle deals with product design. The substantiation provided applies to 590.6, not 445.20.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-19 Log #1368 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Frank Dean, FD Consulting Co.
Comment on Proposal No: 13-19
Recommendation: Delete text as follows:
~~445.20 All 125-volt, single-phase, 15- 20-, and 30-ampere receptacle outlets, that are a part of a 15 kW or smaller, portable generator, shall have ground-fault circuit interrupter protection for personnel integral to the generator or receptacle.~~
Substantiation: A GFCI on the generator will be largely ineffective and certainly will not make the genset more safe. In most applications, a portable generator is not solidly grounded, and this would be necessary for proper GFCI operation. I am amazed that this idea came from UL, they should know better.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.

CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-20 Log #1415 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: James Hendricks, Hendricks Hardware Co.
Comment on Proposal No: 13-19
Recommendation: Delete 445.20 as follows:

~~445.20. All 125-volt, single phase, 15 20, and 30 ampere receptacle outlets, that are a part of a 15 kW or smaller, portable generator, shall have ground fault circuit interrupter protection for personnel integral to the generator or receptacle.~~

Substantiation: Most of the commercially available small generators like the Honda EU2000 (Honeywell, ETQ, and Onan are just a few of the others) feature a floating neutral. Adding a GFCI to the receptacle will serve no purpose, as it will be completely ineffective on a floating neutral generator because the ground and neutral are not tied together. How can the NEC mandate a "safety" measure that won't work?
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-21 Log #1599 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Kurt von Eckroth, Eckroth Engineering, LLC
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: Please see below for substantiation to reject Proposal 13-19.

· This proposal is clearly outside of the scope of the National Electrical Code. The submitter addresses applications of small portable generators such as lighting on camp sites, powering table saws and hand-held tools, and so on. However, 90.2 of the NEC clearly states that the NEC covers the installation of electrical equipment only in premises, yards and lots, parking lots, carnivals, industrial substations, conductors and equipment that connect to the supply of electricity, and installations **used by the electric utility**. Therefore, the NEC has no authority over generators used in stand-alone applications. No any need to.

· According to 90.2 of the NEC, the NEC is an installation code, not a construction code. As an installation code, the NEC can mandate that a particular feature exists (a disconnect at a certain location, for example), **but not how** it is to be achieved (circuit breaker, switch, properly rated plug-and connector, etc.). Therefore, while the NEC can mandate ground fault protection for particular circuits, **it is not within its authority to mandate that said ground fault protection must be provided by a GFCI outlet integral to the generator**.

· If ground fault protection is necessary in a particular application, the Code can require it. However, since there are many different ways to achieve ground fault protection (GFCI outlet, GFCI circuit breaker, GFCI cord set, portable personal GFCI protection device, etc.) the only way that the Code can mandate integral GFCI outlets in generators is if it becomes a product design and performance code, and 90.2 clearly states it is not.

· The proposal would create a Code conflict. **525.23 (C) clearly states that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected. The purpose of this is to assure that egress lighting is always available. Since egress lighting is often powered by portable generators at these sorts of events, the proposed 445.20 cannot mandate GFCI outlets on portable generators.** If the NEC Code Making Panel 13 approves this proposal, the NEC Technical Correlating Committee to whom CMP13 reports will have no choice but to reject the proposal.

· In order for GFCI protection to function, there must be a path for the ground fault current to return back to the power source. In utility systems, this path through the ground is created through a process called bonding and grounding. The reasons for grounding electrical systems are spelled out in 250.4 (A) (1), and are unique to utility power systems. In such a case, the GFCI is necessary to protect the user from being killed by the utility power since exposed metal parts are intentionally electrified through the bonding and grounding process. **However, with stand-alone portable generators, the reasons for bonding and grounding are mitigated and electrification of the ground through bonding and grounding is not required by the NEC**.

Public safety for portable generators is best served by protecting the user through the use of basic insulation and isolation. **This proposal DELIBERATLY (1) creates a ground path, (2) allows the electrocution to begin and then (3) attempts to stop it before lethality using a complicated and electronic sensing and interrupting device.** Quite simply, if there is no ground fault path, then there can be no electrocution as a result of a ground fault.

· The NEC allows both floating neutral and bonded neutral generators. For stand-alone use, it makes no sense to require GFCI protection on a floating neutral generator because of the way it is constructed. In order for a ground fault to occur, a path back to the generator head through the ground must exist. **Since a floating neutral generator has no internal connection between its neutral and its frame, such a path, even if its frame is grounded to earth, does not exist. As a result, the GFCI protection on the generator will never detect a ground fault because it is physically impossible for one to exist.** This change also creates a number of consequences:

· It would mandate the use of a product that currently does not exist—a high vibration/high temperature hardened GFCI.

· It would effectively eliminate all floating neutral generators (the most common kind), as the generator-mounted GFCI will not function unless the neutral and the ground are bonded together at the generator.

· It would force all generators to be tied to their own 6-foot ground rod. Without it, the GFCI will not function.

Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-22 Log #1601 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Robert Pond, Webster, MA
Comment on Proposal No: 13-19
Recommendation: The proposal should be rejected.
Substantiation: 90.2 of the National Electrical Code doesn't cover equipment that isn't installed. The NEC covers only the installation of electrical conductors, equipment, and raceways, etc. The NEC doesn't cover a portable generator used in a stand-alone application nor the appliances it powers. The NEC doesn't have authority over portable generators used in stand-alone applications.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.

LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-23 Log #1602 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Richard Fenner, Webster, MA
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: 590.6 requires ground fault protection for personnel for all temporary wiring installations. 590.6 also permits the GFCI protection to be provided in the electrical outlet, cord set, or device incorporating listed GFCI protection for personnel identified for portable use. If approved, the proposed 445.20 would be in obvious conflict with 590.6, since 445.20 would restrict ground fault protection to the use of GFCI outlets in generators but 590.6 would permit other forms of ground fault protection.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: The requirement in 590.6 only applies to generators used for temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities and would not apply to home standby power and agricultural applications so 590.6 and 445.20 are not in conflict with each other.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-24 Log #1603 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Robert Bartley, Waterford, MI
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: This proposal is not covered by the National Electrical Code. The submitter addresses uses of small portable generators for such things as lighting on camp sites, powering table saws and hand-held tools, and so on. However,90.2 of the NEC states that the NEC covers the installation of electrical equipment only in premises, yards and lots, parking lots, carnivals, industrial substations, conductors and equipment that connect to the supply of electricity, and installations used by the electric utility. The NEC obviously has no jurisdiction over generators used in standalone applications.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-25 Log #1604 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Patricia Lemmon, Waterford, MI
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected
Substantiation: The NEC is an installation code and, according to 90.2, not a construction code. As an installation code, the NEC can mandate that a particular feature exists (a "disconnect" at a certain location, for example), but not how it is to be achieved (circuit breaker, switch, properly rated plug-and-connector, etc.). Therefore, while the NEC can mandate ground fault protection in some instances, it is not within its authority to require that ground fault protection be provided by a GFCI outlet on the generator.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-26 Log #1605 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: David J. Fransen, Robert Bohm Electric Co., Inc.
Comment on Proposal No: 13-19
Recommendation: ~~445.20. All 125-volt, single-phase, 15- 20-, and 30-ampere receptacle outlets, that are a part of a 15 kW or smaller, portable generator, shall have ground-fault circuit interrupter protection for personnel integral to the generator or receptacle.~~ Please eliminate this proposal.
Substantiation: Many generators have a floating neutral. Under article 702, they are installed as a non-separately derived system. A GFCI installed on these generators will not function properly because there is no connection between the ground and the neutral. In the case of a bonded neutral generator there will also be reliability problems because the generator must be solidly grounded for the GFCI to function properly. This is not required and is rarely done.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-27 Log #1645 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Michael Flegel, Reliance Controls Corporation
Comment on Proposal No: 13-19
Recommendation: Reject the proposal.
Substantiation: Statement of Problems Proposal 13-19
Substantiation for Problems 1, 2 and 6 is listed below.

1. It is impossible to have a ground fault back to the generator if it is not bonded and grounded, so GFCI protection on the generator doesn't make sense since no requirement exists for bonding and grounding. In complex systems and in harsh environments, neutrals can be pulled to ground beyond the generator. GFCI protection on generators that are not bonded and grounded does not protect people against these ground faults but they may believe it does. This may encourage bad safety practices and/or discourage people from taking further steps to protect themselves against ground faults.

2. The bonding and grounding needed in Problem 1 will create ground fault hazards. Why intentionally create a hazard and then have to add a device to protect against it, especially when the added device is an electronic device on a piece of hot, vibrating equipment which adds to the likelihood of its failure? It makes more sense to float the system. A floating neutral portable generator without GFCI protection is safer than a bonded neutral portable generator with GFCI protection in stand alone applications even if the latter if properly grounded. There is no need to have GFCI protection in stand alone applications even if the latter is properly grounded. There is no need to have GFCI protection built into a floating neutral generator.

3. This Proposal conflicts with the Exception in 590(A) of Proposal 3-140. If the Temporary Installation is powered by a 125 volt portable generator 15 kW or less, people cannot substitute an assured equipment grounding program in lieu of GFCI protection because no non-GFCI outlet is available on the generator.

4. 90.2 of the National Electrical Code states that the Code only covers the installation of electrical conductors, equipment, and raceways, etc. It does not cover the design of equipment such as having GFCI protection built into a portable generator. The Code can and does address the following installation aspects of a portable generator:

a. Adding downstream GFCI protection—Article 590 (2008)

b. Bonded or not bonded—There are several sections addressing Separately and Non-separately derived systems

c. Receptacles connected to the frame—250.34

In each case, the Code does not dictate that the generator has these design features but rather it instructs on how to install it when a generator has these features. The NEC does not develop product standards for the equipment that is installed. The NEC can specify how to install a bonded neutral generator with GFCI protection, or a floating neutral generator without GFCI protection but it shouldn't require that the generator have the protection built in.

5. 525.23 (C) clearly states that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected. The purpose of this is to assure that egress lighting is always available. Since egress lighting can be powered by 125 volt portable generators at these sorts of events, the proposal will not allow compliance to this Article.

6. The proposal has not substantiated a safety problem; it just incorrectly states there is one. GFCI protection on the generator would ensure that people would use it, but is only effective if people properly bond and ground the generator and is not as effective as other alternatives as stated above in Problems 1 and 2. If you don't electrify the ground by tying the neutral of the generator to it, you have no ground path for a ground fault to occur. People are safer in all the conditions stated in the substantiation of the Proposal with a floating neutral generator without GFCI protection.

Do you know for a fact that the current safety record isn't due to the fact that very few portable generators are grounded and many of them 5kW and less are floating neutral generators? Are you sure adding GFCI protection will make things better and not worse? Isolation is a powerful safety device and should not be ignored. Has somebody provided data to show that what is being done now is not safe?

Bonding and Grounding—Utility vs. Portable Generators

OSHA requires bonded neutral generators in their regulations for construction sites. In reading these regulations, they appear to be identical to the NEC requirements except for this bonding requirement. The interpretation in Appendix A explains their position. To completely understand OSHA's response, please read the request letter by Mr. Iwasa. It appears OSHA incorrectly interprets the NEC. It says a generator in stand alone use is a separately derived system (see Article 100) and as such needs to be bonded. Please note the interpretation does not have any safety arguments other than misinterpreting the NEC which leaves it with no technical merit. As such, it has no relevance in this discussion.

Generators used in simple stand alone applications, operate in a much different environment than a premises wiring system being fed from the utility. There is no huge generator capable of outputting high fault current, no transformers and switchgear, and no large, elevated distribution system subject to lightning strikes all of which can create surges in the system. Such surges must be addressed through bonding and grounding rather than having them go through appliances and endanger safety. The reason for bonding and grounding is substantially reduced when utility power is removed. As a matter of fact, Article 250 agrees and does not require the grounding of a generator in stand-alone applications. This allows a floating system using either floating neutral generators or bonded-neutral generators that are not grounded.

Bonding and grounding have some pitfalls that are tolerated in order to get the desired protection described above from utility systems. A bonded and grounded system creates numerous pathways for current to flow back to the power source. These include the ground, and any metal object connected to the ground such as plumbing fixtures and popes and heating ducts. If someone comes in contact with a hot wire from the power source and one of these objects, the circuit is completed with disastrous results to the individual. In fact, people did realize that these pitfalls created very dangerous situations for premises wiring systems. Products and systems were developed to mitigate the safety risks. Grounding wires were added to appliance plugs and grounding terminals were added to receptacles so that a hot wire faulting to the case of an appliance would cause a short, tripping the circuit breaker. This protected the user in case he touched the case and one of the extensive return paths to the power source created by bonding and grounding the system. The GFCI was invented to interrupt the current flow when the current out of a receptacle isn't the same amount as the returning current. If it isn't returning through the receptacle, then it probably is returning through a person that is touching one of those many objects that have a path back to the power source, again, as a result of bonding and grounding the system.

Why create a more dangerous situation by connecting multiple objects to a return path back to the source if there are no advantages in doing so like in stand alone portable generator applications? Some people would argue that the devices used to protect people in bonded and grounded systems no longer would work in a floating situation. **This is true but they fail to understand they are not necessary.** The circuit breaker tripping in the fault-to-case example above and the GFCI protection are two of the safety devices in bonded and grounded systems mentioned earlier. In the first case, the fault to the case represents only a connection of the person to one wire from the source in a floating system. Because there is no path back to the source, the individual holding the tool is not injured. Similarly, a GFCI would never trip because there is never a ground path available back to the generator i.e. a ground fault can never occur back to the source. **This truly is a paradigm shift in the way we think about electrical systems and it is important for people to understand they have to look at portable generator applications differently.**

Stand Alone Installations

For the casual user such as a camper of home owner working in the back yard, the floating neutral generator is the safest and most cost effective application that does not require additional ground fault protection using GFCIs. Multipoint failures are extremely unlikely to occur but what if they do? **The floating system without GFCI protection still seems to be the safer of the two alternatives as shown in Appendix B (substantiation for Problems 1, 2, and 6).** GFCI protection is needed on a bonded neutral generator that is properly grounded but grounding the generator is unlikely since the NEC does not require it. If not grounded, the protection is unnecessary on the generator because you have a system that does not intentionally create any paths back to the source. However, it is more likely that the neutral in a bonded neutral generator is pulled to ground at the source since the frame is already bonded to the neutral. The solution to that is not to do it which results in the floating neutral generator.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept
Panel Statement: It is clear that there is not an industry consensus on an approach that provides the safest use of portable generators in all applications. Acceptance of this comment does not indicate that the panel agrees with all of the substantiation in this comment and the other comments related to this issue.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:

ADAMS, M.: I agree with the negative comments on vote submitted by Ms. Little, Mr. Olson, and Mr. Mouton.

BOREK, S.: I agree with the negative comments submitted by Ms. L. Little.

CONRAD, J.: I am voting against the panel action to accept comment 13-27. After further review and investigation, I found that the majority of the portable generator available today that are sold through many retailers already have GFCI receptacles on them.

I think it would be very confusing for the public when some gen-set have it and other don't. I also don't agree with the submitters comment that "we are creating a safety issue by adding the GFCI receptacles".

CURRIN, JR., R.: This comment should have been rejected. Where a floating neutral generator is connected to premises wiring through a transfer switch the system is grounded and GFCI protection is necessary to protect persons from shock as required in 210.8. Safety is the primary concern. Several statements were submitted indicating potential problems with requiring GFCI protection.

I feel that the problems can be solved at either the manufacturing level (transfer switches) or during the installation. They do not justify reducing the safety of the consumer who most likely would utilize generators during adverse weather conditions when GFCI protection would be critical. In the event a single pole 120 volt transfer switch is used, the consumer would in all likelihood use any remaining 120 volt receptacles to supply other needs.

LITTLE, L.: We are voting against the panel action to accept comment 13-27. Our comments are as follows:

There are 50 comments addressing proposal 13-19. Two comments were submitted to revise the accepted proposal and 48 were submitted to reject the proposal. At first glance there seems to be a broad based objection to the proposal. Upon further review it appears clear that this is simply a letter writing campaign from a limited base within the manufacturing community. The comments are submitted primarily from manufacturers and vendors of single pole, 120-volt, 15 and 20-ampere transfer switches. The belief that this is a letter writing campaign is supported by the facts that 31 of the comments share consecutive log numbers, indicating that they were submitted in bulk, and much of the substantiation used is repetitive, a result of "cutting and pasting" from a just a few comments.

This issue at hand is simple. This is about safety.

The submitters of these comments seek to protect commercial interests and choose to ignore serious safety concerns where a floating neutral generator is connected to premises wiring through a transfer switch. The recurring theme in the comments written to reject proposal 13-19, focuses on potential and perceived problems of incompatibility. This safety issue is created by design and it is only through design, through the use of GFCI protection, that we can achieve an acceptable level of protection.

The action to accept this comment by CMP-13 ignores the following safety and correlation concerns:

(1) The transformation of a system intended to be ungrounded to a grounded system. This situation occurs when a homeowner supplies a single pole 120-volt, 15 or 20-ampere, transfer switch from an unbonded generator equipped with 15/20-amp receptacles. In this case, the non-GFCI protected receptacles provided on the generator are no longer isolated and have neither GFCI protection nor the protection offered by an isolated (ungrounded) system.

(2) Allowing a "floating neutral" generator is a violation of 250.20(B), and if allowed, results in a situation where the voltage on a 120 volt system can be as high as 240 volts between the line conductor and the frame of the generator. In reality, accepting the comment accepts the premise that not only should "floating neutral" systems be allowed, but they should be required.

(3) Conflict with 210.8(A)(3) & 210.8(B)(4), which require GFCI protection of all 125-volt, single phase, 15- and 20-ampere receptacles.

(4) Conflict with requirements adopted by CMP-3 that accepted the companion proposal and rejected comments similar to the ones accepted here.

(5) Lack of true isolation of system, which becomes a problem for generators over 5 kW (capacitive coupling of generator windings prevent true isolation of system – the reason for the 5 kW limitation that was in place for "Temporary Installations" prior to the 2002 Code), and becomes less reliable as generators age and conductive paths develop between the windings and the metal housing around the windings.

The committee was addressed by the submitter of this comment during the ROC meeting. The submitter clearly stated that in a "stand alone" situation, the isolated/floating neutral design was safe and GFCI's were not necessary. The ungrounded conductor would have no reference to ground. However, the submitter readily admitted that when a single pole 120-volt, 15/20-ampere or a two pole 240-volt transfer switch is used with such a generator, the system becomes "grounded" and is no longer a "stand alone" system. This means that we now have all of the 120-volt, 15 and 20-ampere receptacles on the generator with potential to ground and NO GFCI protection.

The reader of the ROC need not do any more than simply read the substantiation submitted by those wishing to reject proposal 13-19 to find absolutely essential reasons to require GFCI protection of all 120-volt, 15/20/30-ampere receptacles on portable generators. A few examples are provided below:

• The submitter of comment 13-38 states that with a floating neutral type generator there is no need for GFCI protection because the neutral and ground conductors are not connected to a grounding system. However, the same submitter fully acknowledges that where the system is grounded (as would be the case when a transfer switch is employed) GFCI protection is necessary to protect persons from being electrocuted.

• The submitter of comment 13-18 representing a law firm suggests that NFPA could be the subject of legal action should proposal 13-19 be successful. It is interesting that the desire of this submitter to reject proposal 13-19 in itself suggests legal action. In reality, the submitters of other comments to reject proposal 13-19 including manufacturers and vendors of transfer switches have populated the ROC with compelling data for legal action against themselves where the use of a floating neutral generator, together with a transfer switch, contributes to injury or death. It is evident in the substantiation provided that the submitters of these comments understand completely that where a floating neutral generator is connected to a transfer switch with a solid neutral connection to premises wiring serious shock hazards are created. The "stand alone" system of the floating neutral generator becomes a grounded system and all of the receptacles on the generator have potential to ground and no GFCI protection. This is in direct conflict with sections 210.8 and 590.6 of the NEC. The compatibility arguments provided in these comments ignore these hazards.

• The submitter of comment 13-40 (representing a major generator manufacturing company) not only recognizes the need for GFCI protection, but seeks to expand it to all generators and not just those 15 kW or smaller. Requiring portable generators to be equipped with GFCI protection of all 120-volt, 15/20/30-ampere receptacles is within the scope of the NEC. See 90.1(A).

• 90.1 Purpose.

(A) Practical Safeguarding. The purpose of this Code is the practical safeguarding of persons and property from hazards arising from the use of electricity.

Where a portable generator is used as a source for temporary power Article 590 applies. See 590.1.

• 590.1 Scope. The provisions of this article apply to temporary electric power and lighting installations.

Where a portable generator is used as a power source it becomes part of the "premises wiring" and the entire NEC applies. See the Article 100 definition of "premises wiring."

• Premises Wiring (System). Interior and exterior wiring, including power, lighting, control, and signal circuit wiring together with all their associated hardware, fittings, and wiring devices, both permanently and temporarily installed. This includes (a) wiring from the service point or power source to the outlets or (b) wiring from and including the power source to the outlets where there is no service point.

Such wiring does not include wiring internal to appliances, luminaires, motors, controllers, motor control centers, and similar equipment.

Other arguments to reject proposal 13-19 are also without merit. Egress lighting in a carnival type installation can be service supplied, supplied by a large trailer mounted generator or of the battery backup type. It could be argued that the use of the relatively small generators that are the focus of this proposal in themselves present a dilemma with reliability when used for such important issues as egress lighting. Namely, it is problematic that such generators must be shutdown to fill their relatively small fuel tanks, and egress lighting would rely on standard cord and plug configurations as a means of connection. Traffic signal systems and wiring are not within the purview of the NEC.

Summary

This comment must be rejected in the name of safety.

Where is the largest market for portable generators 15 kW and smaller? The vast majority are sold to homeowners.

Why does the typical homeowner buy a generator? The typical homeowner purchases a portable generator for use when the local power grid fails due to ice storms, hurricanes or other weather related events.

When will the homeowner use the generator? The homeowner will use the generator during these weather related events.

When the homeowner connects the generator to the home though a transfer switch that creates a solid connection to the grounded conductor of premises wiring, the system is grounded. A serious safety issue is now created with all of the remaining receptacles on the generator as they are no longer supplied from a "standalone" system. All of the remaining receptacles on the generator now have potential to ground without GFCI protection.

Anyone who thinks that the homeowner will simply connect a single extension cord to a 120-volt, 15/20-ampere transfer switch and not utilize the other receptacles and circuits on the generator has likely never used a portable generator when power is lost in a weather related event. The single circuit fed through the transfer switch will most likely supply a heater and possibly some lighting. The homeowner will run more extension cords to sump pumps, refrigerators, portable lighting, portable shop vacuums and much more. The homeowner will go outdoors in a storm environment, with everything wet, without GFCI protection.

The majority of transfer switches used by home owners are rated at 240-volts and the GFCI requirement implemented by proposal 13-19 for 120-volt 15/20/30-ampere receptacles has no impact as there would not be an issue with the operation of the GFCI. The problem noted by many of the comment submitters occurs only where a single pole, 120-volt, 15/20-ampere transfer switch is employed. In this situation, when a homeowner has an existing single pole 120-volt, 15/20-ampere transfer switch and purchases a new generator with GFCI protection, the home owner will be required to replace the transfer switch or the manufacturer will design a device for compatibility.

The scope of the NEC includes the homeowner who will connect a portable generator to premises wiring and then utilize other receptacles on the portable generator. It is practical to safeguard the homeowner from the hazards that arise from the use of a portable generator that is grounded through a transfer switch connection to premises wiring.

MOUTON, C.: The panel action should have been to reject the comment. Having a GFCI mounted on the portable generator is the safest configuration to protect personnel from electric shock hazards.

ODE, M.: See my explanation for negative vote in Comment 13-14.

OLSON, G.: The committee should have at least dealt with the issue associated with the bonding of portable generators that are interconnected with a premises distribution system. A simple requirement that a label be added to the generator indicating whether or not the neutral is bonded in the machine would be useful in properly applying the machine regardless of the application.

TOBIAS, JR., D.: I agree with the negative comments on vote as submitted by Mr. Ode, Ms. Little, Mr. Conrad, Mr. Currin, Mr. Olson and Mr. Mouton.

13-28 Log #1656 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Gary Rauch, Sussex, WI
Comment on Proposal No: 13-19
Recommendation: Delete the following text: ~~445.20. Ground Fault Circuit Interrupter Protection for Receptacles on 15 kW or Smaller Portable Generators. All 125-volt, single-phase, 15- 20-, and 30-ampere receptacle outlets, that are part of a 15 kW or smaller, portable generator, shall have ground fault circuit interrupter protection for personnel integral to the generator or receptacle.~~
Substantiation: Article 525.23(C) states that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected. This is to assure that egress lighting is always available. Since egress lighting is often powered by portable generators at these sorts of events, the proposed article incorrectly mandates GFCI outlets on all portable generators. Supplemental GFCI protection can easily be added if necessary.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: The proposed change only applies to 125-volt, 15-, 20-, and 30-ampere receptacles on a 15 kW or smaller portable generator. Many carnivals, circuses, fairs, and similar events use larger generators where this requirement would not apply. In addition, 20- or 30-ampere 120/240-volt receptacles are not required by 445.20 to be GFCI protected. See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-29 Log #1657 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Dave Parker, Milwaukee, WI
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: Integral GFCI-protected outlets will not necessarily trip as intended. For instance, in a floating neutral generator where there is no connection between the neutral and ground, the GFCI will not trip. In a bonded neutral generator, the GFCI may not trip unless the generator is connected to a ground rod, which is not required by the Code [250.34(A)]. The appearance of GFCI's on portable generators will mistakenly lead the user to believe that he/she is adequately protected by a GFCI.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-30 Log #1658 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Chris Stackhouse, Milwaukee, WI
Comment on Proposal No: 13-19
Recommendation: Delete the following text: ~~445.20. Ground Fault Circuit Interrupter Protection for Receptacles on 15 kW or Smaller Portable Generators. All 125-volt, single-phase, 15- 20-, and 30-ampere receptacle outlets, that are part of a 15 kW or smaller, portable generator, shall have ground fault circuit interrupter protection for personnel integral to the generator or receptacle.~~
Substantiation: There is a large installed base of transfer switches for switching the hot leg of a 120 volt utility and portable generator. these are in multiple municipal and state traffic signal installations that have been designed for portable generator backup during a power outage. GFCI receptacles on bonded neutral generators will trip if used on these systems, thereby creating the possibility of a safety threat far more serious than that which the GFCI is intended to prevent. GFCI protection, when required by the Code, is more reliable if located independently from the generator.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: The proposed change only applies to 125-volt, 15-, 20-, and 30-ampere receptacles on a 15 kW or smaller portable generator. Existing installations using a single conductor transfer switch could certainly use 20- or 30-ampere 120/240-volt receptacles that are not required by 445.20 to be GFCI protected. New installations can certainly use either two pole or three pole transfer switches. See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-31 Log #1661 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Bill Wade, Charlotte, NC
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: The proposal would create an obvious Code conflict. 525.23(C) states that egress lighting circuits for carnivals, circuses, fairs, and simmilar events cannot be GFCI protected. The purpose of this is to assure that egress lighting is unencumbered. Since egress lighting is often powered by portable generators at outdoor events, the proposed 445.20 cannot mandate GFCI outlets on portable generators. If CMP 13 approves this proposal, the TCC will have to reject it.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: The proposed change only applies to 125-volt, 15-, 20-, and 30-ampere receptacles on a 15 kW or smaller portable generator. Many carnivals, circuses, fairs, and similar events use larger generators where this requirement would not apply. In addition, 20- or 30-ampere 120/240-volt receptacles are not required by 445.20 to be GFCI protected.

OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-32 Log #1772 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Chad Kennedy, Schneider Electric/Square D
Comment on Proposal No: 13-19
Recommendation: The proposal should be rejected.
Substantiation: The industry has not agreed on how to best protect the public for the range of portable generator applications. This resulted in the product standard being published without qualifying as an ANSI consensus standard. There are public safety concerns when portable generators are used as optional standby sources which have not been resolved. For example, consider the large number of installations which intend for the generator to be connected as a non-separately derived source. Failure of the generator to supply needed power will result in users taking safety risks such as removing equipment grounding connections in order to operate the system. Experience in extended weather related power outages provides numerous examples of how misuse can lead to tragedy. The panel should reject this proposal based on the lack of industry consensus for the requirements and the failure to safely address the intended use for an application with a large installed base.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-33 Log #1871 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: James Pond, Webster, MA
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: If ground fault protection is necessary in a particular application, the Code can require it. However, since there are many different ways to achieve ground fault protection (GFCI outlet, GFCI circuit breaker, GFCI cord set, portable personal GFCI protection device, etc.) the only way that the NEC can mandate integral GFCI outlets in generators is if it is a product design and performance requirement as in an ANSI standard. This is clearly contrary to 90.2.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comments 13-14 and 13-18.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-34 Log #1872 NEC-P13 **Final Action: Reject**
(445.20)

Submitter: Joseph Scenna, Malvern, PA
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: None given.
Panel Meeting Action: Reject
Panel Statement: The comment does not comply with Section 4.4.5(d) of the NFPA Regulations Governing Committee Projects because the submitter has not provided substantiation to support his recommendation.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-35 Log #1873 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Howard Butcher, Dallas, TX
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: A majority of the portable generators sold these days are for home standby use. In such applications, premises wiring systems, which already have GFCI protection built in per the NEC, don't need them on the generator. In addition, most of these generators have or should have floating neutrals. Not only do floating neutral generators not need GFCI protection for stand alone use because they are isolated from the ground, but they are also easier and less expensive to connect to a premises wiring system. The best solution already exists without the need for GFCI protection.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comments 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-36 Log #1875 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Robert Hamilton, Osprey, FL
Comment on Proposal No: 13-19
Recommendation: Delete text.
~~**445.20 Ground-Fault Circuit-Interrupter Protection for Receptacles on 15 kW or Smaller Portable Generators.** All 125-volt, single phase, 15-, 20-, and 30-ampere receptacle outlets, that are part of a 15 kW or smaller portable generator, shall have ground-fault circuit-interrupter protection for personnel integral to the generator or receptacle.~~
Substantiation: This proposal should be rejected. Here in Florida, there are many single pole transfer switches installed by municipalities and the state for backup 120-volt generator control of traffic signals. The GFCIs on bonded-neutral generators will trip if used under these circumstances, thereby, causing a loss of generator power and resulting in consequences that could be far more serious than those which the GFCI was intended to prevent, especially during an emergency evacuation.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.

CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: The proposed change only applies to 125-volt, 15-, 20-, and 30-ampere receptacles on a 15 kW or smaller portable generator. Existing installations using a single conductor transfer switch could certainly use 20- or 30-ampere 120/240-volt receptacles that are not required by 445.20 to be GFCI protected. New installations can certainly use either two pole or three pole transfer switches. See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-37 Log #1876 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: David Flegel, Reliance Controls Corp.
Comment on Proposal No: 13-19
Recommendation: Delete text.
~~**445.20 Ground-Fault Circuit-Interrupter Protection for Receptacles on 15 kW or Smaller Portable Generators.** All 125-volt, single phase, 15-, 20-, and 30-ampere receptacle outlets, that are part of a 15 kW or smaller portable generator, shall have ground-fault circuit-interrupter protection for personnel integral to the generator or receptacle.~~
Substantiation: This proposal should be rejected for the following reasons:
1) This proposal conflicts with 525.23(C) which requires that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected. A number of widely-used small portable generators are manufactured with 125-volt outlets only, and do not include 125/250-volt twist-lock outlets. Allowing 125/250-volt outlets to be non-GFCI protected would still not enable such a generator to be used. Supplemental GFCI protection, where otherwise required, can be easily added under existing Code provisions.
2) There is a very large installed base of municipal traffic signal transfer switches that are single-pole 120-volt. A bonded neutral generator with GFCls integral to the generator will not work in these applications. This is because generator bonding will cause a small amount of current to return to the generator through the grounding conductor, creating an imbalance that will always trip the GFCI. Thus, GFCIs under power will not be able to establish a non-tripped condition. Failure to establish temporary backup power for traffic signals (particularly on emergency evacuation routes) would disrupt "public health and safety", a condition that is not permitted under the scope of 708.1.
3) Current GFCI devices are intended for mounting in stationary applications, and not to be added to portable generators. The combination of exposure to excessive vibration and heat plus typically inadequate grounding could easily mislead a user into thinking adequate protection has been provided.
4) The Code recognizes both floating and bonded neutral generators. Floating neutral generators offer an exceptional degree of electrical safety specifically because there is not a bond between the neutral and generator frame. Connecting the neutral to the frame, creates new problems which GFCIs are intended to prevent, but GFCls will not reliably trip because generators are not typically used (nor required to be used) with a ground rod [250.34(A)].
5) This proposal should be rejected in light of the unintended consequences of GFCIs on both bonded-neutral and floating-neutral generators. GFCIs will not trip on a bonded-neutral generator without a connection to earth (ground rod, water pipe, etc.), which is not required according to 250.34(A). GFCs will never trip on a floating-neutral generator, and should not be required at all.
6) 90.1(C) clearly states that the Code is not intended as a design specification. Accordingly, the Code is clearly not intended to direct a manufacturer to design his product in a particular manner, including making GFCI outlets integral to a generator. The panel should proceed with extreme caution. This proposal should be rejected at least until all the negative consequences of undertaking the responsibilities of product design are thoroughly evaluated.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: The proposed change only applies to 125-volt, 15-, 20-, and 30-ampere receptacles on a 15 kW or smaller portable generator. Existing installations using a single conductor transfer switch could certainly use 20- or 30-ampere 120/240-volt receptacles that are not required by 445.20 to be GFCI protected. New installations can certainly use either two pole or three pole transfer switches. See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-38 Log #2002 NEC-P13 **Final Action: Reject**
(445.20)

The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Jerry Qian, All Power America
Comment on Proposal No: 13-19
Recommendation: Proposal 13-19 should be rejected entirely.
We have been made aware that this pending code proposal will require GFCI protection to be integral to all portable generators smaller than 15 kW, regardless of whether or not GFCI protection will perform as intended.
Proposal 13-19 will add this Article to the NEC:
445.20 Ground-Fault Circuit Interrupter Protection for Receptacles, on 15 kW or Smaller, Portable Generators. All 125-volt single-phase, 15-, 20-, and 30-ampere receptacle outlets.
Proposal 13-19 should be rejected entirely.
We have been made aware that this pending code proposal will require GFCI protection to be integral to all portable generators small than 15 kW, regardless of whether or not GFCI protection will perform as intended.
Proposal 13-19 will the following to the NEC:
445.20 Ground-Fault Circuit Interrupter Protection for Receptacles, on 15 kW or Smaller, Portable Generators. All 125-volt single phase, 15-, 20-, 30-ampere receptacle outlets.
Substantiation: Proposal 13-19 should be rejected entirely for the following reasons, including but not limited to:
1. GFCIs on generators will not function reliably unless the neutral and ground conductors are connected to a functional grounding system, which they generally are not.

The NEC does not require the grounding of portable generators when used in stand-alone applications. This becomes extremely important for workers at temporary installations, where GFCI protection is required by the NEC. In such cases, ineffective protection given by the GFCI protection on the portable generator can mistakenly lead personnel to believe that they are protected by the generator GFCI, and discontinue the use of personal or other supplemental GFCI protection that has kept them safe for years. This could be a serious mistake.
2. This Proposal would create at least two Code conflicts.
525.23(C) clearly states that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected. The purpose of this is to assure that egress lighting is always available. Since egress lighting is often powered by portable generators at these sorts of events, the proposed additional Articles cannot mandate GFCI outlets on portable generators.
In addition, proposed 590.6(A)(3) and the Exception under 590.6(A) are mutually exclusive. The Exception allows 590.6(B)(2) under circumstances that are "not compatible with GFCI protection" but the proposal does not provide for a portable generator where non-GFCI protection is allowed.
3. If floating neutral generators are used, there is no need for the GFCI.
In a system as complex as premises wiring, full isolation is not possible, and the reasons for grounding such unique electrical systems are spelled out in 250.4(A)(1). In such a case, the GFCI is necessary to protect the user from being injured or killed by the utility power since exposed metal parts are intentionally electrified through the bonding and grounding process. However, with a stand-alone portable generator, bonding and grounding is not required by the NEC, and full isolation is easily achievable. Therefore, public safety for portable generators is best served by protecting the user through the use of simple, dependable basic insulation and isolation, instead of through a process that deliberately:
(a) creates a ground path,
(b) allows the electrocution to begin and then,
(c) attempts to stop it before lethality is complete using a complicated and fragile electronic sensing and interrupting device.
Quite simply, if there is no ground fault path, then there can be no ground fault.
4. This proposal is clearly outside of the scope of the National Electrical Code.
UL addresses applications of small portable generators such as lighting on camp sites, powering table saws and hand-held tools, and so on. However, 90.2 of the National Electrical Code states that the Code only covers the installation of electrical conductors, equipment, and raceways, etc. It does not cover electrical equipment that is not installed. Neither the portable generator used in a stand-alone application nor the appliances it powers are installed. As a result, the NEC clearly has no jurisdiction over portable generators used in stand-

alone applications.

5. The NEC cannot mandate design or construction requirements for equipment.

As an installation code, the NEC can mandate that a particfular feature exists (disconnect at a certain location, for example), but not how it is to be achieved (circuit breaker, switch, properly rated plug-and-connector, etc.). Therefore, while the NEC can mandate ground fault protection for particular circuits, it is not within its authority to mandate that said ground fault protection must be provided by a GFCI outlet integral to the generator.

UL was the submitter of this proposal. This was a provision that was lobbied heavily by UL during the STP 2201 group's attempt to develop a standard for small portable generators. The group repeatedly voted against this provision, and UL is now trying to force it into the NEC instead.

NEMA Codes and Standards are also opposed, and have voted against it. Unfortunately, NEMA is only one voice (albeit a loud one).

We believe that this proposal is ill-conceived (even though well-intended) and will lead to confusion at the user level, will not improve portable generator safety as intended, or are better addressed by existing code requirements.

Panel Meeting Action: Accept

Panel Statement: See the panel statement on Comment 13-27.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 9 Negative: 9

Explanation of Negative:

ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.

BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.

CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.

CURRIN, JR., R.: See my negative statement on comment 13-27.

LITTLE, L.: See our negative statement on comment 13-27.

MOUTON, C.: See explanation for negative vote on Comment 13-27.

ODE, M.: The proposed change only applies to 125-volt, 15-, 20-, and 30-ampere receptacles on a 15 kW or smaller portable generator. Existing installations using a single conductor transfer switch could certainly use 20- or 30-ampere 120/240-volt receptacles that are not required by 445.20 to be GFCI protected. New installations can certainly use either two pole or three pole transfer switches. See my explanation for negative vote in Comments 13-14 and 13-15.

OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.

TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-39 Log #2127 NEC-P13 **Final Action: Reject**
(445.20)

Submitter: Lora Christensen, Reliance Controls Corp.

Comment on Proposal No: 13-19

Recommendation: Revise text to read as follows:

445.20. Ground-Fault Circuit Interrupter Protection for Receptacles on 15 kW or Smaller, Portable Generators. All 125-volt, single-phase, 15- 20-, and 30-ampere receptacle outlets, that are a part of a 15 kW or smaller, bonded-neutral portable generator, shall have ground-fault circuit interrupter protection for personnel integral to the generator or receptacle.

Substantiation: If there is no neutral connection to the ground, ground faults back to the source are impossible so no need to have GFCI protection on the source. Bonded-neutral generators have the frame of the generator tied to the neutral of the generator. This increases the possibility of the neutral being connected to the ground. Floating-neutral generators only have the grounding conductors tied to the frame isolating the neutral from the frame thereby preventing the neutral from being connected to the ground. No need to have GFCI protection on a floating neutral generator.

Panel Meeting Action: Reject

Panel Statement: The panel action on Comment 13-27 has overturned the panel action on Proposal 13-19. See the panel statement on Comment 13-27.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 17 Negative: 1

Explanation of Negative:

ODE, M.: This should have been an accept in part with not accepting the suggested text of "bonded-neutral" since capacitive coupling of an ungrounded 2-wire system can be a shock and electrocution hazard.

A GFCI receptacle monitors the amount of current that goes out on the ungrounded conductor and then comes back on the neutral conductor and if there is leakage of 6 milliamps or greater that does not come back through the GFCI comparison device, then the GFCI device will trip. GFCIs will trip without the benefit of an equipment grounding conductor path back to the source but obviously having a lower impedance path back to the source is much more desirable since the equipment grounding conductor path back to the frame of the generator and then back to the source on the system bonding jumper to the neutral provides a much lower impedance path.

Section 250.20(B)(1) requires any AC system of 50 volts to 1000 volts to be grounded where the system can be grounded so that the maximum voltage to ground on the ungrounded conductor does not exceed 150 volts. Section 250.20(D) requires any separately derived system, as covered by 250.20(B) to be grounded in accordance with 250.30(A) of which a portable generator would be covered under this section.

"250.20 Alternating-Current Systems to Be Grounded.

Alternating-current systems shall be grounded as provided for in 250.20(A), (B), (C), (D), or (E). Other systems shall be permitted to be grounded. If such systems are grounded, they shall comply with the applicable provisions of this article.

(B) Alternating-Current Systems of 50 Volts to 1000 Volts. Alternating-current systems of 50 volts to 1000 volts that supply premises wiring and premises wiring systems shall be grounded under any of the following conditions:

(1) Where the system can be grounded so that the maximum voltage to ground on the ungrounded conductors does not exceed 150 volts"

In addition, 250.34 does not require the frame of a portable generator to be connected to a grounding electrode if the portable generator supplies only equipment mounted on the generator, cord-and-plug-connected equipment through receptacles mounted on the generator, or both.

"250.34 Portable and Vehicle-Mounted Generators.

(A) Portable Generators. The frame of a portable generator shall not be required to be connected to a grounding electrode as defined in 250.52 for a system supplied by the generator under the following conditions:

(1) The generator supplies only equipment mounted on the generator, cord-and-plug-connected equipment through receptacles mounted on the generator, or both, and

(2) The normally non–current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are connected to the generator frame."

In addition, the normally non-current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are required to be connected to the generator frame. This section does not state that floating the neutral in the generator is acceptable since the generator is a separately derived system and must have a system bonding jumper installed from the equipment grounding system in the generator to the grounded or neutral conductor within the generator.

A portable generator, supplying power to any premises, where there is no direct electrical connection to conductors of another power system, is a separately derived system. Section 250.34(C) requires the grounded conductor from the generator to be connected to the generator frame where 250.26 requires the conductor to be grounded.

"250.34 Portable and Vehicle-Mounted Generators.

(C) Grounded Conductor Bonding. A system conductor that is required to be grounded by 250.26 shall be connected to the generator frame where the generator is a component of a separately derived system.

250.26 Conductor to Be Grounded — Alternating-Current Systems.

For ac premises wiring systems, the conductor to be grounded shall be as specified in the following:

(1) Single-phase, 2-wire — one conductor

(2) Single-phase, 3-wire — the neutral conductor"

The equipment grounding conductor must also be connected to the generator frame. Premises wiring would apply to both fixed loads and portable loads, such as drills and other portable electrical equipment and the danger of electrocution applies anywhere electricity is used. Over the many years these issues have been dealt with in the NEC and with OSHA, there has only been one exception to this rule and that exception applied to 5 kW and smaller 2-wire single-phase generators. This exception was removed from the NEC in the 2002 cycle with the intent that all portable generators be required to have GFCI protection, however, OSHA 29 CFR 1926.404(b)(1)(ii) still has the exception. In OSHA, the exception only applies to 5 kW and smaller 2-wire single phase generators. Any 120/240 volt 3-wire generators must have the neutral connected to the frame and must have GFCI protection, based n the NEC and the OSHA requirements. The 5 kW and smaller 2-wire generators were excluded from GFCI protection since 2-wire generators larger than 5 kW could have capacitive coupling or capacitive reactance effects where ac current at 60 hertz could pass between the winding and the case of the generator.

13-40 Log #2135 NEC-P13 **Final Action: Reject**
(445.20)

Submitter: Gary L. Olson, Cummins Power Generation

Comment on Proposal No: 13-19

Recommendation: Delete text as indicated. Add new sentence.

445.20. Ground-Fault Circuit Interrupter Protection for Receptacles on ~~15 kW or Smaller,~~ Portable Generators. All 125-volt, single-phase, 15-, 20-, and 30- ampere receptacle outlets that are a part of a ~~15 kW or smaller,~~ portable generator, shall have ground-fault circuit interrupter protection for personnel integral to the generator or receptacle. Receptacles that do not incorporate GFCI shall be labeled to indicate this.

Substantiation: There is no technical justification for the "15kW or smaller" on the proposed new text. The problem described could occur on nearly any portable generator installation because generator installations tend to be exposed to dirt and moisture while they are operating. Consequently, GFCI should be applied on circuits where a tool or other temporary device is connected and used in locations as specified in 210.6. Some receptacles, such as 120/240V twist lock devices are most often used to connect a generator to premises wiring systems, and these should not require GFCI because protection should be with in the premises or respective load. When a receptacle on a portable generator is not protected by GFCI it should be labeled as such. A portable generator should have a label on the genset that indicates whether or not the neutral is bonded to frame, because these machines are often connected

to premises wiring systems, and this system must incorporate proper neutral bonding and switching provisions (i.e., a switched neutral in the ATS) in order to result in a safe installation. Finally, some thought perhaps should be given to the term "portable generator", as it could be mean different things to different users.
Panel Meeting Action: Reject
Panel Statement: The panel action on Comment 13-27 has overturned the panel action on Proposal 13-19. See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 14 Negative: 4
Explanation of Negative:
CURRIN, JR., R.: CMP-13 should have accepted this comment. See my negative statement on comment 13-27.
LITTLE, L.: This comment should have been accepted. See our negative statement on comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: I think the committee should have accepted this in principal. Whether a generator is provided with a bonded neutral or floating neutral, depending on how the equipment is used, a hazardous condition could develop. At a minimum the committee should have addressed this issue by requiring at least a label indicating how it should be connected based on the design of the equipment as it ships.

13-41 Log #2186 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Jeffrey Flegel, Reliance Controls Corp.
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: This proposal will cause mass confusion in the marketplace. The installed base of single-pole, 120V manual transfer switches will not operate with generators with GFCI outlet protection and with the neutral bonded to the generator frame. Tens of thousands of single-pole manual transfer switches would be rendered inoperable and require replacement with more expensive two-pole transfer switches. These applications go far beyond home standby use and agricultural applications. For example, from New York to Florida, traffic signals along storm and flood evacuation routes are equipped with single-pole manual transfer switches that will not work with 120V, GFCI protected portable generators. Many of these routes are critical for Homeland Security and may be subject to the requirements of Article 708. Therefore, the NEC should consider the severe economic and safety impact on the public sector and reject this proposal.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-30.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-42 Log #2196 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: R. Dennis Ball, Elmhurst, IL
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: This proposal is not covered by the Code. The submitter addresses uses of portable generators for such things as lighting on camp sites and hand-held tools, and so forth. But, 90.2 states that the NEC covers the installation of electrical equipment only in premises, yards and lots, parking lots, carnivals, industrial substations, conductors and equipment that connect to the supply of electricity, and installations used by the electric utility. The NEC has no jurisdiction over portable generators, used in standalone applications.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-43 Log #2197 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Thomas Molk, Elmhurst, IL
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: The proposal will create a Code conflict. 525.23(C) states that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected. Since egress lighting is often powered by portable generators at outdoor events, the proposed 445.20 cannot mandate GFCI outlets on portable generators. If CMP 13 approves this proposal, the TCC will have to reject it.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: The proposed change only applies to 125-volt, 15-, 20-, and 30-ampere receptacles on a 15 kW or smaller portable generator. Many carnivals, circuses, fairs, and similar events use larger generators where this requirement would not apply. In addition, 20- or 30-ampere 120/240-volt receptacles are not required by 445.20 to be GFCI protected. See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-44 Log #2198 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Laura Sanders, Crestwood, KY
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: This proposal conflicts with 90.2.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.

CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-45 Log #2199 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Glen Sanders, Crestwood, KY
Comment on Proposal No: 13-19
Recommendation: The proposal should be rejected.
Substantiation: Most portable generators sold these days are for home standby use. In this application, premises wiring systems, which already have GFCI protection built in per the NEC don't need them on the generator. In addition, most of these generators have floating neutrals. Not only do floating neutral generators not need GFCI protection for stand alone use, because they are isolated from the ground, but they are also easier and less expensive to connect to a premises wiring system. A superior solution already exists without the need for GFCI protection.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-46 Log #2200 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Patrick Burgoyne, Edison, NJ
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: This proposal is not covered by the National Electrical Code. The submitter talks about uses of small portable generators for such things as lighting on camp sites, powering table saws and hand-held tools, and so on. But, 90.2 of the NEC states that the NEC covers the installation of electrical equipment only in premises, yards and lots, parking lots, carnivals, industrial substations, conductors and equipment that connect to the supply of electricity, and installations used by the electric utility. The NEC has no jurisdiction over generators used in stand-alone applications.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-47 Log #2201 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Alan Schutz, Edison, NJ
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: The NEC is an installation code and according to 90.2, not a construction code. As an installation code, the NEC can mandate that a particular feature exists (a "disconnect" at a certain location for example), but not how it is to be achieved (circuit breakers, switch, properly rated plug-and-connector, etc.). Therefore, while the NEC can mandate ground fault protection in some instances, it is not within its authority to require that ground fault protection be provided by a GFCI outlet on the generator.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-48 Log #2202 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Michael Ferranti, Edison, NJ
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: This proposal will cause problems in the existing manual transfer switch market. Existing single-pole, double-throw, 125V manual transfer switches won't work with generators with GFCI outlet protection. Thousands of transfer switches would be rendered useless and need replacement. Or, worse yet, they might not be replaced at all. This would be dangerous. For example, in the state of New York, traffic signals along storm and flood evacuation routes are equipped with single-pole manual transfer switches that will not work with GFCI protected portable generators. Therefore, the NEC should consider the severe problems this decision will cause and reject this proposal.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: The proposed change only applies to 125-volt, 15-, 20-, and 30-ampere receptacles on a 15 kW or smaller portable generator. Existing installations using a single conductor transfer switch could certainly use 20- or 30-ampere 120/240-volt receptacles that are not required by 445.20 to be GFCI protected. New installations can certainly use either two pole or three pole transfer switches. See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-49 Log #2203 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Tony Ferranti, Edison, NJ
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: The bonded neutral and ground conductors on a portable generator must be solidly connected to a functional grounding system in order for GFCIs to reliably interrupt a fault to ground before lethality is complete in the event of an electrocution. The NEC does not require the grounding of portable generators when used in stand-alone applications. This becomes extremely important for those working under temporary installations (Article 590), where conditions require GFCI protection, and where unintentional grounding and bonding are more likely to occur away from the generator. In such cases, the ineffective protection given by the GFCI protection on the portable generator in these instances may give the false impression that personnel are protected from ground faults when, in fact, they are not. This may cause them to discontinue use of other types of protection they have been using in the past. This would be dangerous and life-threatening.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-50 Log #2204 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Glenn Engemann, Edison, NJ
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: 90.2 of the National Electrical Code does not cover electrical equipment that is not installed. The NEC covers only the installation of electrical conductors, equipment, and raceways, etc. The NEC does not cover a portable generator used in a stand-alone application nor the appliances it powers. The NEC has no authority over portable generators used in stand-alone applications.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-51 Log #2205 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Christopher Glianna, Edison, NJ
Comment on Proposal No: 13-19
Recommendation: The proposal should be rejected.
Substantiation: The proposal would create a Code conflict. 525.23(C) states that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected. The purpose of this is to assure that egress lighting is unencumbered. Since egress lighting is sometimes powered by portable generators at outdoor events, the proposed 445.20 cannot mandate GFCI outlets on portable generators. If this proposal is accepted, the TCC will have to reject it.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: The proposed change only applies to 125-volt, 15-, 20-, and 30-ampere receptacles on a 15 kW or smaller portable generator. Many carnivals, circuses, fairs, and similar events use larger generators where this requirement would not apply. In addition, 20- or 30-ampere 120/240-volt receptacles are not required by 445.20 to be GFCI protected. See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-52 Log #2206 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Joseph Fani, Edison, NJ
Comment on Proposal No: 13-19
Recommendation: The Proposal should be rejected.
Substantiation: If ground fault protection is necessary in a particular application, the Code can require it. However, since there are many different ways to achieve ground fault protection (GFCI outlet, GFCI circuit breaker, GFCI cord set, portable personal GFCI protection device, etc.) the only way that the NEC can mandate integral GFCI outlets in generators is if it is a product design and performance requirement as in an ANSI standard. This is clearly contrary to NEC 90.2.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-53 Log #2207 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Michael Wade, Charlotte, NC
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: In order for GFCI protection to function, there needs to be a path for the ground fault current to return back to the power source. In utility systems, this path through the ground is created through a process called bonding and grounding. The reasons for grounding electrical systems are spelled out in 250.4(A)(1), and are unique to utility power systems. In such a case, the GFCI is necessary to protect the user from being killed by the utility power since the ground and the exposed metal parts touching the ground are intentionally electrified through the bonding and grounding process. However, with a stand-alone portable generator, the reasons for bonding and grounding are mitigated and electrification of the ground through bonding and grounding is not required by the NEC. Public safety for portable generators is best served by protecting the user through the use of basic insulation and isolation, instead of through a process that deliberately (1) creates a ground path, (2) allows the electrocution to begin and then (3) attempts to stop it before lethality is complete using a complicated and fragile electronic sensing and interrupting device. Quite simply, if there is no ground fault path, then there can be no ground fault.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 8 Negative: 10
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
DEGNAN, J.: Although the panel clearly stated during the ROP that the proposed language is unnecessary because the code already contains similar language, it is my opinion that the addition of this language will make the code much clearer to a first time user.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-54 Log #2208 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Linda Howell, Cincinnati, OH
Comment on Proposal No: 13-19
Recommendation: The proposal should be rejected.
Substantiation: This change conflicts with 90.2.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-55 Log #2209 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Rick Krause, Cincinnati, OH
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: If ground fault protection is necessary in a particular application, the Code can require it. However, since there are many different ways to achieve ground fault protection (GFCI outlet, GFCI circuit breaker, GFCI cord set, portable personal GFCI protection device, etc.) the only way that the NEC can mandate integral GFCI outlets in generators is if it is a product design and performance requirement as in an ANSI standard. This is clearly contrary to 90.2.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-56 Log #2210 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Pam Dwertman, Cincinnati, OH
Comment on Proposal No: 13-19
Recommendation: The proposal should be rejected.
Substantiation: The exception in 590.6(A) allows for the use of an assured equipment grounding conductor program instead of GFCI protection for those receptacle outlets used to supply equipment that would create a greater hazard if power were interrupted or having a design that is not compatible with GFCI protection. The proposal would not allow a portable generator to be used in these applications. Since GFCI protection can be added to any portable generator application, the code should not restrict the use of portable generators in these instances which is exactly what the proposed change would be. People may be tempted, or even encouraged, to use a portable generator in an application in which they should not.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-57 Log #2211 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: James Goldschmidt, Cincinnati, OH
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: This proposal is not covered by the National Electrical Code. The submitter addresses uses of small portable generators for such things as lighting on camp sites, powering table saws and hand-held tools, and so on. However, 90.2 of the NEC states that the NEC covers the installation of electrical equipment only in premises, yards and lots, parking lots, carnivals, industrial substations, conductors and equipment that connect to the supply of electricity, and installations used by the electric utility. The NEC obviously has no jurisdiction over generators used in stand-alone applications.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-18.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-58 Log #2212 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Tom Goldschmidt, Cincinnati, OH
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: If ground fault protection is necessary in a particular application, the Code can require it. However, since there are many different ways to achieve ground fault protection (GFCI outlet, GFCI circuit Breaker, GFCI cord set, portable personal GFCI protection device, etc.) the only way that the NEC can mandate integral GFCI outlets in generators is if it is a product design and performance requirement as in an ANSI standard. This is clearly contrary to 90.2.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-59 Log #2213 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Steve Goldschmidt, Cincinnati, OH
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected.
Substantiation: The proposal will create a Code conflict. 525.23(C) states that egress lighting circuits for carnivals, circuses, fairs, and similar events can't be GFCI protected. This is to assure that exit lighting is unencumbered. Since exit lighting is often powered by portable generators at outdoor events, the proposed 445.20 cannot mandate GFCI outlets on portable generators. If CMP 13 approves this proposal, the TCC will have to reject it.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-28.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-60 Log #2295 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Ted Lecher, Sourcing Synergies, LLC
Comment on Proposal No: 13-19
Recommendation: This proposal should be rejected completely.
Substantiation: CMP 13 has overstepped its authority in this matter. According to 90.2 of the NEC, the NEC is an installation code, not a construction code. As an installation code, the NEC can mandate that a particular feature exists (a disconnect at a certain location, for example), but not how it is to be achieved (circuit breaker, switch, properly rated plug-and-connector, etc.). Therefore, while the NEC can mandate ground fault protection for particular circuits, it is not within its authority to mandate that said ground fault protection must be provided by a GFCI outlet integral to the generator.
Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-61 Log #2449 NEC-P13 **Final Action: Reject**
(445.20)

The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.
These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.
Submitter: Jack Mandula, GenTran Corp.
Comment on Proposal No: 13-19
Recommendation: Delete entire proposal.
Substantiation: 1. Portable generators 15 kW or smaller with GFCI protection will not operate with the installed base of non-automatic transfer switches used for standby power applications. Over 3/4 of portable generators sold are used at one time or another for standby power applications, connected to a manual transfer switch, to provide standby power to buildings. Adopting the proposal will create field user issues not solvable without modification to existing, installed equipment.

2. GFCIs on portable generators will not operate properly unless the generator ground and neutral are connected to grounding system, which is not required by the NEC in temporary applications, leading to false sense of security and defeating the possible GFCI protection benefits.

3. This proposal is not within the scope of the NEC. The NEC covers the installation, not the design of equipment. This proposal attempts to mandate certain designs for portable generators, the NEC does not apply.

Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-15.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-62 Log #2518 NEC-P13 **Final Action: Reject**
(445.20)

The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: Bill Johnson, Champion Power Equipment
Comment on Proposal No: 13-19
Recommendation: Reject Proposal 13-19.
Substantiation: Requiring the addition of GFCI receptacles on all 125 volt portable generator panels may introduce safety hazards. GFCI receptacles are not reliable when exposed to the vibration and environment of portable generators powered by single cylinder reciprocating engines. The operational environment of portable generators is much more severe than the environment in which household GFCI receptacles operate and household mounted GFCI receptacles are les reliable than non-GFCI receptacles. For this reason, GFCI receptacles in homes do not generally control lighting so that safe egress in a power outage is possible. Loss of electrical power to lighting (visibility) or power to tools caused by false tripping of generator mounted GFCI receptacles can create safety hazards. Also, panel mounted GFCI receptacles require bonding one hot leg of a 2-wire single phase 120 volt generator output to the generator frame in order to sense a ground fault. The use of floating neutrals in many applications is common in order to eliminate a short circuit return path, preventing an otherwise lethal condition. Installation of GFCI receptacles combined with a floating neutral may result in a false sense of security and a safety hazard.

There is no evidence that mandating GFCI receptacles on all 125 volt portable generator receptacles is safer than the non-GFCI receptacles used in houses. In fact, it is very possible that the proposed mandate will increase safety hazards.

Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

13-63 Log #2519 NEC-P13 **Final Action: Reject**
(445.20)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee directs that Proposal 13-19 be reported as "Reject" because Comments 13-14 through 13-33, 13-35, 13-36, 13-37, 13-38, and 13-41 through 13-63 failed ballot.

These comments received less than two-thirds affirmative vote. Therefore, consensus no longer exists.

Submitter: James Jongkind, American Honda Motor Co., Inc.
Comment on Proposal No: 13-19
Recommendation: Please do not accept the proposal as it could have serious unintended consequences.
Substantiation: Based on Honda's long history of producing floating neutral generators without occurrence of electric shock, we strongly urge you to carefully consider that mandating GFCIs would likely increase the frequency of electric shock via the neutral bonding and frame grounding required for the device to function properly.

While recent revisions to UL943 improve their function and durability, these GFCIs are primarily intended for use on premises and NOT on portable generators which are subject to a host of operational conditions which contribute to their malfunction. Until such time it can be shown that the widespread application of GFCIs on portable generators will reduce the already low number of electric shock cases that occur using the proven floating neutral design, the NEC should not adopt a mandatory requirement.

Panel Meeting Action: Accept
Panel Statement: See the panel statement on Comment 13-27.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 9 Negative: 9
Explanation of Negative:
ADAMS, M.: See my Explanation of Negative Vote on Comment 13-27.
BOREK, S.: See my Explanation of Negative Vote on Comment 13-27.
CONRAD, J.: See my Explanation of Negative Vote on Comment 13-27.
CURRIN, JR., R.: See my negative statement on comment 13-27.
LITTLE, L.: See our negative statement on comment 13-27.
MOUTON, C.: See explanation for negative vote on Comment 13-27.
ODE, M.: See my explanation for negative vote in Comment 13-14.
OLSON, G.: See my Explanation of Negative Vote on Comment 13-27.
TOBIAS, JR., D.: See my Explanation of Negative Vote on Comment 13-27.

ARTICLE 450 — TRANSFORMERS AND TRANSFORMER VAULTS

9-68 Log #373 NEC-P09 **Final Action: Accept**
(450.5)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-166
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-69 Log #1304 NEC-P09 **Final Action: Reject**
(450.5)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-166
Recommendation: The Proposal should be Accepted.
Substantiation: The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.

Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-70 Log #374 NEC-P09 **Final Action: Accept**
(450.5(A)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-167
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-71 Log #1305 NEC-P09 **Final Action: Reject**
(450.5(A)(2))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-167
Recommendation: The Proposal should be Accepted.
Substantiation: The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-72 Log #375 NEC-P09 **Final Action: Accept**
(450.5(B)(2)(b))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-168
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-73 Log #1306 NEC-P09 **Final Action: Reject**
(450.5(B)(2)(b))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-168
Recommendation: The Proposal should be Accepted.
Substantiation: The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-74 Log #376 NEC-P09 **Final Action: Accept**
(450.6)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-169
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-75 Log #1307 NEC-P09 **Final Action: Reject**
(450.6)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-169
Recommendation: The Proposal should be Accepted.
Substantiation: The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-76 Log #377 NEC-P09 **Final Action: Accept**
(450.6(A)(2) Exception)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-170
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-77 Log #1308 NEC-P09 **Final Action: Reject**
(450.6(A)(2) Exception)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-170
Recommendation: The Proposal should be Accepted.
Substantiation: The Panel already includes the words "for each" in the subheading in Table 314.16(B) which is much more explicit than "per". The Exception also includes the phrase "in accordance with" rather than "per" at the end of the Exception.

The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-78 Log #378 NEC-P09 **Final Action: Accept**
(450.6(A)(4))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-171
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-79 Log #1309 NEC-P09 **Final Action: Reject**
(450.6(A)(4))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-171
Recommendation: The Proposal should be Accepted.
Substantiation: This revision will provide consistency with the rest of the sentence since the phrase "…the conductors of each phase or neutral…" appears in the latter part of the sentence.

The proposed wording is more appropriate for a standard and is more explicit in describing the installation.

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-80 Log #685 NEC-P09 **Final Action: Reject**
(450.23)

Submitter: Paul Mrozinsky, Montgomery, AL
Comment on Proposal No: N/A
Recommendation: NFPA 70 descriptions define substations that are installed on the floor with walls or chain link fences with lockable doors. The 12470/480 volt substations I have to deal with are on platforms twelve feet in the air with one ladder access with no lockable access doors. One of these substations straddles a production line. Several of these substations have liquid filled transformers that were installed as replacements for failed dry type transformers with no confinement reservoirs. NFPA 70, 450-23 defines the requirement for the confinement reservoirs; but does not address the fact that if the transformer itself develops a leak the hot fluid could splash out of the containment and off the platform splattering all over the floor underneath including equipment and scalding people in the vicinity. Where is the missing link defining what must be concerning this type of installation elevated twelve feet above the floor? Are these types of installations permitted with production operations underneath or in close proximity?
Substantiation: It will define the acceptable installation of elevated platform substations with liquid filled and dry transformers. Where may these substations be installed with regards to manufacturing, including welding, and flame or laser cutting, operations below them or in near proximity to them. Welding and cutting operations exceed the 300 degree centigrade temperature of acceptable fluid in fluid filled transformers. This issue has open questions with OSHA and insurance companies that I have been in contact with.
Panel Meeting Action: Reject
Panel Statement: This comment does not comply with the Regulations Governing Committee Projects [at 4.4.5(b) and (c)] in that no proposal was identified and no suggested text was provided. The submitter is encouraged to resubmit in a timely way for the 2014 NEC cycle.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-81 Log #379 NEC-P09 **Final Action: Accept**
(450.45(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-184
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, where the use is in a line of text and not part of a table or equation, the existing use is correct and should not be changed.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-82 Log #1310 NEC-P09 **Final Action: Reject**
(450.45(C))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-184
Recommendation: The Proposal should be Accepted in Principle and reworded as follows: "…shall not be less than ~~1900 mm2 (3 in.2) per kVA~~ 1900 mm^2/kVA (3 in.^{2}/kVA) of transformer capacity in service…".
Substantiation: The Panel was correct in Rejecting the Proposal as originally submitted. However, the Proposal should be Accepted in Principle and reworded as stated in the Comment.

The proposed wording is more appropriate for a standard and complies with the NEC Style Manual, specifically 3.2.7.2. While the specific text is not included in the NEC Style Manual, it does show the correct style for "cubic feet per minute" as "ft3/min".

The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 460 — CAPACITORS

11-63 Log #1558 NEC-P11 **Final Action: Reject**
(460.8(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-144
Recommendation: Accept the word "identified" changed to "approved" in two places.
Substantiation: The panel response regarding "identified" is partially correct; it may relate to testing agencies per the FPN, but the definition states: "Recognizables" as suitable for the specific purpose, function, use, environment, application and so forth.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the revisions as proposed as no technical substantiation has been provided in regards to the disconnecting means. The submitters concerns are presently covered in 110.3.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-64 Log #1557 NEC-P11 **Final Action: Reject**
(460.10 Exception No. 2 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-145
Recommendation: Accept the proposal with the following revisions:
Exception No. 2: Capacitor cases installed on nonmetallic poles supplying open overhead conductors as covered in Article 225 which do not provide an equipment grounding conductor, shall not be required to be grounded.
Substantiation: Premises with large areas and numbers of separate buildings or other structures supplied by 600 volt or less systems where an equipment grounding conductor is not required to be run with the conductors such as those supplying transformers, as covered in 250.110, Exception No. 2 should be excluded.
Panel Meeting Action: Reject
Panel Statement: Section 250.32 requires an equipment grounding conductor to be installed when installing circuits between buildings and other structures, therefore an equipment grounding conductor will be present. The panel recognizes the exception to 250.110 for capacitors located 8 feet or more above grade mounted on wooden poles and intends to require all other capacitors to be properly grounded to an equipment grounding conductor.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 480 — STORAGE BATTERIES

13-64 Log #585 NEC-P13 **Final Action: Accept in Principle in Part**
(480.2)

Submitter: Stephen McCluer, APC by Schneider Electric / Rep. IEEE Stationary Battery Committee
Comment on Proposal No: 13-30
Recommendation: Modify the panel's proposed language as follows:
Nominal ~~Battery~~ dc Voltage. The voltage ~~calculated~~ assigned to a cell appropriate to its chemistry, or to a battery based on the number and type of cells in the battery ~~on the basis of 2 volts for each cell for the lead-acid type. 1.2 volts for each cell for the alkali type, and 4 volts for each cell of the lithium-ion type.~~
Move deleted text to a Fine Print Note (FPN) as follows:
FPN: The most common nominal cell voltages are; 2 volts per cell for the lead-acid systems, 1.2 volts per cell for alkali systems, and 4 volts per cell for Li-ion systems, although nominal voltages might vary with different chemistries.
Substantiation: The definition should be "generic" enough to apply to any battery, not just to specific chemistries. When necessary, specific chemistries can be addressed in the body of the Article.
(1) Change the term "battery" to "dc" in order to distinguish it from nominal ac voltage. The term "nominal dc voltage" can then apply either to a "cell" (which is what the NEC 2008 definition describes), or to a "battery" (which can consist of hundreds of "cells").
(2) Add the words "assigned to a cell appropriate to its chemistry, or to a battery based on the number and type of cells in the battery." This wording accomplishes three goals:
[a] it allows the term to apply both to cells and to batteries;
[b] it allows for variations in chemistries; and
[c] it allows the term to be consistently used from one cycle to the next without having to redefine it every time a new chemistry is introduced.
(3) Move the cell-specific information, which is tutorial in nature, into a FPN. The wording of the FPN points out that nominal cell voltage can vary from one chemistry to another within a battery type. For example, there are many differnet chemistries all lumped together under the term "lithium-ion". Not all lithium cells are 4 volts.
- Lithium-ion phosphate is about 3.5 volts (nominal); see http://www.batteryuniversity.com/partone-5Ahtm
-Lithium-metal-polymer (presently discontinued for stationary use, but still used in motive) is about 3 volts; see http://www.itpower.co.uk/investire/pdfs/lithium.pdf
-LIthium-iln titanate is 2.3 volts (nominal).
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle in Part
Revise text to read as follows:
Nominal Battery Voltage. The voltage of a battery based on the number and type of cells in the battery.
FPN: The most common nominal cell voltages are; 2 volts per cell for the lead-acid systems, 1.2 volts per cell for alkali systems, and 4 volts per cell for Li-ion systems. Nominal voltages might vary with different chemistries.
Panel Statement: The panel has simplified the recommended definition and is not aware of any confusion that exists in discerning the type of voltage derived from a battery.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-65 Log #588 NEC-P13 **Final Action: Accept in Part**
(480.2)

Submitter: Stephen McCluer, APC by Schneider Electric / Rep. IEEE Stationary Battery Committee
Comment on Proposal No: 13-31
Recommendation: Modify the panel's proposed definition as follows:
Sealed Cell ~~or Sealed Battery~~. A cell ~~or battery~~ that has no provision for the routine addition of water or electrolyte or for external measurement of electrolyte specific gravity and may contain pressure relief venting.
Substantiation: Delete references to "battery." "Cells" are sealed. "Batteries" are not and cannot be sealed. [A battery - which is multiple cells in series - might be put into a so-called "sealed enclosure", but that has nothing to do with this definition as intended by this Code.] Add the word "routine" because people have found ways to re-hydrate a dehydrated VRLA battery (for example), but that was never the intent of the design.
Cells can be "sealed" to prevent the release of gas, and they can be sealed to prevent the addition or the release of liquid (electrolyte)...or sometimes both. This definition specifically addresses the electrolyte and allows for valve regulated cells to be included under the definition of "sealed." Academically speaking, that would be incorrect; but for the practical application of this code it is acceptable.
Panel Meeting Action: Accept in Part
The panel accepts the addition of the word "routine" and rejects the remainder of the comment.
Panel Statement: The use of the phrase "sealed batteries" is a very common method of describing a multiple cell lead acid battery or a sealed gel cell battery that has a permanent cap and does not usually allow fluid to be added to the battery or release of gases out of the cells. There was no technical substantiation provided that the term sealed battery is not being used. Routine was accepted since extreme measures obviously could be used to permit fluid to be added to the battery. The panel notes that the title should be "Sealed Cell or Sealed Battery" and is incorrect in the ROP Draft.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-66 Log #589 NEC-P13 **Final Action: Accept**
(480.2)

Submitter: Stephen McCluer, APC by Schneider Electric / Rep. IEEE Stationary Battery Committee
Comment on Proposal No: 13-28
Recommendation: Modify the panel's recommended definition:
Battery System. Interconnected battery subsystems consisting of one or more storage batteries and battery chargers, and can include inverters, converters and associated electrical equipment.
Substantiation: Clarify that a battery system can actually consist of multiple "batteries." Clarify that a battery system will always contain, as a minimum, one or more batteries and one or more battery chargers. Clarify that other features, such as inverters, converters, and electrical equipment may or may not always be present. For example, a fully integrated UPS system containing charger(s), inverter(s) battery(ies) and controls could be considered a "battery back-up system". In some applications, such as a dc power system for telecommunications, there probably would not be any inverters.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-67 Log #380 NEC-P13 **Final Action: Accept**
(480.2.Nominal Battery Voltage)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 13-29
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-68 Log #532 NEC-P13 **Final Action: Hold**
(480.5)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 13-34
Recommendation: The Panel Action should have been Accept in Part. Per Mr. Degnan's affirmative comment, add an exception as follows: "*Exception: Where stationary batteries are used for standby generator startup, communications or other applications requiring high reliability.*" Further, the Panel should consider assigning an energy level at which 840.5 applies. As written the requirement applies equally to a string of 20 "D" cells or three 12-volt automobile batteries in series. The ampere-hour rating, and hence the capacity for injury and property damage is orders of magnitude greater for the auto batteries; it is almost non-existent for the "D" cells.
Substantiation: The current requirement is too broad and considers neither applications requiring higher reliability nor energy level (i.e., ampere-hour rating of the battery).
Panel Meeting Action: Hold
The action holds only Comment 13-68.
Panel Statement: The comment introduces new material regarding communications or other applications that require high degree of reliability.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-69 Log #584 NEC-P13 **Final Action: Accept in Part**
(480.5)

Submitter: Stephen McCluer, APC by Schneider Electric / Rep. IEEE Stationary Battery Committee
Comment on Proposal No: 13-34
Recommendation: Modify the original proposal:
480.5 Disconnecting Means. A disconnecting means shall be provided for all ungrounded conductors derived from a stationary battery system over ~~30~~ 50 volts. A disconnecting means shall be readily accessible. ~~and located within sight of the battery system.~~
Substantiation: The proposal should have been Accepted in Part.
1) The 30 volt requirement was added in the last code cycle without any technical substantiation for why that level was chosen. The industry standard has always been 50 volts nominal. We note that NFPA 70E, which had permitted an even higher voltage, was revised in the upcoming release to 50 volts nominal. The use of 30 volts in the NEC creates a correlation conflict.
2) The last half of the final sentence should be deleted due to the FPN that was added in Proposal 13-33.
Panel Meeting Action: Accept in Part
Accept the recommendation to change the voltage level to "over 50 volts" and reject the remainder of the comment.
Panel Statement: Looking back at the 2008 NEC comments, Comment 13-21 to Proposal 13-16 did seem to assign the voltage of 30 volts arbitrarily without any substantiation in the Panel Statement for the action. Section 480.4 does not require overcurrent protection for conductors from a battery rated less than 50 volts and 690.71(E) and (F) require disconnection of batteries for more than twenty-four 2 volt cells (in excess of 48 volts).
The remainder of the comment was rejected because "located within sight" provides a defined distance of 50 feet or less for the location of the disconnecting means for the batteries. The FPN added in Proposal 13-33 references a permissive requirement whereas "located within sight of the battery system" as used in this section is mandatory.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:
SPINA, M.: 50VDC should be considered as the nominal DC voltage of the battery.

13-70 Log #2514 NEC-P13 **Final Action: Reject**
(480.7)

Submitter: Stephen McCluer, APC by Schneider Electric / Rep. IEEE Stationary Battery Committee
Comment on Proposal No: 13-36
Recommendation: Delete the existing text:
~~480.7 Insulation of Batteries of over 250 volts. The provisions of 480.6 shall apply to storage batteries having the cells connected so as to operate at a nominal voltage exceeding 250 volts, and, in addition, the provisions of this section shall also apply to such batteries. Cells shall be installed in groups having a total nominal voltage of not over 250 volts. Insulation, which can be air, shall be provided between groups and shall have a minimum separation between live battery parts of opposite polarity of 50 mm (2 in.) for battery voltages not exceeding 600 volts."~~
Substantiation: 480.7 provides no benefit. It requires separating cells of battery system into groups of 250 Volts. The actual voltage of the battery will depend upon the application, which may be much higher than 250 volts. When connected in series, separating into groups will only create a high voltage group and a low voltage group, but they are all part of the same battery. The requirement for inserting either a physical insulator or an air gap at the 250 volt level (which is roughly at the mid-point of most battery systems):
- increases the cost and complexity,
- introduces failure points,
- reduces reliability of the system,
- increases the possibility of human error, and
- provides absolutely no safety benefit.

See the material that I have provided for additional technical data.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: No substantiation has been provided to indicate that the current requirement has caused reduced reliability, increased failure points, increased incidents of human error or reduced safety. The substantiation does not adequately support a reduction in the level of safety provided by the current separation requirement. There are currently task groups working on coordination of battery requirements in NFPA 70, NFPA 70E, and other industry standards.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-71 Log #587 NEC-P13 **Final Action: Accept**
(480.9, FPN)

Submitter: Stephen McCluer, APC by Schneider Electric / Rep. IEEE Stationary Battery Committee
Comment on Proposal No: 13-37
Recommendation: Affirm the panel action to delete the proposed FPN.
~~FPN: For large installations requiring ventilation see Article 500.5 Classification of Locations (B) Class I Locations (2) Class I, Division 2 (2) in which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation and which might become hazardous through failure or abnormal operation of the ventilating equipment, or~~
Substantiation: The IEEE Stationary Battery Committee supports the panel's rejection of Proposal 13-37. A new FPN is not necessary. The presence of batteries in a space does not create a hazardous location when the batteries are installed, maintained and operated in accordance with best practices and codes.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-72 Log #586 NEC-P13 **Final Action: Accept**
(480.9(A))

Submitter: Stephen McCluer, APC by Schneider Electric / Rep. IEEE Stationary Battery Committee
Comment on Proposal No: 13-39
Recommendation: Affirm the panel action to Reject the proposed new FPN.
~~FPN: For large installations requiring ventilation see 500.5 Classification of Locations (8) Class I Class I, Division 2 (2) in which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation and which might become hazardous through failure or abnormal operation of the ventilating equipment.~~
Substantiation: The IEEE Stationary Battery Committee supports the panel's rejection of the proposal. The presence of batteries does not create a hazardous location when installed, maintained and operated in compliance with best practices and codes.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-73 Log #583 NEC-P13 **Final Action: Hold**
(480.9(A), FPN (New))

Submitter: Stephen McCluer, APC by Schneider Electric / Rep. IEEE Stationary Battery Committee
Comment on Proposal No: 13-38
Recommendation: Revise text to read as follows:
FPN: See ~~IEEE/ASHRAE Std. 1635, Guide for the Ventilation and Thermal Management of Stationary Battery Installations.~~ NFPA 1 Chapter 52 for ventilation considerations for specific battery chemistries.
Substantiation: Some battery technologies do not require ventilation greater than that required for human habitation. The standard included in the original proposal will include design guidelines for various battery types, but the standard has not been released by IEEE and ASHRAE at the time of this comment. The Uniform Fire Code (NFPA 1) identifies ventilation requirements for several types of batteries.
Panel Meeting Action: Hold
The panel action holds only Comment 13-73.
Panel Statement: This comment is held for the 2014 NEC revision cycle. The comment introduces a new standard (NFPA 1) that the public has not had an opportunity to review and comment.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

ARTICLE 490 — EQUIPMENT, OVER 600 VOLTS, NOMINAL

9-83 Log #2617 NEC-P09 **Final Action: Accept**
(490.2)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-186
Recommendation: Accept the panel action on the proposal in principle.
In the panel action in 490.33, change the title to read "Guarding of Energized Parts Operating at 600 Volts, Nominal, or Less Within Compartments." In the panel action on 490.35(B), change the wording to read "Where operating at 600 volts nominal, or less, control equipment, relays …".
Substantiation: This comment incorporates the preferred wording provided by the TCC, to which there is no objection.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-84 Log #144 NEC-P09 **Final Action: Accept**
(490.2.Low Voltage (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-186
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal regarding "600 volts, and below" to what is more commonly used in the Code "600 volts, nominal, or less".
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the direction of the Technical Correlating Committee and has taken a clarifying action in Comment 9-83.
Panel Statement: Refer to the panel action on Comment 9-83 for the clarified text.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-85 Log #381 NEC-P09 **Final Action: Accept**
(490.3)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-187
Recommendation: Continue to reject the proposal.
Substantiation: The CMP 9 actions on this topic are correct for all such proposals within its scope. It is interesting to note that there are some applications of the word "per" that are not really correct, or at least capable of improvement. One good example where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-86 Log #1311 NEC-P09 **Final Action: Reject**
(490.3)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 9-187
Recommendation: The Proposal should be Accepted.
Substantiation: The proposed wording provides clarity, is more appropriate for a standard, and complies with the NEC Style Manual.
The Manual of Style for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).
Most of the Panels have accepted changes to replace "per" with more explicit language and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 9-5.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-87 Log #1134 NEC-P09 **Final Action: Reject**
(490.21(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-195
Recommendation: Accept the proposal with the following revisions:
Circuit Interrupting Devices. Where more than one switch, circuit breaker, contactor, or other switching device, or combination of such devices is supplied by different circuits and the load side terminals are interconnected to provide for connection to different circuit conductors, each switching device shall be provided with approved means to prevent closing of more than one such device. Each such device shall be provided with a conspicuous durable sign warning of the presence of more than one supply circuit.
Substantiation: Switching devices other than load interrupter switches can be used for this application. Such arrangements are generally supplied by different circuits, but not necessarily different sources (of supply). The justification to close multiple switching devices connected in this matter should be explained in the panel statement.
Panel Meeting Action: Reject

Panel Statement: Switchgear arrangements to enhance reliability such as "main-tie-main" configurations require the ability to close all three devices at the same time. Additionally, generator testing to ensure proper synchronization requires closing multiple switching devices at the same time.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-88 Log #1556 NEC-P09 **Final Action: Reject**
(490.21(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-195
Recommendation: Accept the proposal with the following revisions:
Circuit Interrupting Devices. Where more than one switch circuit breaker, contractor, or other switching device, or combination of such devices is supplied by different circuits and the load side terminals are interconnected to provide connection to the different circuit conductors, each circuit interrupting device shall be provided with approved interlocks to prevent closing more than one such device.
Substantiation: This should be a safety requirement. Such devices may not be supplied from different sources, but the different circuits from the same source.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 9-87.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-89 Log #145 NEC-P09 **Final Action: Hold**
(490.22)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-196
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by providing specific text on "designed for the purpose" in the last sentence of this section.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Hold
This action is on Comment 9-89 only.
Panel Statement: The TCC recommendation is on text that was not subject to the panel action on Proposal 9-196 and action on this recommendation is not appropriate at this point in the process. Action on this recommendation at this time precludes public review and comment. This action holds any potential revision to the last sentence regarding fuseholders and does not obstruct implementing CMP 9's action on Proposal 9-196.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-90 Log #146 NEC-P09 **Final Action: Accept**
(490.44(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-201
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered by Code-Making Panel 9 based upon the action of Code-Making Panel 1 taken on Proposal 1-63.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the direction of the Technical Correlating Committee to reconsider its action on Proposal 9-201 and has taken action in Comment 9-91 to hold Proposal 9-201 and Comment 9-91.
Panel Statement: See the panel action and statement on Comment 9-91.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-91 Log #2618 NEC-P09 **Final Action: Hold**
(490.44(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-201
Recommendation: Continue to accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110: "**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
Panel Meeting Action: Hold
This action holds Comment 9-91 and Proposal 9-201 for the 2014 NEC revision cycle.
Panel Statement: Because CMP 1 has held comments related to this topic, this action correlates with CMP 1's actions.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

9-92 Log #2775 NEC-P09 **Final Action: Accept**
(490.47)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 9-202
Recommendation: Proposal should be rejected.
Substantiation: CMP 4 rewrote the definitions and subsequent requirements for the installation of the service conductors that the submitter is referencing in his proposal. The submitter presented rationale in his substantiation based on the presumption that CMP 4 would accept his proposals to CMP 4, we did not. The submitter is incorrect that under existing NEC requirements all "service drop" and "service entrance" conductors are utility owned, they are not. Utilizing the word "service" in 408.3 will be sufficient whether the recommended changes in Article 430 pass or not.
Panel Meeting Action: Accept
Panel Statement: CMP 9 assumes the article reference in the substantiation is to Article 230.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 500 — HAZARDOUS (CLASSIFIED) LOCATIONS, CLASSES I, II, AND III, DIVISIONS 1 AND 2

14-4 Log #682 NEC-P14 **Final Action: Reject**
(500 through 516)

Submitter: Evans Massey, Baldor Electric Company
Comment on Proposal No: 14-6a
Recommendation: In the Fine Print Notes (FPNs) appearing in Articles 500 through 506, 510, 511, 514, 515 and 516, delete all publication and revision dates for standards that are not extracted as text.
Substantiation: The Technical Correlating Committee action on1Proposal 14-6a (Log#CP1400) refers to *Manual of Style for NFPA Technical Committee Documents* section 2.3.1.2.4 in the request to maintain dated references to external standards. Panel 14 is bound instead by the National Electric Code (*NEC*®) Style Manual, which in Section 4.2 states that reference to other standards shall not be in mandatory Code text. There is no requirement to have dated references to these external standards. Identification of dated reference is only mandated for extracts, as discussed in Section 4.3.2.3.
Undated references are appropriate for the hazardous location series of external IEC based standards, for instance the ANSI/ISA 60079, and ANSI/ISA 61241 series. Where certification is sought for product in the US, typically the most recent version of the standards are used. With dated references for this standards series the following problems can occur- In the US, we could be using one version for NEC, another version for USCG and MMS Certification, and yet a third by our third party certifiers. This is further complicated by the adoption cycle of the Code. If a manufacturer held certification to the most recent version of the standard, and due to delays in adoption, certain states were using earlier versions of the code, it would be impossible to demonstrate compliance to the previous version of the standard that would be requested from earlier versions of the Code. Further, in Chapter 4 – Essentially what this means is that third party certified product will be unable to meet the Code if the dated references are included.

Panel Meeting Action: Reject
Panel Statement: The NEC Technical Correlating Committee has directed that dates are to be included.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-5 Log #2303 NEC-P14 **Final Action: Accept in Part**
(500 through 516)

TCC Action: Based on the panel statement on Comment 14-5 and the Technical Correlating Committee's Comment 14-6, which was Accepted, the Technical Correlating Committee directs that the panel action on this comment be reported as "Accept in Part", and accepts the restoration of the publication dates in Articles 500-506, 510, 511, 513, 514, 515 and 516, but not the additional Annex since the panel does not have jurisdiction over it.
Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 14-6a
Recommendation: Restore the publication and revision dates for referenced documents mentioned in the Fine Print Notes (FPNs) as they appeared in the 2008 NEC in Articles 500 through 506, 510, 511, 513, 514, 515 and 516. Provide these same publication and revision dates for those same documents appearing in Annex A.
Substantiation: While fine print notes are intended to provide reference information only, document publication and revision dates are important. Just like the date of the NEC revision needs to be retained for general information affecting designs and installations made at a point in time, these dated references also serve an important task. Deleting the publication and revision information would be disservice for uses and practitioners of this Code.
Panel Meeting Action: Reject
Panel Statement: The NEC Technical Correlating Committee has directed that the correct dates are to be included. Annex A is under the jurisdiction of Panel 1.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
WECHSLER, D.: The requested action was to restore the publication and revision dates for referenced documents mentioned in the Fine Print Notes (FPNs) as they appeared in the 2008 NEC in Articles 500 through 506, 510, 511, 513, 514, 515 and 516, and not eliminate some of the dates as the proposal action reflected.

However the NEC Technical Correlating Committee directed that the correct dates were to be included and this action was accepted in part, but since Annex A was under the jurisdiction of Panel 1 no action was taken on the Annex material. Therefore the action on this comment really was to accept in Principle.

A real mess may however result from the resultant actions taken as the specific detailed documentation perhaps may not have addressed for example, action taken to comply with the direction by the TCC, the facts that some fpn documents had dates which were not designated for change during the 2011 document cycle nor where considered as part of any proposed action, and action which should now result in some documents such as the ISA 60079-0 being dated 2005 and not 2009. For this reason it is strongly recommended that the Standards Council eliminate all the product standard fine print notes from Articles under the purview of CMP-14, as it was determined in the meeting that there was actually little value in retaining this product standard fine print notes at all.

14-6 Log #147 NEC-P14 **Final Action: Accept**
(500.2)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-8
Recommendation: The Technical Correlating Committee directs that the number, title and edition of the document from which this extract is taken be listed at the end of the extract in accordance with NEC Style Manual 4.3.2.3.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action on Proposal 14-9, in accordance with the *Manual of Style for NFPA Technical Committee Documents* .
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-7 Log #1292 NEC-P14 **Final Action: Reject**
(500.2 Combustible Dust)

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 14-9
Recommendation: We request CMP-14 reconsider the action on Proposal 14-9 and reject the proposal.
Substantiation: The definition of combustible dust is covered in NFPA 499, which is referenced in 500.4(B). The classification of the area should be determined by professionals using NFPA 499. That complete process is required to be documented in accordance with 500.4(A). The area classification process and documentation is supposed to occur as part of the design process and prior to the installation. NEC 90.1(C) indicates this "Code" is not intended as a design manual. NEC 90.2(A) indicates the "Code" covers installation requirements for electrical systems. The proper place for the definition of "Combustible Dust" is NFPA 499. In an effort to minimize the chance of owner/operators assuming area classification is an installation responsibility, enforcement recommends this information be excluded from the NEC and remain in NFPA 499. Including the definition in multiple locations, including the NEC, increases the number of correlation responsibilities required as documents are revised without increasing safety.
Panel Meeting Action: Reject
Panel Statement: Panel 14 agrees that the definition of combustible dust, as extracted from NFPA 499, should be included because this information is important in hazardous area classification.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
JONES, R.: I agree with the substantiation submitted with Comment 14-7. The NEC is an installation standard and is not intended as a design manual.

OFFERDAHL, D.: To date there has been no documentation presented to indicate that the existing definition for "Combustible Dust" in NFPA 499, is not or has not been sufficient. The inclusion of a definition for "Combustible Dust in Section 500.2 and 506.2 will increase the probability that facility management staff will assume that the installers can complete such a task and that ultimately because there are now definitions for combustible dust. Therefore AHJ's could now also be assumed to be responsible for classification of the area or location." The existing reference to NFPA 499 for the definition of combustible dust located in Section 500.4(B) has been adequate for many years and a change has not been supported by current documentation.
Comment on Affirmative:
SIMMONS, J.: James Carpenter is correct in his assessment of the negative effects of adding this definition to the NEC. Section 90.1 tells us, in subsection (A) that "the purpose of this Code is the practical safeguarding of persons and property from the hazards arising from the use of electricity." The addition of the definition does not increase the safety of Class II installations. Subsection (C) (Intention) of Section 90.1 goes on to indicate that "this Code is not intended as a design specification or an instruction manual for untrained persons."

The addition of a definition that states a combustible dust is "any finely divided solid material that is 420 microns or smaller in diameter and presents a fire or explosion hazard" does nothing to help an inspection agency insure the safety of a Class II installation. It also does not help the installer have a better understanding of what is required to safely install Class II wiring.

Area classification is a design function which requires the use of many standards in addition to the NEC. Typically the design professional determines the area classification and provides that information to the inspection agency and installer in the form of plans and specifications. The design professional may need to refer to more than one standard to determine the appropriate area classification.

The inclusion of selected references from other standards in the NEC could, in some cases, lead to unsafe installations where uninformed designers rely strictly on the NEC to design projects for hazardous locations believing that the important parts of the other standards have been referenced in the NEC.

There has been a tendency in the past few code cycles to add more and more "design" references, particularly in the form of FPNs, to the NEC. As the number of design references increase, the NEC becomes more difficult for inspectors and installers to use. As 90.1 indicates, the NEC is not intended to be used as a design manual.

14-8 Log #490 NEC-P14 **Final Action: Reject**
(500.5(C)(1)(3), FPN)

Submitter: Mindy Wang, Ampco Safety Tools
Comment on Proposal No: 14-14
Recommendation: Revise text to read as follows:

500.5 Classification of Locations.

(C) Class II Locations.

(1) Class II, Division 1.

(3) In which Group E combustible dusts may be present in quantities sufficient to be hazardous.

FPN: Dusts containing magnesium or aluminum are particularly hazardous, and the use of extreme precaution is necessary to avoid ignition and explosion. For further information on classification and safeguards against fire and explosion for combustible metal dusts, see NFPA 484 – 2009, Standard for Combustible Metals.

Substantiation: NFPA 484 addresses area classification by identifying the following locations to be classified per Article 500 of NFPA 70:

- Chapter 6 Aluminum, Section **6.1.6 Electrical Power and Control, paragraph 6.1.6.2, "**In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code*."
- Chapter 6 Aluminum, Section **6.2.4.2 Electrical Equipment, paragraph 6.2.4.2.4, "**Wet solvent milling areas or other areas where combustible or flammable liquids are present shall be classified where applicable, in accordance with Article 500 of *NFPA 70, National Electrical Code"*
- Chapter 6 Aluminum, Section **6.2.4.3 Plasma Spray Operations, paragraph 6.2.4.4, "**In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code*."
- Chapter 7 Magnesium, Section **7.1.6 Electrical Power, paragraph 7.1.6.2, "**In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code*."
- Chapter 7 Magnesium, Section **7.3.4 Electrical Equipment, paragraph 7.3.4.1, "**In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code*."
- Chapter 7 Magnesium, Section **7.7.6 Storage of Magnesium Powder, paragraph 7.7.6.6, "**In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code*."
- Chapter 8 Niobium, Section **8.1.4 Electrical Power, paragraph 8.1.4.3, "**In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code*."
- Chapter 9 Tantalum, Section **9.1.3 Electrical Power, paragraph 9.1.3.1, "**In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code*."
- Chapter 10 Titanium, Section **10.6.2 Titanium Powder Handling, paragraph 10.6.2.4* *Electrical Installations.***, "In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code*."
- Chapter 11 Zirconium, Section **11.6.2.4 Electrical Installations, paragraph 11.6.2.4.2, "**In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code*."
- Chapter 12, Requirements Combustible Metals Covered Chapter 5 Chapter 11, Section **12.3.2 Storage of Combustible Metal Powder, paragraph 12.3.2.6, "**In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code*."
- Chapter 12, Requirements Combustible Metals Covered Chapter 5 Chapter 11, Section 12.5 Electrical Equipment, paragraph **12.5.2, "**In local areas of a plant where a hazardous quantity of dust accumulates or is present in suspension in the air, the area shall be classified, and all electrical equipment and installations in those local areas shall comply with Article 500 of *NFPA 70, National Electrical Code.*"

Proposed text provides cross reference to an existing standard on dust hazard and is consistant with other informative FPN found in Article 500.

Panel Meeting Action: Reject
Panel Statement: The submitter has provided no additional information to substantiate the comment.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-9 Log #454 NEC-P14 **Final Action: Reject**
(500.5(C)(2)(1))

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 14-15
Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:

"(1) In which combustible dust due to abnormal operations may be are present in the air in quantities sufficient to produce explosive or ignitable mixtures; or...".

Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.

However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms *may* or *can* shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term *may* shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."

Since the use of the term *may* in this Section does not meet these either of these criteria, it should be changed.

The change wording proposed here does not change the meaning of this Section since the requirement relates to the abnormal operations as opposed to normal operations in Section 500.5(C)(1) which has similar wording.

Panel Meeting Action: Reject
Panel Statement: The recommendation does not comply with Section 4.4.5 of the NFPA Regulations Governing Committee Projects, as it is not clear what text changes are being proposed.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-10 Log #1132 NEC-P14 **Final Action: Reject**
(500.5(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-16
Recommendation: Accept the proposal.
Substantiation: The word "flyings" should be inserted after the first use of "fibers" as it is in the last half of the sentence. "Or where materials producing combustible fibers/flyings" is superfluous; if they are producing fibers/flyings they are present and included in "because of the presence of..."
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-11 Log #2155 NEC-P14 **Final Action: Accept**
(500.5(D))

Submitter: Jeremy Neagle, Intertek Testing Services
Comment on Proposal No: 14-16
Recommendation: Revise 500.5(D) as follows:

"(D) Class III Locations. Class III locations are those that are hazardous because of the presence of easily ignitible fibers or where materials producing combustible flyings are handled, manufactured, or used, but in which such fibers/flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitible mixtures. Class III locations shall include those specified in 500.5(D)(1) and (D)(2)."

Substantiation: I agree with the panel action and statement. However, the submitter introduces text (although shown incorrectly with struck-through formatting) which would clarify the current text of the code. Adding the word 'where' before 'materials' corrects the grammar of the sentence and clarifies the requirements of the code.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-12 Log #1131 NEC-P14 **Final Action: Reject**
(500.7(K)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-22
Recommendation: Accept the proposal with the following revisions:
In a building or other structure located in or with an opening into a Class 1, Division 2 location where the interior of the building or other structure does not contain a source of flammable gas or vapor, electrical equipment in that building or other structure shall not be required to comply with requirements for Class 1, Division 2 locations.
Substantiation: Structures other than "buildings" should be included. All electrical equipment for unclassified locations may not be suitable for the conditions. "General" equipment for unclassified locations is broad and may be deemed to modify "uses permitted" and "uses not permitted" provisions.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-13 Log #1287 NEC-P14 **Final Action: Reject**
(500.8, FPN 1)

Submitter: Mindy Wang, Ampco Safety Tools
Comment on Proposal No: 14-23
Recommendation: Revise original proposal to read as follows:
500.8 Equipment.
FPN No. 1: It is important that inspection authorities and users exercise more than ordinary care with regard to installation and maintenance. Spark resistant tools may be needed to control ignition sources in classified locations.
Substantiation: The scope of Article 500 covers the requirements for electrical and electronic equipment and wiring in Class I, Divisions 1 and 2; Class II, Divisions 1 and 2; and Class III, Divisions 1 and 2 locations where fire or explosion hazards may exist due to flammable gases, flammable liquid–produced vapors, combustible liquid–produced vapors, combustible dusts, or ignitable fibers/flyings.
Section 500.8 states that "Articles 500 through 504 require equipment construction and installation that ensure safe performance under conditions of proper use and maintenance." Hand tools are often used in installation or maintenance.
FM Approvals LLC, formerly Factory Mutual Research Corporation, (FM) is an international organization recognized by the U.S. government as a Nationally Recognized Testing Laboratory (NRTL) for scientific research and product certification. Product approval from a NRTL assures that products meet consensus-based standards of safety to provide the assurance, required by OSHA, that these products are safe for use in the United States workplace. FM Approval Standard 7910, Spark Resistant Tools is used as guidance to evaluate tools intended for use in environments where there is a risk of ignition of flammable materials, dusts or vapors resulting from sparks created by iron and steel hand tools. These tools prevent the ignition of flammable materials, dusts or vapors by mechanical sparks created by the use of iron and steel hand tools slipping or striking a surface. These tools provide a solution in place of ferrous tools in flammable environments.
As stated in FPN No 1 of section 500.8, "It is important that inspection authorities and users exercise more than ordinary care with regard to installation and maintenance." Flammable atmospheres require a variety of safety measures including control of ignition sources. Hand tools should not be overlooked as a potential ignition source in flammable atmospheres.
Proposed text provides additional information on more than ordinary care that is available and can be taken with regard to installation and maintenance in classified (hazardous) locations; therefore, we believe proposed text is within the scope of Article 500. We respectfully request the Committee to reconsider our proposal.
Panel Meeting Action: Reject
Panel Statement: The use of spark resistant tools is not within the scope of the *National Electrical Code*.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-14 Log #1288 NEC-P14 **Final Action: Reject**
(500.8, FPN 1)

Submitter: Mindy Wang, Ampco Safety Tools
Comment on Proposal No: 14-23
Recommendation: Revise original proposal to read as follows:
500.8 Equipment.
FPN No. 1: It is important that inspection authorities and users exercise more than ordinary care with regard to installation and maintenance. For further information on ignition sources control pertaining to flammable and combustible liquids see NFPA 30-2008, Flammable and Combustible Liquids Code. For further information on ignition sources control pertaining to combustible dusts see NFPA 654-2006, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids.
Substantiation: Article 500 covers the requirements for electrical and electronic equipment and wiring for all voltages in Class I, Divisions 1 and 2; Class II, Divisions 1 and 2; and Class III, Divisions 1 and 2 locations where fire or explosion hazards may exist due to flammable gases, flammable liquid–produced vapors, combustible liquid–produced vapors, combustible dusts, or ignitable fibers/flyings.
Proposed text provides cross reference to existing standards on control of ignition sources in flammable atmospheres and is consistant with other informative FPN found in Article 500.
Panel Meeting Action: Reject
Panel Statement: It is not the intent of nor is it within the scope of the Code to provide cross references to other standards that deal with sources of ignition beyond those presented by the electrical system, nor does the proposed text contribute to the utility of the Code.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-15 Log #382 NEC-P14 **Final Action: Accept**
(500.8(B)(2)(b))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-24
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-16 Log #1684 NEC-P14 **Final Action: Reject**
(500.8(B)(3)(6))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-25
Recommendation: Delete and substitute text as follows:
(3) Where specfically permitted in Articles 501 through 503, electrical equipment not specifically identified for use in hazardous (classified) locations shall be permitted to be installed or used in Division 2 locations if the equipment does not constitute a source of ignition under normal conditions of use.
(C) Where flammable gases, flammable liquid produced vapors, combustible liquid produced vapors, combustible dusts, ignitable fibers/flyings are or likely to be present, their simultaneous presence shall be considered when determining the safe operation of the electrical equipment.
Substantiation: "General Purpose" is not Code defined; "equipment" includes enclosures part of or in connection with, an electrical system per the Article 100 definition.
In (6), fibers/flyings should be included as they can affect safe operating temperatures. "Likely" is a term used over 80 times in the NEC
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-17 Log #1683 NEC-P14 **Final Action: Reject**
(500.8(C)(6))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-30
Recommendation: Accept the proposal revised as follows:
Fixed equipment in Class 1 locations that is approved for use in Class 1 Division 2 locations shall not be required to be marked with the class, division, group, temperature class, or ambient temperature range.
Substantiation: Although "general purpose" may be it may be deemed not to include weatherproof, dusttight, etc., which even if not required may be installed. Who is to determine "acceptable"? "Approved" is defined as acceptable to the AHJ.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-18 Log #2317 NEC-P14 **Final Action: Reject**
(500.8(E))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 14-33
Recommendation: Revise the text to mirror the requirements of 110.12(A), as follows:
(3) Unused Openings. All unused openings, other than those intended for the operation of equipment, those intended formounting purposes, or those permitted as part of the design for listed equipment, shall be closed with listed metal close-up plugs. The plug engagement shall comply with 500.8(E)(1) or 500.8(E)(2).
Substantiation: This comment is mainly for consistency with other Code requirements. Although openings in hazardous locations equipment are often only for raceway and cable entries, there may be other openings that must remain open as well.
Panel Meeting Action: Reject
Panel Statement: The text as proposed in this comment would allow the possibility of an unsafe condition. All unused threaded openings must be plugged so that the integrity of the enclosure is maintained. Panel 14 notes that 500.8(E) applies to a special application and it is not the Panel's intent to mirror the requirement of 110.12(A).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-19 Log #2539 NEC-P14 **Final Action: Hold**
(500.8(E)(1))

Submitter: Richard A. Janoski, Finleyville, PA
Comment on Proposal No: 14-33
Recommendation: Revise text to read as follows:
(1) **Equipment Provided with Threaded Entries for NPT Threaded Conduit or Fittings.** For equipment provided with threaded entries for NPT threaded conduit or fittings, listed conduit, listed conduit fittings, or listed cable fittings shall be used.
Substantiation: As 500.8(E)(1) is presented in the 2008 NEC, a grammatical error leaves the conduit fittings and the cable fittings without a rule that requires them to be listed. The word "listed" is only preceding the word "conduit", therefore it only applies to the conduit. The addition of the word "listed" preceding the conduit fittings, and the cable fittings will add the necessary listing requirement. This will also provide continuity between the proposed text for 500.8(E)(1) and 500.8(E)(2).
Panel Meeting Action: Hold
Panel Statement: While the panel supports the comment, the suggested wording addresses text that was not altered at the Report on Proposals (ROP) stage and, therefore, constitutes new material. This comment will automatically be logged as a proposal for the next revision cycle of the Code.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-20 Log #2619 NEC-P14 **Final Action: Accept in Principle**
(500.8(E)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-33
Recommendation: Accept the proposal in principle.
In 500.8(E)(1) change "referred to herein" to "described in this section."
Substantiation: The NEC Style Manual (at 3.3.4) does not permit the word "herein" because the "here" in the "herein" is indistinct, and requires that if the pointer is necessary (frequently it is not but it is appropriate in this case) an alternate, and specific pointer such as the one suggested in this comment must be used.
Panel Meeting Action: Accept in Principle
Delete the phrase "referred to herein" from the second sentence of 500.8(E)(1).
Panel Statement: The panel agrees with the submitter and has deleted the ambiguous phrase.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-21 Log #2157 NEC-P14 **Final Action: Accept**
(500.8(E)(2))

Submitter: Jeremy Neagle, Intertek Testing Services
Comment on Proposal No: 14-33
Recommendation: The third sentence of 500.8(E)(2) should be revised to read as follows:
'…Metric threaded entries into explosionproof equipment shall have a class of fit of at least 6g/6H and shall be made up with at least five threads fully engaged for Group C and Group D, and at least ~~not less than~~ eight ~~full~~ threads fully engaged for Group A and Group B…'
Substantiation: The proposed changes clarify the text of the code and are consistent with the wording used throughout this section of the code.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-22 Log #2620 NEC-P14 **Final Action: Reject**
(500.8(E)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-34
Recommendation: Accept the proposal in principle.
Change "identified as being metric" to "identified and marked as being metric."
Substantiation: The panel statement is not responsive. The sentence applies to "equipment with metric threaded entries …" and then "such entries" as the subject of the next clause. How can this rule be covering anything but equipment? It then asks that this equipment either be identified as metric, or shipped with NPT adapters. All of this makes perfect sense, as long as "identified" really means "marked." This comment suggests using both terms to avoid losing the original concept, but the word "marked" is essential to assure correct application in the field.
Panel Meeting Action: Reject
Panel Statement: Marking is only one method of identification. Other equally acceptable methods can be used.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-23 Log #10 NEC-P14 **Final Action: Reject**
(500.8(F))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 14-35
Recommendation: Accept this proposal in part by accepting the recommended text for 500.8(F) and continuing to reject the recommendation for a fine print note.
Substantiation: The panel statement about adding conductive optical fiber cables assumes that conductive optical fiber cables are not already covered. The current text covers optical fiber cables that have "conductors that are capable of carrying current". See the definition of conductive optical fiber cable in 770.2; a cable that has "conductors that are capable of carrying current" is a conductive optical fiber cable. A typical conductive optical fiber cable has a metallic strength member.
Composite optical fiber cables have electrical conductors that are intentionally current-carrying. Section 770.3(A) states that conductive optical fiber cables are classified as electrical cables in accordance with the type of electrical conductors.
Panel Meeting Action: Reject
Panel Statement: No additional substantiation has been provided for the addition of "conductive optical fiber cable".
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 501 — CLASS I LOCATIONS

14-24 Log #1545 NEC-P14 **Final Action: Reject**
(501.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-36
Recommendation: Accept the proposal with the following revisions:
Wiring Methods. Wiring methods shall comply with 501.10(A) or (B).
(A) Class 1, Division 1.
In Class 1, Division 1 locations, only the wiring methods in (a) through (d) shall be employed.
(a) Threaded rigid metal conduit or threaded steel intermediate metal conduit with threaded fittings and thread to thread connections.
Exception: Type PVC conduit and Type RTRC conduit containing an equipment grounding conductor shall be permitted underground where encased in a cement concrete envelope a minimum of 50 mm (2 in.) thick and provided with not less than 600 mm (24 in.) of cover from the top of the conduit to finished grade. Threaded rigid metal conduit or threaded steel intermediate metal conduit with threaded fittings and connections shall be used for not less than the last 600 mm (24 in.) of the underground run to emergence and the point of connection to the above ground wiring method or enclosure.
(b) Type MI cable with approved termination fittings.
(c) On premises with restricted public access where the conditions of supervision and maintenance ensure that only qualified persons install and service the installation,
Type MC-HL and Type ITC-HL cable listed for Class 1, Zone 1, or Division locations, with a gas/vaportight continuous corregated sheath and overall jacket of polymeric material, with fittings listed for the application, and containing an equipment grounding conductor.
FPN: See 330.12, 727.4, and 727.5 for restrictions on the use of Type MC and Type ITC cables.
(2) Flexible Connections. Where necessary to employ flexible connections. flexible fittings listed for Class 1 locations and containing an equipment grounding conductor, or flexible cords or cables in accordance with 400.3 and 501.140 shall be permitted in lengths not longer than necessary.
(3) Boxes and Fittings. All boxes, other enclosures, and fittings shall be approved for Class 1 locations.
Substantiation: "Shall be permitted" does not impose a requirement per 90.5 and thus, is not enforceable. 250.122 already applies. Threaded fittings and connections should be specified for RMC and IMC. (See 342.42 and 344.42). Type MI cable and fittings are not required to be listed in Article 332; installation and support are covered in that Article.
(c) should be predicated on supervision and maintenance, not type of occupancy; "industrial" rules out commercial and governmental occupancies and is not specified in 408.20 for a similar provision.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-25 Log #1552 NEC-P14 **Final Action: Reject**
(501.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-36
Recommendation: Accept the proposal with the following revisions:
Wiring Methods. Wiring methods shall comply 501.10(A) and (B).
(A) Class 1, Division 1.
(1) General. In Class 1, Division 1 locations, only the wiring methods in (a) through (d) shall be utilized unless otherwise permitted in 501.10(B)(3).
(a) Threaded rigid metal conduit, threaded steel intermediate metal conduit, with threaded fittings and connections.
Exception: Type PVC conduit and Type TRTRC conduit containing an equipment grounding conductor shall be permitted underground where encased in a cement concrete envelope a minimum of 500 mm (2 in.) thick and provided with not less than 600 mm (24 in.) of cover, measured from the top of the conduit to finished grade. Threaded rigid metal conduit or threaded steel intermediate metal conduit, with threaded fittings and connections shall be used for not less than the last 600 mm (24 in.) of the underground run to the above wiring method or enclosure.
(b) Type MI cable with termination fittings approved for the location.
(c) On premises with restricted public access where the conditions of supervision and maintenance ensure that only qualified persons install and service the installation. Type MC-HL cable containing an equipment grounding conductor and listed for use in in Class 1, Zone 1 or Division 1 locations, with a gas/vaportight continuous corrugated metal sheath, an overall jacket of polymetric material.
FPN: See 300.12 for restrictions on use of Type MC cable.
Substantiation: In (A)(1), "shall be permitted" is not mandatory per 90.5.
(B) (Not Enforceable) and doesn't correlate with 501.10, Wiring methods, which uses the word "shall". Threaded fittings and connections should be required in addition to threaded RMC and IMC since 342.42 and 344.42 do not prohibit threadless couplings and connectors. The first sentence of the Exception should specify "underground" since the first sentence specifies underground. In the Exception, the dimensions should be a minimum since "shall" requires 2 ft, no more. The concrete envelope should specify "cement" since there is also asphalt concrete. In the Exception, "point of emergence" is superfluous and permits RMC and IMC to terminate at ground level. The above ground wiring may not be a raceway, such as an enclosure or Type MI cable. Article 330 in my 2008 NEC does not reference MC-HL. Article 332 does not require listing for Type MI cable or fittings. Proposal 3-38, 332.4 (new) in the 2010 ROP to require listing, was rejected.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-26 Log #148 NEC-P14 **Final Action: Accept**
(501.10(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-37
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action as it relates to 4.1.1 of the NEC Style Manual concerning references to entire articles.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise text to read as follows:
501.10 Wiring Methods. Wiring methods shall comply with 501.10(A) or (B).
(A) Class I, Division 1.
(1) General. In Class I, Division 1 locations, the wiring methods in (a) through (d) shall be permitted.
(a) Threaded rigid metal conduit or threaded steel intermediate metal conduit.
Exception: Type PVC conduit and Type RTRC conduit shall be permitted where encased in a concrete envelope a minimum of 50 mm (2 in.) thick and provided with not less than 600 mm (24 in.) of cover measured from the top of the conduit to grade. The concrete encasement shall be permitted to be omitted where subject to the provisions of 514.8, Exception No. 2, and 515.8(A). Threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway. An equipment grounding conductor shall be included to provide for electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.
(b) Type MI cable ~~with termination~~ terminated with fittings listed for the location. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings.
(c) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type MC-HL cable, listed for use in Class I, Zone 1, or Division 1 locations, with a gas/vaportight continuous corrugated metallic sheath, an overall jacket of suitable polymeric material, a separate equipment grounding conductor (s) in accordance with 250.122, and ~~provided~~ terminated with ~~termination~~ fittings listed for the application.
Type MC-HL cable shall be installed in accordance with the provisions of Article 330, Part II.
~~FPN: See 330.12 for restrictions on use of Type MC cable.~~
(d) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type ITC-HL cable, listed for use in Class I, Zone 1, or Division 1 locations, with a gas/vaportight continuous corrugated metallic sheath, an overall jacket of suitable polymeric material and ~~provided~~ terminated with ~~termination~~ fittings listed for the application, and installed in accordance with the provisions of Article 727.

~~*FPN: See 727.4 and 727.5 for restrictions on use of Type ITC cable.*~~
(2) Flexible Connections. *Where necessary to employ flexible connections, as at motor terminals, flexible fittings listed for ~~Class I, Division 1 locations~~ the location or flexible cord in accordance with the provisions of 501.140 terminated with cord connectors listed for the location shall be permitted.*
(3) Boxes and Fittings. *All boxes and fittings shall be approved for Class I, Division 1.*
Panel Statement: As there is no "Article" for Type MC-HL Cable, a reference to Part II of Article 330 (Type MC Cable) is required to specify what installation requirements are to be applied for Type MC-HL Cable. (Add Part II, as shown.) The panel believes that a reference to all of Article 727 is appropriate as the application of ITC-HL cable requires the application of all sections of Article 727.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-27 Log #1561 NEC-P14 **Final Action: Reject**
(501.10(A)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-42
Recommendation: Accept the proposal with the following revisions:
All boxes, other enclosures, and fittings shall be listed or identified as suitable for Class 1, Division 1 locations.
Substantiation: "Approved" is defined as acceptable to the Authority Having Jurisdiction which is not necessarily the same as "identified" or "listed". The AHJ may not be qualified and should not have the responsibility to evaluate whether such equipment is suitable; the responsibility is to enforce the NEC. 501.10(A)(b),(c), and (d), (A)(2), (B)(2) require listing.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-28 Log #2621 NEC-P14 **Final Action: Reject**
(501.10(B)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-43
Recommendation: Accept the proposal in principle.
In 501.10(B)(1)(4) change "with the provisions of Article 725 …" to "with the provisions of 725.154 and 725.179…".
Substantiation: This change will bring the panel action into compliance with the whole-article reference prohibition in the NEC Style Manual, at 4.1.1.
Panel Meeting Action: Reject
Panel Statement: Panel 14 has determined that a reference to all of Article 725 is appropriate, as the application of PLTC and PLTC-ER cable requires the application of all parts of Article 725.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-29 Log #1402 NEC-P14 **Final Action: Reject**
(501.10(B)(1)(2))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 14-47
Recommendation: The panel should reject the proposal.
Substantiation: While we agree that the permission to use rigid metal conduit and intermediate metal conduit is covered by 501.10(B)(1)(1), it does not add to the user-friendliness of the NEC to remove 501.10(B)(1)(2). This (2) takes up one and a half lines in the NEC and is hardly responsible for contributing to the bulk of the Code. When the 2011 NEC is printed, this section will be highlighted to show that a change was made. As a CMP user member stated during the ROP meetings, it could appear as if these wiring methods are no longer allowed in these locations. There was no Panel Statement to explain the deletion. It is much more user-friendly to leave the text in rather than to send the reader back to another section.
Panel Meeting Action: Reject
Panel Statement: The redundancy does not improve "user-friendliness" or clarity of the Code.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-30 Log #1560 NEC-P14 **Final Action: Reject**
(501.10(B)(2)(5))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-49
Recommendation: Accept the proposal with the following revisions:
Extra-hard usage flexible cords or cables that comply with 400.3 and contain an equipment grounding conductor, and are provided with listed bushed fittings where entering enclosures. The flexible cord or cable shall not be longer than necessary, and installed in a manner so there is no strain on terminations, or provided with approved strain relief.
Substantiation: Article 400 does not specify listing and there is no Table comparable to Table 400.4 for listed cords. Reference to 400.3 requires consideration for wet locations, sunlight resistance, and use. All extra-hard usage types may not be suitable, e.g., EV, EVE, EVT and those without a W in their designation.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-31 Log #1559 NEC-P14 **Final Action: Reject**
(501.10(B)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-50
Recommendation: Accept the proposal with the following revisions:
(B)(3) Nonincendive field wiring shall be permitted using any wiring method suitable for the use and conditions.
(B)(3)(1) In separate cables or raceways.
Substantiation: "Any" wiring methods permitted for unclassified locations includes many which may not be suitable or permitted such as open wiring on insulators, concealed knob and tube wiring, and may modify "not permitted" use since it modifies those provisions per 90.3. Separate raceways should be included with separate cables.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-32 Log #2158 NEC-P14 **Final Action: Accept**
(501.10(B)(3))

Submitter: Jeremy Neagle, Intertek Testing Services
Comment on Proposal No: 14-50
Recommendation: Revise the second paragraph of 501.10(B)(3) as follows:
"Separate nonincendive field wiring circuits shall be installed in accordance with one of the following:
(1) In separate cables
(2) In multiconductor cables where the conductors of each circuit are within a grounded metal shield
(3) In multiconductor cables or raceways, where the conductors of each circuit have insulation with a minimum thickness of 0.25 mm (0.01 in.)"
Retain first paragraph and FPN.
Substantiation: I agree with the panel action and statement. However, it is noted that the current text of 501.10(B)(3) inadvertently omits the permission to run separate non-incendive field wiring circuits as discreet conductors in a single raceway, the proposed change corrects this.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-33 Log #1105 NEC-P14 **Final Action: Reject**
(501.15(B)(2) Exception No. 4)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-52
Recommendation: Accept the proposal with the following revisions:
(2) The conduit system segment is entirely in outdoor locations not enclosed by walls or other structures which would prevent natural air ventilation and permit accumulation of flammable gases or vapors.
Substantiation: Outdoor locations may be closely confined by solid walls or structures that impede dispersion of gases and vapors.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-34 Log #2624 NEC-P14 **Final Action: Reject**
(501.15(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-195
Recommendation: Accept the panel action in principle.
In 505.15(C)(1)(d) change "the provisions of Article 725" to "the provisions of 725.154 and 725.179."
Substantiation: This comment resolves a violation of the whole article referencing prohibition in the NEC Style Manual at 4.1.1.
Panel Meeting Action: Reject
Panel Statement: Panel 14 has determined that a reference to all of Article 725 is appropriate, as the application of PLTC and PLTC-ER cable requires the application of all parts of Article 725.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-35 Log #2622 NEC-P14 **Final Action: Reject**
(501.15(D)(1) Exception)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-54
Recommendation: Accept the proposal.
Substantiation: When the gas exposure is limited to a twisted pair, that pair with or without shielding applied to the pair will pass a leak test. However, when the shielding is applied to plural twisted pairs, the opportunity for gas migration is far greater as the shielding creates a miniature hose. The ubiquitous Ethernet cabling is a good example, since the shielded types generally apply the shielding around the entire assembly of eight conductors (four pairs). This is especially true with the advent of modern configurations to reduce cross-talk in the higher communication categories. These configurations apply a different twist pitch to each pair, with the result that the pairs do not nest and the passage of gas is even more severe as a result. The permission to avoid separating cable components must be strictly limited.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided data to support the recommendation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-36 Log #2623 NEC-P14 **Final Action: Reject**
(501.15(D)(2) Exception)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-57
Recommendation: Accept the proposal.
Substantiation: The panel statement refers to the statement on the submitter's Proposal 14-54, which references "all types of shielded cables – pairs, triads, quads, etc." but the intent of the proposal was only to reach that which is covered in the final sentence of the exception, namely, twisted-pair cables. When the gas exposure is limited to a twisted pair, that pair with or without shielding applied to the pair will pass a leak test. However, when the shielding is applied to plural twisted pairs, the opportunity for gas migration is far greater as the shielding creates a miniature hose. The ubiquitous Ethernet cabling is a good example, since the shielded types generally apply the shielding around the entire assembly of eight conductors (four pairs). This is especially true with the advent of modern configurations to reduce cross-talk in the higher communication categories. These configurations apply a different twist pitch to each pair, with the result that the pairs do not nest and the passage of gas is even more severe as a result. The permission to avoid separating cable components must be strictly limited.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided data to support the recommendation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-37 Log #149 NEC-P14 **Final Action: Accept**
(501.15(F)(3))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-60
Recommendation: The Technical Correlating Committee directs that the publication date of the ANSI document be included in the text as required by the Manual of Style for NFPA Technical Committee Documents Section 2.3.1.2.4 which requires dates of publication for referenced documents.
In addition, the Technical Correlating directs that the panel revise the meeting action text to comply with the NEC Style Manual.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The correct date is 2003.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-38 Log #6 NEC-P14 **Final Action: Accept in Principle**
(501.17)

TCC Action: The Technical Correlating Committee directs that the panel action on Comment 14-38 be reported as "Accept in Principle" by accepting all the proposed text changes and also by adding the date of the ANSI Standard.
This action will then correlate with Comment 14-37, which was an "Accept" by accepting the addition of the date of the ANSI document.
The Technical Correlating Committee also directs that the phrase "need not be provided with an additional means of sealing." be changed to: "... shall not be required to be provided with an additional means of sealing." to conform with the NEC Style Manual.
Submitter: Ted H. Schnaare, Rosemount Incorporated
Comment on Proposal No: 14-60
Recommendation: Revise text to read as follows:
501.17 Process Sealing
This section applies to process connected equipment which includes, but is not limited to, canned pumps, submersible pumps, flow,pressure, temperature, or analysis measurement instruments, A process seal is a device to prevent the migration of process flu ids from the designed containment into the external electrical system.
Process connected electrical equipment that incorporates a single process seal, such as a single compression seal, diaphragm, or tube to prevent flammable or combustible fluids from entering a conduit or cable system capable of transmitting fluids, shall be provided with an additional means to mitigate a single process seal failure, The additional means may include, but is not limited to the following: ~~One of the following means shall be provided to prevent process fluids from entering the electrical raceway or cable system:~~
~~(1) Process connected electrical equipment that incorporates a single process seal, such as single compression seal, diaphragm, or tube to isolate flammable or combustible fluids from entering a conduit or cable system capable of transmitting fluids, shall be provided with an additional means to mitigate a single process seal failure. The additional means may include, but is not limited to the following:~~
(1) ~~a.~~ A suitable barrier meeting the process temperature and pressure conditions that the barrier will be subjected to upon failure of the single process seat There shall be a vent or drain between the single process seal and the suitable barrier. Indication of the single process seal failure shall be provided by visible leakage, an audible whistle, or other means of monitoring.
(2) ~~b.~~ A listed Type MI cable assembly, rated at not less than 125 percent of the process pressure and not less than 125 percent of the maximum process temperature (in degrees Celsius), installed between the cable or conduit and the single process seal.
(3) ~~c.~~ A drain or vent located between the single process seal and a conduit or cable seal. The drain or vent shall be sufficiently sized to prevent over-pressuring the conduit or cable seal above 6 in. water column (1493 Pa). Indication of the single process seal failure shall be provided by visible leakage, an audible whistle, or other means of monitoring.
~~(2)~~ Process-connected electrical equipment that does not rely on a single process seal or is listed and marked - single "seal" or "dual seal" need not be provided with an additional means of sealing.
FPN: For construction and testing requirements for process sealing for listed and marked "single seal" or "dual seal" requirements refer to ANSl IISA-12.27.01, Requirements for Process Sealing Between Electrical Systems and Potentially Flammable or Combustible Process Fluids.

Substantiation: The addition of 501.17 does much to improve the clarity of the process sealing issue. However, the new text eliminates an important provision of the current and past Codes. In the current Code, only equipment that relies on a single seal is subject to the additional sealing requirements. Removing this provision will dramatically impact current and future installations without any significant justification.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-39 Log #455 NEC-P14 **Final Action: Reject**
(501.20)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 14-61
Recommendation: The Proposal action should have been to Accept in Principle in Part and changed to read as follows:
Where condensed vapors or liquids ~~may~~ are capable of collecting on, or come in contact with, (the remainder of the Section to be unchanged).
Continue to Reject the change of the word "suitable" in 502.100(A)(1).
Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.
However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms *may* or *can* shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term *may* shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."
Since the use of the term *may* in this Section does not meet these either of these criteria, it should be changed.
Panel Meeting Action: Reject
Panel Statement: The term "may" is the correct term and it is not a violation of the style manual as it is not used as part of the mandatory rule. It is part of the conditional statement that sets up the mandatory rule.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-40 Log #1103 NEC-P14 **Final Action: Reject**
(501.20)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-61
Recommendation: Accept the proposal with the following revisions:
Conductors shall comply with applicable provisions of 310.10.
Substantiation: Lead sheathed conductors are rare except for high-voltage applications. This provision doesn't relate to corrosion. 310.8 is more inclusive, covers metal sheaths, corrosion, and sunlight resistance. Since not specifically amended, it already applies. Apparently, it was not deemed necessary to specify other requirements for Article 310 conductors. "May" is a term to be used for discretionary use by the Authority Having Jurisdiction per the NEC Style Manual.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-41 Log #1106 NEC-P14 **Final Action: Reject**
(501.20)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-61
Recommendation: Accept the proposal with the following revisions:
Conductors shall comply with applicable requirements of 310.8.
Substantiation: Lead-sheathed conductors are rare, except perhaps for high voltage. This provision doesn't relate to corrosion. "May" is subjective and a term to be avoided per the NEC Style Manual and to be used at the discretion of the Authority Having Jurisdiction. 310.8 is more inclusive, covers metal sheaths, corrosion, and sunlight resistance. Since it is not specifically amended, it applies. Apparently, it is not deemed necessary to specify other requirements for Article 310 conductors.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-42 Log #1095 NEC-P14 **Final Action: Reject**
(501.30)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-63
Recommendation: Accept the proposal with the following revisions:
Grounding and Bonding Class 1, Division 1 and 2. Electrical wiring and equipment in Class 1, Division 1 and 2 locations shall be grounded and bonded in accordance with 501.30(A) and (B).
Exception: Nonincendive field wiring.
(A) Bonding. The single locknut, double-locknut, and locknut bushing type connections shall not be permitted to be the sole bonding means, but bonding jumpers with approved fittings, threaded metal raceway connections to thread couplings, explosion-proof unions, threaded bosses or openings of equipment or other approved means shall be used. Such means of bonding shall also apply to intervening metal raceways, cables, boxes and other enclosures, and other equipment between Class 1 locations and the point of grounding of service equipment of separately derived systems.
Exception: The specific bonding means of this section shall be required only to the building or other structure disconnecting means grounding terminal(s) or bus(es), if branch circuit(s) overcurrent protecton is provided on the load side of the building disconnecting means.
FPN: No change.
Substantiation: This provision should exempt nonincendive field wiring since it poses no-fire or explosion hazard for Class 1 atmospheres.
(A) presently does not prohibit single-locknut connections normally used with connectors for flexible conduits and Type MI cable. Since locknuts do perform a bonding function "sole" is added in (A). Threaded raceway connections to threaded couplings, threaded hubs, bosses and openings should be noted, as their absence begs the question, "are these other approved means?" There may not be a grounded circuit conductor in the supply circuit to a building disconnecting means if it is an ungrounded system or doesn't include a grounded circuit conductor, or there is no grounding electrode conductor per 250.32(A), Exception.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-43 Log #1120 NEC-P14 **Final Action: Reject**
(501.30(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-66
Recommendation: Accept the proposal with the following revisions:
Types of Equipment Grounding and Bonding Conductors. Flexible metal conduit, liquidtype flexible metal conduit, and flexible metal fittings shall contain or include a separate equipment grounding or bonding conductor.
Substantiation: Bonding conductors should be included in the heading and equipment grounding conductors in the text. 250.102 already applies.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-44 Log #1104 NEC-P14 **Final Action: Reject**
(501.40 Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-73
Recommendation: Accept the proposal with the following revisions:
...”without the use of removable handle ties”...
Substantiation: The same as the proposal.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no additional substantiation to support the recommendation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-45 Log #683 NEC-P14 **Final Action: Accept in Principle**
(501.100(B))

Submitter: Paul E. Guidry, Fluor Enterprises, Inc. / Rep. Associated Builders and Contractors
Comment on Proposal No: 14-75
Recommendation: (B) Class I, Division 2. In Class I, Division 2 locations, transformers ~~and capacitors~~ shall comply with 450.21 through 450.27. Capacitors shall comply with 460.2 through 460.28.
Substantiation: The panel statement seems to address the part of the proposal dealing with T codes, but doesn’t address the second part of the proposal. Capacitors are not addressed in 450.21 through 450.27. I believe this still needs to be fixed.
Panel Meeting Action: Accept in Principle
See Comment 14-46.
Panel Statement: See Panel Statement on 14-46.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-46 Log #1061 NEC-P14 **Final Action: Accept**
(501.100(B))

Submitter: Benjamin Porta, ENGlobal Engineering, Inc.
Comment on Proposal No: 14-75
Recommendation: Revise text to read as follows:
(B) Class I, Division 2. In Class I, Division 2 locations, transformers and ~~capacitors~~ shall comply with 450.21 through 450.27 and capacitors shall comply with 460.2 through 460.28.
Substantiation: It is my understanding that the intention of 501.100(B) is to apply non-hazardous area transformer and capacitor installation requirements to Class 1, Division 2 areas. Sections 450.21 through 450.27, referred to in 501.100(B), apply only to transformers. The proposed revision would clarify which NEC sections apply to capacitor installations in Class 1, Division 2 areas.
Panel Meeting Action: Accept
Accept, but editorially delete the word “and” after the word “transformer”.
Panel Statement: The panel understands that the word “and” should have been deleted.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-47 Log #1102 NEC-P14 **Final Action: Reject**
(501.105(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-77
Recommendation: Accept the proposal with the following revised portions:
(B)(1) Exception: Other approved types of enclosures shall be permitted if current interrupting contacts comply with one or more of the following:
(1) Are immersed in oil
(2) Are enclosed in a hermetically sealed chamber
(3) Are in nonincendive circuits
(4) Are listed for Class 1, Division 1 and 2
(B)(2) Exception: Other approved types of enclosures shall be permitted... (remainder unchanged).
(B)(3) Transformer windings, impedence coils, solenoids, and other windings that do not incorporate sliding or make-or-break contacts shall be provided with approved enclosures (remainder unchanged).
(B)(4) Assemblies. Where an assembly is made up of components covered in 501.195(B)(1), (B)(2), and (B)(3), a single assembly shall be permitted (remainder unchanged).
(B)(5) Fuses. Where enclosures covered in 501.105(B)(1) through (B)(4) are permitted, fuses for overcurrent protection of instrument circuits not subject to overloading in normal uses shall be permitted to be installed in such enclosures if each fuse or group of fuses is provided with a disconnecting means complying with 501.105(B)(1).
Substantiation: In (B)(1) Exception, “sealed against the entrance of gases or vapors” is superfluous; hermetically sealed is defined as impervious to external influences. In (B)(1), Exception No. 4 should include Class 1, Division 1; Class II and III have Division 2 locations. In (B)(5), groups of fuses should be included and disconnecting means other than a “switch” such as a circuit breaker should be noted. Although “general purpose” may or may not be understood to mean the same thing as the proposal, it is not NEC defined; “approved” is defined in Article 100.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must “include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted”. The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-48 Log #1097 NEC-P14 **Final Action: Reject**
(501.105(B)(6))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-78
Recommendation: Accept the proposal with the following revisions:
Connections. Process control instruments shall be permitted to be connected by a flexible cord that complies with 400.3 and 501.140(B)and a locking and grounding type attachment plug and receptacle if all the following apply:
(1) A disconnecting means in accordance with 501.105(B) is provided that simultaneously disconnects all ungrounded conductors supplying the receptacle(s).
(2) The rated current and voltage of the process control instrument(s) does not exceed 3 amperes and 120 volts, nominal.
(3) The flexible cord does not exceed 900 mm (3 ft) in length and contains an equipment grounding conductor.
(4) The receptacle(s) does not supply other equipment.
(5) A durable label is provided at the receptacle(s) warning: “Do not unplug under load.”
Substantiation: Editorial. The disconnecting means should include circuit breakers. The provision will facilitate replacement so that the statement is superfluous. The 3 ampere, 120 volt requirement should clearly apply to the instruments; present wording applies to the cord since that is the main subject of the provision. Present wording requires the receptacle(s) itself to bear the label.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must “include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted”. The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-49 Log #1135 NEC-P14 **Final Action: Reject**
(501.105(B)(6))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-78
Recommendation: Accept the proposal with the following revisions:
Connections. Process control instruments shall be permitted to be connected by a flexible cord(s) that complies with 400.3, and attachment plug and receptacle in accordance with the following:
(1) A disconnecting means complying with 501.105(B)(1) is provided to disconnect the receptacle(s).
(2) The current and voltage do not exceed 3 amperes at 120 volts, nominal.
(3) The flexible cord does not exceed 900 mm (3 ft).
(4) The flexible cord is an extra-hard or hard usage type containing an equipment grounding conductor.
(5) The flexible cord is protected by location or other approved means.
(6) The flexible cord is not subject to strain on terminations or is provided with approved strain relief means.
(7) The receptacle and attachment plug are locking and grounding type.
Substantiation: Cords should comply with 400.3; all extra-hard or hard usage types may not be suitable. An equipment grounding conductor should be required.
Panel Meeting Action: Reject

Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-50 Log #1116 NEC-P14 **Final Action: Reject**
(501.140)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-83
Recommendation: Accept the proposal with the following revisions:
Flexible Cords and Cables. Flexible cords and cables used in Class 1, Division 1 and 2 locations shall only be permitted as follows:
(1) In accordance with 400.3 and 501.10(A)(2), (B)(2), (B)(3), and 501.105(B)(6).
(2) For connections between portable lighting or other portable utilization equipment to the fixed portion of the supply circuit.
(3) For electric submersible pumps with means for removal without entering the wet pit. The flexible cord or cable shall be permitted to be installed in an approved raceway from the edge of the wet pit to the fixed wiring if the cord or cable is continuous without splice and the length of the cord or cable from the edge of the wet pit does not exceed 3.0 m (10 ft).
(5) The cords or cables are extra-hard usage type that comply with 400.3 and contain an equipment grounding conductor.
(6) Approved bushings are provided where cords or cables enter enclosures not required to be explosion-proof, and conduit seals are provided where the cords or cables enter an explosion-proof enclosure.
(7) The flexible cords and cables are installed or supported by approved means so there is no strain on terminations.
(8) Cord and cable lengths are continuous without splice.
Exception: This section does not apply to flexible cords and cables used for nonincendive field wiring.
FPN: No change.
Substantiation: "Shall be permitted" does not impose a requirement and is not enforceable per 90.5(B). This section doesn't include 501.10(A)(2)(2), (B)(2), (B)(3) and 501.105(B)(6)(6). There should be a length provision for wet pit cords to prevent unlimited length. All extra-hard usage type cords may not be suitable for the conditions, i.e., wet locations and sunlight resistance, electric vehicle cables. An EGC should be specified. Cords in nonincendive circuits should be exempt.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-51 Log #1096 NEC-P14 **Final Action: Reject**
(501.140(B)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-82
Recommendation: Accept the proposal.
Substantiation: "Approved" and the requirements of 110.14 are not synonymous, "approved" may be deemed to amend that section.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no additional substantiation to support the recommendation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-52 Log #2159 NEC-P14 **Final Action: Accept**
(501.140(B)(3))

Submitter: Jeremy Neagle, Intertek Testing Services
Comment on Proposal No: 14-86
Recommendation: This section should be deleted.
Substantiation: I agree that the submitter's proposal does not conform with the NFPA Regulations Governing Committee Projects for the reason stated. However, I also agree that 501.140(B)(3) is superfluous text which is already covered by 110.14.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-53 Log #2160 NEC-P14 **Final Action: Accept**
(501.140(B)(3))

Submitter: Jeremy Neagle, Intertek Testing Services
Comment on Proposal No: 14-87
Recommendation: This section should be deleted.
Substantiation: I agree that the submitter's proposal does not conform with the NFPA Regulations Governing Committee Projects for the reason stated. However, I also agree that 501.140(B)(3) is superfluous text which is already covered by 110.14.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-53a Log #CC1400 NEC-P14 **Final Action: Accept**
(501.140(B)(5))

Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-88
Recommendation: Instead of the action taken on Proposal 14-88, replace the text accepted by Proposal 14-88 with the following:
(5) In Division 1 locations or in Division 2 locations where the boxes, fittings, or enclosures are required to be explosionproof, the cord shall be terminated with a cord connector or attachment plug listed for the location or a cord connector installed with a seal listed for the location. In Division 2 locations where explosionproof equipment is not required, the cord shall be terminated with a listed cord connector or listed attachment plug.
Delete the existing exception to (5).
Substantiation: The text recommended in this comment clarifies the difference in requirements between Class I, Division 1 and Class I, Division 2.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-54 Log #1648 NEC-P14 **Final Action: Accept in Principle**
(501.140(B)(6))

Submitter: A. W. Ballard, Phoenix, NY
Comment on Proposal No: 14-89
Recommendation: Revise 501.140(B)(6) to add "except as provided in 501.140(A)(5)."
Substantiation: The Panel's acceptance of proposal (No. 14-85) to 501.140(A)(5) is meaningless unless 501.140(B)(6) is revised. The proposed revision will make it useful and address the concerns in the Panel Statement.
Panel Meeting Action: Accept in Principle
Revise 501.140(B)(6) reads as follows:
"(6) Be of continuous length. Where 501.140(A)(5) is applied, cords shall be of continuous length from the power source to the temporary portable assembly and from the temporary portable assembly to the utilization equipment."
Panel Statement: The panel agrees with the submitter's intent and has revised 501.140(B)(6) to apply positive language to the concept.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 502— CLASS II LOCATIONS

14-55 Log #150 NEC-P14 **Final Action: Accept**
(502)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-90
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal relative to the requirements for Class II, Division 2.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The Panel requests the TCC to refer to the text of 502.150(B) as shown in the Preprint. The action of the Panel is correctly reflected in that document. However, the text of 502.150(B) was inadvertently omitted from the ROP.
See the text of Article 502, Part III as shown in Comment 14-62.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-55a Log #CC1401 NEC-P14 **Final Action: Accept**
(502.10(A)(2)(5))

Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-95
Recommendation: Revise action on Proposal 14-95 from Accept to Accept in Principle.
Revise the Accepted wording as follows:
(5) Flexible cord listed for extra-hard usage and terminated with listed dusttight fittings ~~listed for the location~~. Where flexible cords are used, they shall comply with 502.140.
FPN: See 502.30(B) for grounding requirements where flexible conduit is used.
Substantiation: The comment clarifies the specific requirements between Class II, Division 1 and Class II, Division 2 by preserving the reference to section 502.140 for sealing. "Listed for the location" is addressed under Panel comment 14-64a on section 502.140.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-56 Log #2161 NEC-P14 **Final Action: Accept**
(502.10(B)(3))

Submitter: Jeremy Neagle, Intertek Testing Services
Comment on Proposal No: 14-98
Recommendation: Revise the second paragraph of 502.10(B)(3) as follows:
(Retain first paragraph and FPN).
"Separate nonincendive field wiring circuits shall be installed in accordance with one of the following:
(1) In separate cables
(2) In multiconductor cables where the conductors of each circuit are within a grounded metal shield
(3) In multiconductor cables or raceways, where the conductors of each circuit have insulation with a minimum thickness of 0.25 mm (0.01 in.)"
Substantiation: I agree with the panel action and statement. However, it is noted that the current text of 502.10(B)(3) inadvertently omits the permission to run separate non-incendive field wiring circuits as discreet conductors in a single raceway, the proposed change corrects this.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-57 Log #2141 NEC-P14 **Final Action: Accept**
(502.10(B)(7))

Submitter: Thomas Guida, TJG Services, Inc. / Rep. Champion Fiberglass, Inc.
Comment on Proposal No: 14-96
Recommendation: The Panel Action on this proposal should be Accept in Principle with the following action:
Add the following text to read as follows:
(7) In industrial establishments with restricted public access where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where metallic conduit does not provide sufficient corrosion resistance, Reinforced Thermosetting Resin Conduit (RTRC) factory elbows, and associated fittings, all marked with suffix -XW, and Schedule 80 PVC Conduit, factory elbows and associated fittings shall be permitted.
Substantiation: The potential for a corrosive atmosphere is present in many industrial applications and is not necessarily connected to the nature or level of the hazard present.
Panel Meeting Action: Accept
Add the proposed text as new 502.10(B)(1)(7).
Panel Statement: The panel notes that the correct location for the accepted new text is 502.10(B)(1)(7).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-58 Log #1118 NEC-P14 **Final Action: Reject**
(502.30(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-104
Recommendation: Accept the proposal with the following revisions:
(B) Types of Equipment Grounding and Bonding Conductors. Liquidtight flexible metal conduit and dusttight flexible connectors shall contain or provide a separate equipment grounding or bonding conductor.
Substantiation: Bonding conductors should be included in the heading. "Separate" covers "wire type." 250.102 already applies.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-59 Log #456 NEC-P14 **Final Action: Reject**
(502.100)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 14-111
Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:
(3) Metal Dusts. No transformer or capacitor shall be installed in a location where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be are capable of being present.
Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.
However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms may or can shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term may shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."
Since the use of the term may in this Section does not meet these either of these criteria, it should be changed.
Panel Meeting Action: Reject
Panel Statement: The term "may" is the correct term and it is not a violation of the style manual as it is not used as part of the mandatory rule. It is part of the conditional statement that sets up the mandatory rule.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-60 Log #1810 NEC-P14 **Final Action: Reject**
(502.100)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 14-90
Recommendation: As indicated in the following text revisions, for added user and code practitioner clarification, reinsert as applicable the terms "Group E", "Group F", and "Group G" into the action proposal modified texts as shown below:
502.100 Transformers and Capacitors.
(A) Class II, Division 1. In Class II, Division 1 locations, transformers and capacitors shall comply with 502.100(A)1) through (A)(2~~3~~).
(1~~3~~) Group E. No transformer or capacitor shall be installed in a Class II, Division 1, Group E location.
(2~~1~~) Group F or Group G, ~~Containing Liquid That Will Burn.~~
(a) Transformers and capacitors containing a liquid that will not burn shall be installed only in vaults complying with 450.41 through 450.48, or be identified as a complete assembly, including terminal connections for Class II locations.
(b) Transformers and capacitors containing a liquid that will burn shall be installed only in vaults complying with 450.41 through 450.48, and, in addition, (1), (2), and (3) shall apply.
(1) Doors or other openings communicating with the Division 1 location shall have self-closing fire doors on both sides of the wall, and the doors shall be carefully fitted and provided with suitable seals (such as weather stripping) to minimize the entrance of dust into the vault.
(2) Vent openings and ducts shall communicate only with the outside air.
(3) Suitable pressure-relief openings communicating with the outside air shall be provided.
~~(2) Group F or Group G, Not Containing Liquid That Will Burn. Transformers and capacitors that do not contain a liquid that will burn shall be installed in vaults complying with 450.41 through 450.48 or be identified as a complete assembly, including terminal connections for Class II locations. (3) Group E. No transformer or capacitor shall be installed in a Class II, Division 1, Group E location, where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be present.~~

Substantiation: 502.100 order was changed making Group E first, with its condition of not permitting the installation. Then Group F and Group G was clarified and the text was consolidated into the renumbered (a) and (b) paragraphs.
Panel Meeting Action: Reject
Panel Statement: While it appears that the submitters intent was only to provide clarification using the defined Group terms, the submitter has altered the texts in a number of areas which has created new material which has not been subject to public review, but also was probably not the intent of this submission.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-61 Log #2318 NEC-P14 **Final Action: Accept**
(502.112(A))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 14-90
Recommendation: Revise the text of 502.112(A) for clarity, as follows:
(A) Class II, Division 1. In Class II, Division 1 locations, switches, circuit breakers, motor controllers, ~~and~~ fuses, ~~including~~ pushbuttons, relays, and similar devices, shall be provided with enclosures identified for the location.
Substantiation: As currently written, the requirement seems to describe pushbuttons and relays as types of fuses. The proposed text in this comment offers a solution, but another solution might be to change the word "including" to the phrase "as well as."
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-62 Log #1811 NEC-P14 **Final Action: Accept in Principle in Part**
(502.115, 502.120, and 502.130)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 14-90
Recommendation: As indicated in the following text revisions, for added user and code practitioner clarification, reinsert as applicable the terms "Group
502.115 Switches, Circuit Breakers, Motor Controllers, and Fuses.
(A) Class II, Division 1. In Class II, Division 1 locations, switches, circuit breakers, motor controllers, and fuses, including pushbuttons, relays, and similar devices, shall be provided with enclosures identified for the location ~~dust ignitionproof enclosures.~~
(B) Class II, Division 2. In Class II Division 2 locations, enclosures for fuses, switches, circuit breakers, and motor controllers, including pushbuttons, relays, and similar devices, ~~shall be dusttight or otherwise~~ identified for the location.
502.120 Control Transformers and Resistors.
(A) Class II, Division 1. In Class II, Division 1 locations, control transformers, solenoids, impedance coils, resistors, and any overcurrent devices or switching mechanisms associated with them shall be provided with ~~have dust ignitionproof~~ enclosures identified for the ~~Class II~~ locations.
(B) Class II, Division 2. In Class II, Division 2 locations, transformers and resistors shall comply with 502.120(B)(1) through (B)(3).
(1) Switching Mechanisms. Switching mechanisms (including overcurrent devices) associated with control transformers, solenoids, impedance coils, and resistors shall be provided with enclosures ~~that are dusttight or otherwise~~ identified for the location.
(2) Coils and Windings. Where not located in the same enclosure with switching mechanisms, control transformers, solenoids, and impedance coils shall be provided with enclosures ~~that are tight metal housings without ventilating openings or shall be installed into dusttight or otherwise~~ identified for the location.
(3) Resistors. Resistors and resistance devices shall have ~~dust ignitionproof~~ enclosures ~~or otherwise~~ identified for the location ~~enclosures identified for Class II locations.~~
502.130 Luminaires. Luminaires shall comply with 502.130(A) and (B).
(B)(2) Fixed Lighting. Luminaires for fixed lighting shall be provided with enclosures that are ~~dusttight or otherwise~~ identified for the location ~~enclosures.~~
Substantiation: This action provides consistent language for Class II, Division 1 and Division 2 loations for the proposed text changes made during the ROP action.
Panel Meeting Action: Accept in Principle in Part
Art. 502 Part III
III. Equipment
502.100 Transformers and Capacitors.
(A) Class II, Division 1. In Class II, Division 1 locations, transformers and capacitors shall comply with 502.100(A)(1) through (A)(3).
(1) Containing Liquid That Will Burn. Transformers and capacitors containing a liquid that will burn shall be installed only in vaults complying with 450.41 through 450.48, and, in addition, (1), (2), and (3) shall apply.
(1) Doors or other openings communicating with the Division 1 location shall have self-closing fire doors on both sides of the wall, and the doors shall be carefully fitted and provided with suitable seals (such as weather stripping) to minimize the entrance of dust into the vault.
(2) Vent openings and ducts shall communicate only with the outside air.
(3) Suitable pressure-relief openings communicating with the outside air shall be provided.
(2) Not Containing Liquid That Will Burn. Transformers and capacitors that do not contain a liquid that will burn shall be installed in vaults complying with 450.41 through 450.48 or be identified as a complete assembly, including terminal connections ~~for Class II locations~~.
(3) Group E. No transformer or capacitor shall be installed in a Class II, Division 1, Group E location.
(B) Class II, Division 2. In Class II, Division 2 locations, transformers and capacitors shall comply with 502.100(B)(1) through (B)(3).
(1) Containing Liquid That Will Burn. Transformers and capacitors containing a liquid that will burn shall be installed in vaults that comply with 450.41 through 450.48.
(2) Containing Askarel. Transformers containing askarel and rated in excess of 25 kVA shall be as follows:
(1) Provided with pressure-relief vents
(2) Provided with a means for absorbing any gases generated by arcing inside the case, or the pressure-relief vents shall be connected to a chimney or flue that will carry such gases outside the building
(3) Have an airspace of not less than 150 mm (6 in.) between the transformer cases and any adjacent combustible material
(3) Dry-Type Transformers. Dry-type transformers shall be installed in vaults or shall have their windings and terminal connections enclosed in tight metal housings without ventilating or other openings and shall operate at not over 600 volts, nominal.
502.115 Switches, Circuit Breakers, Motor Controllers, and Fuses.
(A) Class II, Division 1. In Class II, Division 1 locations, switches, circuit breakers, motor controllers, and fuses, including pushbuttons, relays, and similar devices, shall be provided with enclosures identified for the location.
(B) Class II, Division 2. In Class II, Division 2 locations, enclosures for fuses, switches, circuit breakers, and motor controllers, including pushbuttons, relays, and similar devices, shall be dusttight or otherwise identified for the location.
502.120 Control Transformers and Resistors.
(A) Class II, Division 1. In Class II, Division 1 locations, control transformers, solenoids, impedance coils, resistors, and any overcurrent devices or switching mechanisms associated with them shall be provided with enclosures identified for the location.
(B) Class II, Division 2. In Class II, Division 2 locations, transformers and resistors shall comply with 502.120(B)(1) through (B)(3).
(1) Switching Mechanisms. Switching mechanisms (including overcurrent devices) associated with control transformers, solenoids, impedance coils, and resistors shall be provided with enclosures that are dusttight or otherwise identified for the location.
(2) Coils and Windings. Where not located in the same enclosure with switching mechanisms, control transformers, solenoids, and impedance coils shall be provided with enclosures that are dusttight or otherwise identified for the location.
(3) Resistors. Resistors and resistance devices shall have dust-ignitionproof enclosures that are dusttight or otherwise identified for the location.
502.125 Motors and Generators.
(A) Class II, Division 1. In Class II, Division 1 locations, motors, generators, and other rotating electrical machinery shall be in conformance with either of the following:
(1) Identified for the location
(2) Totally enclosed pipe-ventilated, meeting temperature limitations in 502.5
(B) Class II, Division 2. In Class II, Division 2 locations, motors, generators, and other rotating electrical equipment shall be totally enclosed nonventilated, totally enclosed pipe-ventilated, totally enclosed water-air-cooled, totally enclosed fan-cooled or dust-ignitionproof for which maximum full-load external temperature shall be in accordance with 500.8(D)(2) for normal operation when operating in free air (not dust blanketed) and shall have no external openings.
Exception: If the authority having jurisdiction believes accumulations of nonconductive, nonabrasive dust will be moderate and if machines can be easily reached for routine cleaning and maintenance, the following shall be permitted to be installed:
(1) Standard open-type machines without sliding contacts, centrifugal or other types of switching mechanism (including motor overcurrent, overloading, and overtemperature devices), or integral resistance devices
(2) Standard open-type machines with such contacts, switching mechanisms, or resistance devices enclosed within dusttight housings without ventilating or other openings
(3) Self-cleaning textile motors of the squirrel-cage type
502.128 Ventilating Piping.
Ventilating pipes for motors, generators, or other rotating electrical machinery, or for enclosures for electrical equipment, shall be of metal not less than 0.53 mm (0.021 in.) in thickness or of equally substantial noncombustible material and shall comply with all of the following:
(1) Lead directly to a source of clean air outside of buildings
(2) Be screened at the outer ends to prevent the entrance of small animals or birds

(3) Be protected against physical damage and against rusting or other corrosive influences

Ventilating pipes shall also comply with 502.128(A) and (B).

(A) Class II, Division 1. In Class II, Division 1 locations, ventilating pipes, including their connections to motors or to the dust-ignitionproof enclosures for other equipment, shall be dusttight throughout their length. For metal pipes, seams and joints shall comply with one of the following:

(1) Be riveted and soldered

(2) Be bolted and soldered

(3) Be welded

(4) Be rendered dusttight by some other equally effective means

(B) Class II, Division 2. In Class II, Division 2 locations, ventilating pipes and their connections shall be sufficiently tight to prevent the entrance of appreciable quantities of dust into the ventilated equipment or enclosure and to prevent the escape of sparks, flame, or burning material that might ignite dust accumulations or combustible material in the vicinity. For metal pipes, lock seams and riveted or welded joints shall be permitted; and tight-fitting slip joints shall be permitted where some flexibility is necessary, as at connections to motors.

502.130 Luminaires.

(A) Class II, Division 1. In Class II, Division 1 locations, luminaires for fixed and portable lighting shall comply with 502.130(A)(1) through (A)(4).

(1) Luminaires. Each luminaire shall be identified for the location and shall be clearly marked to indicate the maximum wattage of the lamp for which it is designed.

(2) Physical Damage. Each luminaire shall be protected against physical damage by a suitable guard or by location.

(3) Pendant Luminaires. Pendant luminaires shall be suspended by threaded rigid metal conduit stems, by threaded steel intermediate metal conduit stems, by chains with approved fittings, or by other approved means. For rigid stems longer than 300 mm (12 in.), permanent and effective bracing against lateral displacement shall be provided at a level not more than 300 mm (12 in.) above the lower end of the stem, or flexibility in the form of a fitting or a flexible connector listed for the location shall be provided not more than 300 mm (12 in.) from the point of attachment to the supporting box or fitting. Threaded joints shall be provided with set screws or other effective means to prevent loosening. Where wiring between an outlet box or fitting and a pendant luminaire is not enclosed in conduit, flexible cord listed for hard usage shall be permitted with a listed cord connector that maintains the protection technique where the cord enters the luminaire and the outlet box. Flexible cord shall not serve as the supporting means for a luminaire.

(4) Supports. Boxes, box assemblies, or fittings used for the support of luminaires shall be identified for Class II locations.

(B) Class II, Division 2. In Class II, Division 2 locations, luminaires shall comply with 502.130(B)(1) through (B)(5).

(1) Portable Lighting Equipment. Portable lighting equipment shall be identified for the location. They shall be clearly marked to indicate the maximum wattage of lamps for which they are designed.

(2) Fixed Lighting. Luminaires for fixed lighting shall be provided with enclosures that are dusttight or otherwise identified for the location. Each luminaire shall be clearly marked to indicate the maximum wattage of the lamp that shall be permitted without exceeding an exposed surface temperature in accordance with 500.8(D)(2) under normal conditions of use.

(3) Physical Damage. Luminaires for fixed lighting shall be protected from physical damage by suitable guards or by location.

(4) Pendant Luminaires. Pendant luminaires shall be suspended by threaded rigid metal conduit stems, by threaded steel intermediate metal conduit stems, by chains with approved fittings, or by other approved means. For rigid stems longer than 300 mm (12 in.), permanent and effective bracing against lateral displacement shall be provided at a level not more than 300 mm (12 in.) above the lower end of the stem, or flexibility in the form of an identified fitting or a flexible connector shall be provided not more than 300 mm (12 in.) from the point of attachment to the supporting box or fitting. Where wiring between an outlet box or fitting and a pendant luminaire is not enclosed in conduit, flexible cord listed for hard usage shall be permitted when terminated with a listed cord connector that maintains the protection technique. Flexible cord shall not serve as the supporting means for a luminaire.

(5) Electric-Discharge Lamps. Starting and control equipment for electric-discharge lamps shall comply with the requirements of 502.120(B).

502.135 Utilization Equipment.

(A) Class II, Division 1. In Class II, Division 1 locations, all utilization equipment shall be identified for the location.

(B) Class II, Division 2. In Class II, Division 2 locations, all utilization equipment shall comply with 502.135(B)(1) through (B)(4).

(1) Heaters. Electrically heated utilization equipment shall be identified for the location.

Exception: Metal-enclosed radiant heating panel equipment shall be permitted to be dusttight and marked in accordance with 500.8(C).

(2) Motors. Motors of motor-driven utilization equipment shall comply with 502.125(B).

(3) Switches, Circuit Breakers, and Fuses. Enclosures for switches, circuit breakers, and fuses shall be comply with 502.115(B).

(4) Transformers, Solenoids, Impedance Coils, and Resistors. Transformers, solenoids, impedance coils, and resistors shall comply with 502.120(B).

502.140 Flexible Cords — Class II, Divisions 1 and 2.

Flexible cords used in Class II locations shall comply with all of the following:

(1) Be of a type listed for extra-hard usage

Exception: Flexible cord listed for hard usage as permitted by 502.130(A)(3) and (B)(4).

(2) Contain, in addition to the conductors of the circuit, an equipment grounding conductor complying with 400.23

(3) Be connected to terminals or to supply conductors in an approved manner

(4) Be supported by clamps or by other suitable means in such a manner that there will be no tension on the terminal connections

(5) Be provided with suitable seals to prevent the entrance of dust where the flexible cord enters boxes or fittings that are required to be dust-ignitionproof

502.145 Receptacles and Attachment Plugs.

(A) Class II, Division 1. In Class II, Division 1 locations, receptacles and attachment plugs shall be of the type providing for connection to the equipment grounding conductor of the flexible cord and shall be identified for Class II locations.

(B) Class II, Division 2. In Class II, Division 2 locations, receptacles and attachment plugs shall be of the type that provides for connection to the equipment grounding conductor of the flexible cord and shall be designed so that connection to the supply circuit cannot be made or broken while live parts are exposed.

502.150 Signaling, Alarm, Remote-Control, and Communications Systems; and Meters, Instruments, and Relays.

FPN: See Article 800 for rules governing the installation of communications circuits.

(A) Class II, Division 1. In Class II, Division 1 locations, signaling, alarm, remote-control, and communications systems; and meters, instruments, and relays shall comply with 502.150(A)(1) through (A)(3).

(1) Contacts. Switches, circuit breakers, relays, contactors, fuses and current-breaking contacts for bells, horns, howlers, sirens, and other devices in which sparks or arcs may be produced shall be provided with enclosures identified for the location.

Exception: Where current-breaking contacts are immersed in oil or where the interruption of current occurs within a chamber sealed against the entrance of dust, enclosures shall be permitted to be of the general-purpose type.

(2) Resistors and Similar Equipment. Resistors, transformers, choke coils, rectifiers, thermionic tubes, and other heat-generating equipment shall be provided with enclosures identified for the location.

Exception: Where resistors or similar equipment are immersed in oil or enclosed in a chamber sealed against the entrance of dust, enclosures shall be permitted to be of the general-purpose type.

(3) Rotating Machinery. Motors, generators, and other rotating electrical machinery shall comply with 502.125(A).

(B) Class II, Division 2. In Class II, Division 2 locations, signaling, alarm, remote-control, and communications systems; and meters, instruments, and relays shall comply with 502.150(B)(1) through (B)(4).

(1) Contacts. Contacts shall comply with 502.150(A)(1) or shall be installed in enclosures that are dusttight or otherwise identified for the location.

Exception: In nonincendive circuits, enclosures shall be permitted to be of the general-purpose type.

(2) Transformers and Similar Equipment. The windings and terminal connections of transformers, choke coils, and similar equipment shall comply with 502.120(B)(2).

(3) Resistors and Similar Equipment. Resistors, resistance devices, thermionic tubes, rectifiers, and similar equipment shall comply with 502.120(B)(3).

(4) Rotating Machinery. Motors, generators, and other rotating electrical machinery shall comply with 502.125(B).

Panel Statement: The intent of the submitter to provide consistent language in the revised 14-90 panel action had been addressed in the Draft of the Proposed 2011 edition of NFPA 70, National Electrical Code, which accurately reflects the Panel's action at the ROP meeting. However, the released ROP document did not reflect the Panel actions accurately. The text shown here as the Panel Meeting Action is the correct Panel action.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-63 Log #457 NEC-P14 **Final Action: Reject**
(502.115(A)(2))

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 14-115
Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:

(2) Metal Dusts. In locations where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics ~~may be~~ are capable of being present, (remainder of the text to remain the same).

Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.

However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms *may* or *can* shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term *may* shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."

Since the use of the term *may* in this Section does not meet these either of these criteria, it should be changed.

Panel Meeting Action: Reject
Panel Statement: The term "may" is the correct term and it is not a violation of the style manual as it is not used as part of the mandatory rule. It is part of the conditional statement that sets up the mandatory rule.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-63a Log #CC1402 NEC-P14 **Final Action: Accept**
(502.130(A)(3))

Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-117, 14-118
Recommendation: Revise text to read as follows:

(3) Pendant Luminaires. Pendant luminaires shall be suspended by threaded rigid metal conduit stems, by threaded steel intermediate metal conduit stems, by chains with approved fittings, or by other approved means. For rigid stems longer than 300 mm (12 in.), permanent and effective bracing against lateral displacement shall be provided at a level not more than 300 mm (12 in.) above the lower end of the stem, or flexibility in the form of a fitting or a flexible connector listed for the location shall be provided not more than 300 mm (12 in.) from the point of attachment to the supporting box or fitting. Threaded joints shall be provided with set screws or other effective means to prevent loosening. Where wiring between an outlet box or fitting and a pendant luminaire is not enclosed in conduit, flexible cord listed for hard usage shall be permitted to be ~~when terminated with a listed cord connector that maintains the type of protection~~ used in accordance with section 502.10(A)(2)(5) ~~where the cord enters the luminaire and the outlet box~~. Flexible cord shall not serve as the supporting means for a luminaire.

Substantiation: The comment addresses a concern that the proposal would exclude the use of a separate seal that is listed for the location. The reference to 502.10(A)(2)(5) ensures compliance with the methods in section 502.140 for sealing of the cord.

The removal of "where the cord enters the luminaire and the outlet box" was done as the existing wording "Where wiring between an outlet box or fitting and a pendant luminaire" is self evident as to where the termination is being accomplished.

This comment also addresses a correlation problem between the Accepted in Principle text for proposals 14-117 and 14-118 and also addresses the 14-64 comment from the TCC.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-63b Log #CC1403 NEC-P14 **Final Action: Accept**
(502.140)

Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-123
Recommendation: Revise the wording Accepted in Principle via Proposal 14-123 as follows:

(5) In Division 1 locations, the cord shall be terminated with a cord connector listed for the location or a listed cord connector installed with a seal listed for the location. In Division 2 locations, the cord shall be terminated with a listed dusttight cord connector.

Substantiation: The comment clarifies the differences in sealing requirements between Class II, Division 1 and Class II, Division 2.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-64 Log #151 NEC-P14 **Final Action: Accept**
(502.140)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-123
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal with regard to the final text.

This action will be considered the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The Panel believes it has addressed the TCC's comment by means of its Panel Comment 14-63a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-65 Log #2162 NEC-P14 **Final Action: Accept**
(502.140(3))

Submitter: Jeremy Neagle, Intertek Testing Services
Comment on Proposal No: 14-125
Recommendation: This section should be deleted.
Substantiation: I agree that the submitter's proposal does not conform with the NFPA Regulations Governing Committee Projects for the reason stated. However, I also agree that 502.140(3) is superfluous text which is already covered by 110.14.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-66 Log #2163 NEC-P14 **Final Action: Accept**
(502.140(3))

Submitter: Jeremy Neagle, Intertek Testing Services
Comment on Proposal No: 14-126
Recommendation: This section should be deleted.
Substantiation: I agree that the submitter's proposal does not conform with the NFPA Regulations Governing Committee Projects for the reason stated. However, I also agree that 502.140(3) is superfluous text which is already covered by 110.14.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-67 Log #458 NEC-P14 **Final Action: Reject**
(502.150)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 14-128
Recommendation: The Proposal action should have been to Accept in Principle in Part and changed to read as follows:

(1) Contacts. Switches, circuit breakers, relays, contactors, fuses and current-breaking contacts for bells horns, howlers, sirens, and other devices in which sparks or arcs ~~may be~~ are capable of being produced (the rest of the text to remain unchanged).

Substantiation: Continue to reject the change for 502.150(B)(1). This proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.

However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms *may* or *can* shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term *may* shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."

Since the use of the term *may* in this Section does not meet these criteria, it should be changed.

Panel Meeting Action: Reject
Panel Statement: The term "may" is the correct term and it is not a violation of the style manual as it is not used as part of the mandatory rule. It is part of the conditional statement that sets up the mandatory rule.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 503 — CLASS III LOCATIONS

14-68 Log #1812 NEC-P14 **Final Action: Reject**
(503.6)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 14-130
Recommendation: Delete 503.6 Zone Equipment.
Substantiation: The scope of Article 503 covers the requirements for electrical and electronic equipment and wiring for all voltages in Class III, Division 1 and 2 locations where fire or explosion hazards may exist due to ignitable fibers/flyings. Unlike Article 506 which addresses both combustible dusts and ignitable fibers/flyings, Article 503 does not deal with combustible dusts. Article 503 as currently written does not deal with any Zone concept. The Class III, Divisions are defined in Article 500.5(D) and a careful comparison between a defined Class III location and a Zone 20 location will reveal differences. For instance:
(1) Class III locations are not likely to have fibers/flyings in suspension in air in quantities sufficient to produce ignitable mixtures, while Zone 20, 21 and 22 may have fibers/flyings present in air in quantities sufficient to produce ignitable mixtures.
(2) A Class III, Division 1 location is a location in which easily ignitable fibers/flyings are handled, manufactured, or used; whereas, a Zone 20 is a location in which ignitable fibers/flyings are present continuously.

This proposal to create a new section attempts to create an equipment installation equivalency between Class III and the Zone 20, 21, and 22 concepts without providing sufficient justification for this action. It is our assertion that those wishing to apply the Zone concept under Article 506 should stay in Article 506, and not apply Article 503.

Panel Meeting Action: Reject
Panel Statement: The panel has determined that there are no adverse safety implications by adding this Section and recognizing the equipment being added by the original proposal as equivalent or superior to that currently permitted in a Class III location.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:

WECHSLER, D.: The Panel action should have been to accept this comment and not included this section in this code.

While the panel action states that 'the panel determined that there are no adverse safety implications by adding this Section', the Panel continues to support separation under Articles in 502 for combustible dusts and 503 for ignitible flyings. Article 502 has been provided with correlation with Article 506.

Proposal 14-130 was substantiated on the basis that a Zone 20 could be alternatively classified as Class III, Division 1, and Zone 22, as Class III, Division 2. However there has been no technical substantiation made to correlate Zone 20 or 22 with Class III materials. Additionally no technical information has been provided to substantiate that the materials addressed under Article 503 are in fact the same as those addressed under Article 506.

The scope of Article 503 covers the requirements for electrical and electronic equipment and wiring for all voltages in Class III, Division 1 and 2 locations where fire or explosion hazards may exist due to ignitable fibers/flyings. Unlike Article 506 which addresses both combustible dusts and ignitable fibers/flyings, Article 503 does not deal with combustible dusts. Article 503 as currently written does not deal with any Zone concept. The Class III, Divisions are defined in Article 500.5(D) and a careful comparison between a defined Class III location and a Zone 20 location will reveal differences. For instance:

(1) Class III locations are not likely to have fibers/flyings in suspension in air in quantities sufficient to produce ignitable mixtures, while Zone 20, 21 and 22 may have fibers/flyings present in air in quantities sufficient to produce ignitable mixtures.

(2) A Class III, Division 1 location is a location in which easily ignitable fibers/flyings are handled, manufactured, or used; whereas, a Zone 20 is a location in which ignitable fibers/flyings are present continuously.

Those wishing to apply the Zone concept under Article 506 should stay in Article 506, and not apply Article 503.

14-69 Log #594 NEC-P14 **Final Action: Accept in Part**
(503.10(A))

TCC Action: The Technical Correlating Committee directs that the changes made by Code-Making Panel 14 appear in 503.10(A)(1)(1), and that the wording of parts (2), (3) and (4) of 503.10(A) remain as Accepted in Principle by Proposal 14-131, since the code panel did not indicate any changes to these parts, but also did not indicate in their panel action what should be done with them.

The Technical Correlating Committee also directs that the word "Type" be inserted in front of the words "PVC" and "RTRC" in the modified language as accepted in this comment.

Submitter: John L. Simmons, Florida East Coast JATC / Rep. IBEW
Comment on Proposal No: 14-131
Recommendation: Revise the proposed text to read as follows:

(A) Class III, Division I.

(1) In Class III, Division 1 locations the following wiring method shall be permitted:

(1) Rigid metal conduit ~~rigid nonmetallic~~ Schedule 80 PVC conduit, XW-type RTRC conduit, intermediate metal conduit electrical metallic tubing, dusttight wireways, or...

Substantiation: This comment was generated by a Task Group from CMP-14. The 2008 NEC changed the term rigid nonmetallic conduit to rigid polyvinyl chloride conduit; Type PVC. The change also moved RTRC conduit to a new Article 355. The 2005 NEC Handbook references the 2004 UL General Information for Electrical Equipment Directory (White Book) in its commentary under the definition of Rigid Nonmetallic Conduit in 352.2. "The White Book describes two types of rigid nonmetallic conduct recognized for use in accordance with 352.1. Rigid nonmetallic Schedule 40 and Schedule 80 PVC conduit, (DZYR) and 2, reinforced thermosetting resin conduit (DZKT)." The 2008 NEC gave RTRC its own article and revised the title of Article 352, but it did not change the fact that both are still rigid nonmetallic conduit. This is evidenced by the fact that the definition of PVC in 352.2 states that it is a "rigid nonmetallic conduit" and the definition of RTRC in 355.2 states that it is a "rigid nonmetallic conduit".

Schedule 80 PVC is being specified to be consistent with rigid metal conduit, IMC, and EMT, all of which can be used where subject to physical damage. XW-Type RTRC is suitable according to the UL "White Book", for use in locations subject to physical damage. The revised text corrects and brings the section up-to-date with the changes made in the 2008 NEC and includes both rigid nonmetallic types.

Panel Meeting Action: Accept in Part

Revise 503.10(A) to read:

Class III, Division 1. In Class III, Division 1 locations, the wiring method shall be rigid metal conduit, ~~rigid nonmetallic~~ PVC conduit, RTRC conduit, intermediate metal conduit, electrical metallic tubing, dusttight wireways, or Type MC or MI cable with listed termination fittings.

Panel Statement: The Panel agrees with the submitter's revision, but does not believe that the substantiation provides a reason to restrict PVC conduit to Schedule 80 or RTRC to type XW. As such, the Panel accepts the proposal with Schedule 80 and XW type references removed.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-69a Log #CC1404 NEC-P14 **Final Action: Accept**
(503.10(A)(3)(4))

Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-131
Recommendation: Revise the wording Accepted in Principle via Proposal 14-131as follows:
(4) Interlocked armor Type MC cable having an overall jacket of suitable polymeric material and ~~provided~~ installed with listed dusttight termination fittings ~~listed for the location~~.
Substantiation: The comment addresses the minimum requirement for an MC cable fitting when flexible connections are required and correlates with the requirements for MC cable fittings in section 503.10(A)(1).
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-70 Log #2139 NEC-P14 **Final Action: Accept in Principle**
(503.10(B))

Submitter: Thomas Guida, TJG Services, Inc. / Rep. Champion Fiberglass, Inc.
Comment on Proposal No: 14-132
Recommendation: The Panel Action on this proposal should be Accept in Principle with the following action:
Revise 503.10(A) by replacing the generic term "rigid nonmetallic conduit" with "rigid polyvinyl chloride conduit, reinforced thermosetting resin conduit.
Substantiation: This change aligns the description of these conduits with their description in this Code in Articles 352 and 355.
Panel Meeting Action: Accept in Principle
See Comment 14-69.
Panel Statement: See Comment 14-69.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-71 Log #1101 NEC-P14 **Final Action: Reject**
(503.10(B) Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-133
Recommendation: Accept the proposal.
Substantiation: "Likely" is a term used many times in the NEC. See Explanation of Negative Vote for Proposal 7-9, 320.12(1) in the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: No new substantiation to support a change was provided. CMP 14 also reviewed the negative comment on 7-9 and could not find any substantiation there either.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-72 Log #1100 NEC-P14 **Final Action: Reject**
(503.10(B)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-134
Recommendation: Accept the proposal as intended for (A)(3) with the following revisions:
Nonincendive field wiring shall be permitted using any approved wiring method permitted for unclassified locations.
(A)(3)(1) In separate cables or raceways.
Substantiation: "Approved" permits the Authority Having Jurisdiction to enforce "permitted" and "not permitted" uses. This section modifies/amends those provisions by "any wiring method." Present wording of (A)(3)(1) does not require separate raceways; is that the intent?
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-73 Log #1099 NEC-P14 **Final Action: Reject**
(503.128(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-141
Recommendation: Accept the proposal with the following revisions:
Be protected by approved means where subject to and or likely to be subject to physical damage or corrosion.
Substantiation: "Likely" is a term used many times in the NEC. Damage or corrosion may not be evident at the time of installation or inspection, but circumstances can indicate it is probable.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-74 Log #459 NEC-P14 **Final Action: Reject**
(503.130(A) and (B))

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 14-142
Recommendation: The Proposal action should have been to Accept in Principle in Part and changed to read as follows:
(B) Physical Damage. A luminaire that ~~may be~~ is exposed to physical damage shall be protected by a suitable guard.
Substantiation: Continue to reject the change for 503.130(A)
This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.
However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms *may* or *can* shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term *may* shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."
Since the use of the term *may* in this Section does not meet these criteria, it should be changed.
Panel Meeting Action: Reject
Panel Statement: The term "may" is the correct term and it is not a violation of the style manual as it is not used as part of the mandatory rule. It is part of the conditional statement that sets up the mandatory rule.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-75 Log #1098 NEC-P14 **Final Action: Reject**
(503.130(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-142
Recommendation: Accept the proposal with the following revisions:
Change "identified" to "approved" in the proposal.
Substantiation: The panel statement did not address why lampholders, signs, should not be included. This type of equipment can be hazardous if infiltrated with combustible fibers/flyings or if sparks can escape. "Likely" is a term used many times in the NEC.
Panel Meeting Action: Reject
Panel Statement: The substantiation does not support the recommendation to change "identified" to "approved".
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-76 Log #460 NEC-P14 **Final Action: Reject**
(503.130(B))

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 14-143
Recommendation: The Proposal action should have been to Accept in Principle in Part and changed to read as follows:
(B) Physical Damage. A luminaire that ~~may be~~ is exposed to physical damage shall be protected by a suitable guard.
Substantiation: Continue to reject the change for 503.130(A).
This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.
However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms may or can shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term may shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."
Since the use of the term may in this Section does not meet these criteria, it should be changed.
Panel Meeting Action: Reject
Panel Statement: The term "may" is the correct term and it is not a violation of the style manual as it is not used as part of the mandatory rule. It is part of the conditional statement that sets up the mandatory rule.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-77 Log #461 NEC-P14 **Final Action: Reject**
(503.130(B))

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 14-144
Recommendation: The Proposal action should have been to Accept in Principle in Part and changed to read as follows:
(B) Physical Damage. A luminaire that ~~may be~~ is exposed to physical damage shall be protected by a suitable guard.
Substantiation: Continue to reject the change for 503.130(A).
This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The submitter of the proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.
However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms *may* or *can* shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term *may* shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."
Since the use of the term *may* in this section does not meet these criteria, it should be changed.
Panel Meeting Action: Reject
Panel Statement: The term "may" is the correct term and it is not a violation of the style manual as it is not used as part of the mandatory rule. It is part of the conditional statement that sets up the mandatory rule.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-78 Log #777 NEC-P14 **Final Action: Reject**
(503.135(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-151
Recommendation: Accept the proposal and revise as follows:
In (A), change "acceptable" to "approved."
In (B) Contact conductors shall be accessible only to authorized or qualified persons, or guarded.
Substantiation: Unnecessary references increase the bulk of the NEC which I have seen grow from a 5 in. by 7 in. size that fit in a hip pocket to the size of a large telephone book. "Acceptable" does not specify to whom; "approval" is by the Authority Having Jurisdiction. "Guarded" in Article 100 provides for noncontact by persons or objects.
Panel Meeting Action: Reject
Panel Statement: The panel notes that this comment was submitter on Proposal 14-151, and the correct code reference is 503.155(A) and (B).
The recommended text does not add clarity to the Code.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-79 Log #779 NEC-P14 **Final Action: Reject**
(503.140)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-145
Recommendation: Accept the proposal with the following revisions:
(1) Be of an extra-hard usage type in accordance with 400.3.
(2) No change.
(3) Be installed or supported in a manner to prevent strain on terminations.
(4) Be provided with approved means to prevent entrance of fibers/flyings, where the cord enters boxes or other enclosures or fittings.
Substantiation: All extra-hard usage cords may not be suitable for the application; e.g., where not designated with "W" for wet locations and sunlight resistance, or those with EV designations. Some installations can be such, without clamps so there is no tension on terminations.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-80 Log #778 NEC-P14 **Final Action: Accept**
(503.140(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-149
Recommendation: Delete the existing text.
Substantiation: This is already covered by 110.14 which applies unless considered as modified by "approved" which is "acceptable to the Authority Having Jurisdiction." The NEC Style Manual 4.1 states: "Do not use a reference if the requirement is already covered by 90.3."
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-80a Log #CC1405 NEC-P14 **Final Action: Accept**
(503.140(5))

Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-146
Recommendation: Revise the Accepted in Principle wording as follows:
(5) Be terminated with a listed dusttight cord connector. ~~that maintains the protection technique or with an attachment plug listed for the location to prevent the entrance of fibers/flyings where the cord enters enclosures, boxes, or fittings permitted when terminated with a listed cord connector that maintains the type of protection.~~
Substantiation: The comment addresses grammatical errors with the Accepted in Principle proposal wording and removes unnecessary explanative text. Correlates with the intended requirements in 503.10(A)(1).
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 504 — INTRINSICALLY SAFE SYSTEMS

14-81 Log #776 NEC-P14 **Final Action: Reject**
(504.3)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-153
Recommendation: Accept the proposal.
Substantiation: Whether emphasized or not, other applicable provisions apply and I assume 4.1 of the NEC Style Manual is not limited to proposers.
Panel Meeting Action: Reject
Panel Statement: The purpose of this section is to establish the precedence of Article 504 over other parts of the Code.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-82 Log #775 NEC-P14 **Final Action: Reject**
(504.10(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-154
Recommendation: Accept the proposal and revise as follows:
Approved enclosures of any type suitable for the use shall be permitted for intrinsically safe apparatus.
Substantiation: "General Purpose" is not defined; is a fence, wall, or cardboard box a general purpose enclosure?
Panel Meeting Action: Reject
Panel Statement: The recommended text of this comment differs from that which the submitter submitted in the original proposal. The panel cannot determine which version the submitter wants to be accepted.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-83 Log #152 NEC-P14 **Final Action: Accept**
(504.50(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-163
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 5-102 which was "Accepted in Principle" by Code-Making Panel 5.
This action shall be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: If the reference to 250.30(A)(7), Grounding Electrode, has been changed by Panel 5 action to 250.30(A)(4), Grounding Electrode, then the original proposal should be accepted.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-84 Log #781 NEC-P14 **Final Action: Reject**
(504.60(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-164
Recommendation: Accept the proposed text.
Substantiation: Reference is unnecessary and the NEC Style Manual 4.1 states: "Do not use a reference if already covered by 90.3, whether or not related to locations." This provision is also covered by 504.3, Article 250, Part V, 501.30, 502.30, and 503.30.
Panel Meeting Action: Reject
Panel Statement: The reference to 250.100 is necessary, since it deals specifically with hazardous (classified) locations. It does not improve the usability of the Code to delete this reference.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-85 Log #1119 NEC-P14 **Final Action: Reject**
(504.80(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-166
Recommendation: Accept the proposal with the following revisions:
Wiring. Raceways, cables, cable trays and other wiring methods and enclosures for intrinsically safe systems shall be identified with permanently affixed durable labels with the wording "Intrinsic Safe Wiring." The labels shall be visible after installation and placed so the wiring method can be easily traced through the entire accessible length of the wiring method including the portions that are separated by walls, ceilings, floors, or partitions. Spacing between labels shall not exceed 7.5 m (25 ft).
Exception: As otherwise permitted in 504.80(C).
FPN No. 1 and 2 no change.
Substantiation: Labels should only be required where the wiring method is accessible. Color coding per 504.80(C) should be included. "Accessible" length removes need for the exception.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-86 Log #782 NEC-P14 **Final Action: Reject**
(504.80(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-167
Recommendation: Accept the proposal with the following revisions:
(C) Color Coding. Color coding shall be permitted to identify intrinsically safe system circuit conductors, if they have light blue colored insulation, and no other system conductors on the premises have light blue colored insulation. Light blue color coding of raceways, cables, cable trays, and enclosures that contain intrinsically safe wiring shall be permitted in lieu of identification specified in 504.80(B).
Substantiation: The provision for color coding of raceways, etc. should include boxes that are not "junction" boxes and relieve the requirements of 504.80(B), which are not changed by (C).
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 505 — CLASS I, ZONE 0, 1, AND 2 LOCATIONS

14-87 Log #1278 NEC-P14 **Final Action: Accept**
(505.2)

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-170
Recommendation: Proposal 14-170 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Substantiation: Proposal 14-170 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Panel Meeting Action: Accept
Panel Statement: See also Panel Comment 14-88a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
COSPOLICH, J.: The IEEE is concerned regarding the way in which combustible dust and ignitable fibers and flyings are addressed in ISA-60079-0 and ISA -60079-11 and the suggestion that this is contrary to the current NEC and NFPA 499 standards. ISA-60079-0 and ISA-60079-11 applies to Zone 20, Zone 21, and Zone 22.

14-88 Log #1813 NEC-P14 **Final Action: Reject**
(505.4)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 14-171
Recommendation: Restore the publication and revision dates for referenced documents mentioned in the Fine Print Notes (FPNs) as they appeared in 505.4 of the 2008 NEC,.
Substantiation: While fine print notes are intended to provide reference information only, document publication and revision dates are important. Just like the date of the NEC revision needs to be retained for general information affecting designs and installations made at a point in time. These dated references also serve an important task. Deleting the publication and revision information would be a disservice for uses and practitioners of this Code.
Panel Meeting Action: Reject
Panel Statement: See Panel Comment 14-88a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:

JONES, R.: CMP-14's action on this comment was appropriate. Members of a technical committee are not required to purchase a document that is being requested to be referenced. The entity submitting the proposal is required to include copies of the document with the proposal. The NFPA Regulations Governing Committee Projects, section 4.3.3(f), states: "Two copies of any document(s) (other than an NFPA document) being proposed as a reference standard or publication are to be submitted with the proposal."

At the ROP stage, CMP-14 agreed that an updated version of the ISA standard would be appropriate; however, the proposed version had not been published. The ten members involved with the development of the ANSI/ISA 60079 series of standards were not in agreement at the ROC stage, therefore, all members of CMP-14 needed to review the proposed standard in order to determine if it was proper to reference the new version in the NEC.

14-88a Log #CC1406 NEC-P14 **Final Action: Reject**
(505.4 (A))

TCC Action: The Technical Correlating Committee directs that this comment and Proposal 14-171 be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative on the comment.

The Technical Correlating Committee notes that consensus was not achieved to support the original proposal.

Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-171
Recommendation: Revise the reference to ANSI/ISA-60079-0 in FPN No. 7 of 505.4(B) to read as follows:
ANSI/ISA-60079-0 (12.00.01)-2005, *Electrical Apparatus for Use in Class I, Zones 0, 1, and 2 Hazardous (Classified) Locations: General Requirements.*
Substantiation: The 2005 edition date is being retained because some members of Panel 14 have not had the opportunity to review the 2009 published document. The published copy is still not available for sale as of the time of the ROC meeting. ANSI/ISA standards in Fine Print Notes in the affected sections of this ROC having edition dates shall reflect the current edition date, except for the ANSI/ISA 60079-0 document. Where there are no edition dates, no action will be taken.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 9 Negative: 5
Explanation of Negative:

BRIESCH, E.: The Comment should be rejected. The Panel's substantiation suggests that Panel members have not had the opportunity to review the 2009 edition of ANSI/ISA-60079-0. There are dozens of referenced standards in Articles 500-516 and I'm sure the Panel members have not reviewed most of them. They are accepted in acknowledgement of the fact that they are developed by a group of experts on the particular subject under an accredited standards development process. The 2009 edition of ANSI/ISA-60079-0 has been developed under the ANSI accredited process just as have all of the other referenced product standards. To single out this one standard is inappropriate. In addition, all of the other 2009 editions of the ANSI/ISA-60079 series of standards were accepted and they must be used in conjunction with the general requirements found in the 2009 edition of ANSI/ISA-60079-0. Furthermore, product certifiers will be using the current editions of the standards to evaluated equipment. If the 2005 edition of ANSI/ISA-60079-0 is referenced in the NEC this will create confusion to users of the Code especially since product markings required by the standard will not be reflected in the Code text. Articles 505 and 506 require that equipment be listed and, although the product standards are only found in Fine Print Notes, they do provide the guidance as to what requirements listed equipment should meet.

KUCZKA, J.: The comment should be rejected. Standards committees are comprised with members that are considered to be subject matter experts. The basis to accept the comment on the premise that the code panel members have not had time to review the standard is not a valid argument in that many of the members on this panel that supported the change to update the reference date did serve on the standards develop committee. As there are multiple references in FPN's to national standards this basis to not support an update to the most current standard could be used in any argument where the dissenter wishes to exclude requirements based on the content of any particular national standard. These arguments are better left to the full membership of the standards development committees.

LAWRENCE, JR., W.: This Panel comment should be rejected.

(1)The substantiation states that the Panel had not had the opportunity to review the 2009 edition of ANSI/ISA 60079-0. Note that 7 members of Panel 14 are also members of the ISA Technical Committee that developed and balloted on that standard, so those Panel 14 members had reviewed the document and confirmed that fact at the meeting. When the Panel was queried during the discussion as to which members had reviewed the prior (2005) edition of ANSI/ISA 60079-0, it was those same Panel 14 members who confirmed that they had reviewed it. The remainder of the Panel 14 members had not reviewed the 2005 edition. It would appear that the fact that Panel members only had 7 weeks to review the 2009 edition was not a factor in their failure to do so. To single out this one standard is not appropriate as I doubt that the majority of the dozens of other reference standards in Articles 505 and 506 have been reviewed by the Panel members. These documents have been processed through the ANSI consensus process and therefore represent an agreed position, noting that consensus does not require unanimity.

(2) The statement made regarding the document not being available for sale was not true. An on-line search made at the meeting did not show the 2009 edition, but a subsequent call to ISA revealed a data entry error as the cause. ISA later confirmed availability as shown below:

Eliana Beattie states:

Just to clarify, ANSI/ISA-60079-0 (12.00.01)-2009 has been available for purchase since the ISA S&P Board approval on 14 October 2009. Unfortunately, we were delayed over coordination of the ISA and UL standards' covers and by data entry on our end. However, any customer who e-mailed, phoned, faxed, or mailed in an order for the 2009 edition of ISA-60079-0 would have been able to place an order for the standard.

MASSEY, L.: This panel action should be REJECTED based on the following:

1. The 2009 edition of ANSI/ISA 60079-0 was available for review by the entire panel several weeks prior to the ROC meeting. Contrary to the statement made during the meeting, the published standard was available from ISA as of October 14, 2009. In addition, of the current CMP14, there are ten members directly involved in the development of the ANSI/ISA 60079 series of standards who had ample time to review these documents during the development process.

2. The applicable panel statement for rejecting the inclusion of updated ISA standards was "The panel agrees with the concept of the proposal, but cannot accept it because the standard involved has not been published." This requirement has been satisfied with the publication of the subject standard. As no other objections were included in the ROP, the most current ISA standard should be referenced in the FPNs. Section 4.3.5.1 of the NFPA Regulations Governing Committee Projects clearly indicates that the panel statement shall be "...sufficiently detailed so as to convey the TC's rationale for its action so that rebuttal may, if desired, be submitted during the Comment period." Considering that the CMP-14 concerns related to Proposal 14-171 (as modified by subsequent CMP14 and TCC rulings) have been FULLY SATISFIED, one could infer that the only logical CMP-14 action is to REJECT Comment 14-88a.

NEAGLE, J.: The panel action should be to reject this comment. The substantiation for the comment indicates that ANSI/ISA 60079-0 was not available at the time of the ROC meeting and that panel members had not had an opportunity to review the document. As confirmed by the standard publisher the document was available as of October 14, 2009, which should have allowed ample time for review.

Comment on Affirmative:

JONES, R.: CMP-14's action on this comment was appropriate. Members of a technical committee are not required to purchase a document that is being requested to be referenced. The entity submitting the proposal is required to include copies of the document with the proposal. The NFPA Regulations Governing Committee Projects, section 4.3.3(f), states: "Two copies of any document(s) (other than an NFPA document) being proposed as a reference standard or publication are to be submitted with the proposal."

At the ROP stage, CMP-14 agreed that an updated version of the ISA standard would be appropriate; however, the proposed version had not been published. The ten members involved with the development of the ANSI/ISA 60079 series of standards were not in agreement at the ROC stage, therefore, all members of CMP-14 needed to review the proposed standard in order to determine if it was proper to reference the new version in the NEC.

14-89 Log #1133 NEC-P14 **Final Action: Reject**
(505.5(C)(2)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-15
Recommendation: Accept the proposal.
Substantiation: See the Explanation of Negative Vote for Proposal 7-9, 320.12(1) in the 2010 ROP. The term "likely" is used in 500.5(D) and many other sections.
Panel Meeting Action: Reject
Panel Statement: The term "may" is the correct term and it is not a violation of the style manual as it is not used as part of the mandatory rule. It is part of the conditional statement that sets up the mandatory rule.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-90 Log #1279 NEC-P14 **Final Action: Accept**
(Table 505.9(C)(2))

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-181
Recommendation: Proposal 14-181 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Substantiation: Proposal 14-181 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Panel Meeting Action: Accept
Panel Statement: See also Panel Comment 14-88a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-91 Log #1280 NEC-P14 **Final Action: Accept**
(Table 505.9(C)(2)(4))

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-182
Recommendation: Proposal 14-182 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Substantiation: Proposal 14-182 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Panel Meeting Action: Accept
Panel Statement: See also Panel Comment 14-88a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-92 Log #1814 NEC-P14 **Final Action: Reject**
(505.9(C)(2), FPN)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 14-179
Recommendation: Delete FPN 4.
Substantiation: The 'EPL' concept is not recognized in the National Electrical Code. There is also no US Code requirement for this marking. The Code uses fine print notes as a means of alerting and providing additional information to requirements within this Code. If this marking is used, it is applied just like any other supplemental added non-required marking. The US Code does not need to address this non-requirement by a fine print note. Therefore, this FPN should be deleted.
Panel Meeting Action: Reject
Panel Statement: The Fine Print Note adds clarity for the marking that will be found on the equipment.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
WECHSLER, D.: The Panel action should have been to accept this comment and not include this FPN in this code.

The Equipment Protection Level or EPL concept is not currently recognized in the NEC nor any other NFPA standard.

It is also difficult to understand the benefit for including a new fine print note which informs, but does not define what to do about a very high, high or enhanced level of ignition sensitivity protection, which would normally be of concern in working with hazardous classified locations.

Lastly, this added note does not even state that this marking is not a required US marking and therefore can be ignored totally.

In actual fact, the EPL was developed by the IEC in response to actions taken by the European Legislative action, ATEX, which was attempting to deal with the fact that under that hazardous area classification identification system, equipment formerly was marked for the protection design applied and not for the hazardous area classification. The IEC created this additional scheme to address that which simply existed in the US Class-Division scheme. Example, equipment designed and listed as a protection under explosionproof can be used in a Class I, Division 1 location and it so marked Class I, Division 1. The EPL concept is addressed to some degree in IEC 60079-0, and in the 2009 revision of ISA 60079-0. However it was the action of CMP-14 under CP1406 not to recognized ISA 60079-0 2009 but only 60079-0, 2005 which did not support EPL.
Comment on Affirmative:
SIMMONS, J.: The addition of the new FPN is for design purposes and not in concert with the intention of the NEC, as stated in 90.1(C). The continual addition of FPNs to refer the reader to other standards is creating confusion. References to other standards should be restricted to Annex A.

With the ever-changing technology of the electrical industry, the tendency to add FPNs will continue. As this continues, the NEC will become more like a design manual than a document for the "practical safeguarding of persons and property". It is already difficult to keep the documents listed in the FPNs up to date. Confusion is generated where a document date listed in the NEC is not the current document date.

Some users will point out that FPNs are not enforceable. This being true, why do we have so much unenforceable information in the NEC? This comment should be accepted and the proposed FPN should not be added to the NEC.

14-93 Log #1817 NEC-P14 **Final Action: Reject**
(505.9(C)(5), FPN 1)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 14-231
Recommendation: Delete FPN 1.
Substantiation: The 'EPL' concept is not recognized in the National Electrical Code. There Is also no US Code requirement for this marking. The Code uses fine print notes as a means of alerting and providing additional information to requirements within this Code. If this marking is used, it is applied just like any other supplemental added non-required marking. The US Code does not need to address this non-requirement by a fine print note. Therefore, this FPN should be deleted.
Panel Meeting Action: Reject
Panel Statement: The Fine Print Note adds clarity for the marking that will be found on the equipment.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
WECHSLER, D.: The Panel action should have been to accept this comment and not include this FPN in this code.

The Equipment Protection Level or EPL concept is not currently recognized in the NEC nor any other NFPA standard.

It is also difficult to understand the benefit for including a new fine print note which informs, but does not define what to do about a very high, high or enhanced level of ignition sensitivity protection, which would normally be of concern in working with hazardous classified locations.

Lastly, this added note does not even state that this marking is not a required US marking and therefore can be ignored totally.

In actual fact, the EPL was developed by the IEC in response to actions taken by the European Legislative action, ATEX, which was attempting to deal with the fact that under that hazardous area classification identification system, equipment formerly was marked for the protection design applied and not for the hazardous area classification. The IEC created this additional scheme to address that which simply existed in the US Class-Division scheme. Example, equipment designed and listed as a protection under explosionproof can be used in a Class I, Division 1 location and it so marked Class I, Division 1. The EPL concept is addressed to some degree in IEC 60079-0, and in the 2009 revision of ISA 60079-0. However it was the action of CMP-14 under CP1406 not to recognized ISA 60079-0 2009 but only 60079-0, 2005 which did not support EPL.
Comment on Affirmative:
SIMMONS, J.: The addition of the new FPN is for design purposes and not in concert with the intention of the NEC, as stated in 90.1(C). The continual addition of FPNs to refer the reader to other standards is creating confusion. References to other standards should be restricted to Annex A.

With the ever-changing technology of the electrical industry, the tendency to add FPNs will continue. As this continues, the NEC will become more like a design manual than a document for the "practical safeguarding of persons and property". It is already difficult to keep the documents listed in the FPNs up to date. Confusion is generated where a document date listed in the NEC is not the current document date.

Some users will point out that FPNs are not enforceable. This being true, why do we have so much unenforceable information in the NEC? This comment should be accepted and the proposed FPN should not be added to the NEC.

14-94 Log #153 NEC-P14 **Final Action: Accept**
(505.9(D)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-183
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal with regard to the accepted language in Proposal 14-184.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel confirms that the word "additional" has been deleted.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-95 Log #154 NEC-P14 **Final Action: Accept**
(505.9(D)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-184
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal with regard to the accepted language in Proposal 14-183.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel confirms that the action taken on the wording is correct.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-96 Log #155 NEC-P14 **Final Action: Accept**
(505.9(E))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-188
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered since it violates the Manual of Style for NFPA Technical Committee Documents section 2.3.1.2.4 which requires dates of publication for referenced documents.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: ASME date is 1983, ISO dates are 1980, ignore 60079-1 date.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-97 Log #11 NEC-P14 **Final Action: Reject**
(505.9(F))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 14-189
Recommendation: Accept this proposal in principle in part by accepting the recommended text for 505.9(F) with the reference to 506.15 corrected to 505.16 and continuing to reject the recommendation for a fine print note.
Substantiation: The panel statement about adding conductive optical fiber cables assumes that conductive optical fiber cables are not already covered. The current text covers optical fiber cables that have "conductors that are capable of carrying current". See the definition of conductive optical fiber cable in 770.2; a cable that has "conductors that are capable of carrying current" is a conductive optical fiber cable. A typical conductive optical fiber cable has a metallic strength member.
Composite optical fiber cables have electrical conductors that are intentionally current-carrying. Section 770.3(A) states that conductive optical fiber cables are classified as electrical cables in accordance with the type of electrical conductors.
Panel Meeting Action: Reject
Panel Statement: No additional substantiation provided for the addition of "conductive optical fiber cable".
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-98 Log #156 NEC-P14 **Final Action: Accept**
(505.9(F))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-189
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal. The panel did not indicate whether it accepted the proposed FPN or not.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel confirms that the Fine Print Note is not to be added, to remain consistent with the Panel Action on Proposal 14-35.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-99 Log #157 NEC-P14 **Final Action: Accept**
(505.15(B))

TCC Action: The Technical Correlating Committee directs that this comment continue to be reported as "Accept", with the notation that the Informational Note for Part (B)(1)(c) will be maintained for the final text of this section.
The Informational Note was deleted at the proposal stage, and reinstated at the comment stage, without any panel comment for so doing.
Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-191
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action as it relates to 4.1.1 of the NEC Style Manual concerning references to entire articles.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise text as follows:
(B) Class I, Zone 1.
(1) General. In Class I, Zone 1 locations, the wiring methods in (B)(1)(a) through (B)(1)(f) shall be permitted.
(a) All wiring methods permitted by 505.15(A).
(b) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation,
and where the cable is not subject to physical damage, Type MC-HL cable listed for use in Class I, Zone 1 or Division 1 locations, with a gas/vaportight continuous corrugated metallic sheath, an overall jacket of suitable polymeric material, a separate equipment grounding conductor(s) in accordance with 250.122, and terminated ~~provided~~ with ~~termination~~ fittings listed for the application.
Type MC-HL cable shall be installed in accordance with the provisions of Article 330, Part II.
~~FPN: See 330.12 for restrictions on use of Type MC cable.~~
(c) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation,
and where the cable is not subject to physical damage, Type ITC-HL cable, listed for use in Class I, Zone 1 or Division 1 locations, with a gas/vaportight continuous corrugated metallic sheath, an overall jacket of suitable polymeric material and terminated ~~provided~~ with ~~termination~~ fittings listed for the application.
FPN: See 727.4 and 727.5 for restrictions on use of Type ITC cable.
(d) Type MI cable terminated with ~~termination~~ fittings listed for Class I, Zone 1 or Division 1 locations. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings.
(e) Threaded rigid metal conduit, or threaded steel intermediate metal conduit.
(f) Type PVC conduit and Type RTRC conduit shall be permitted where encased in a concrete envelope a minimum of 50 mm (2 in.) thick and provided with not less than 600 mm (24 in.) of cover measured from the top of the conduit to grade. Threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway. An equipment grounding conductor shall be included to provide for electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.
(2) Flexible Connections. Where necessary to employ flexible connections, flexible fittings listed for Class I, Zone 1 or Division 1 locations or flexible cord in accordance with the provisions of 505.17 terminated with a listed cord connector that maintains the type of protection shall be permitted.

Panel Statement: As there is no "Article" for Type MC-HL Cable, a reference to Part II of Article 330 (Type MC Cable) is required to specify what installation requirements are to be applied for Type MC-HL Cable. (Add Part II, as shown.) The panel believes that a reference to all of Article 727 is appropriate as the application of ITC-HL cable requires the application of all sections of Article 727.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-100 Log #1281 NEC-P14 **Final Action: Accept**
(505.15(C)(1)(h))

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-198
Recommendation: Proposal 14-198 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Substantiation: Proposal 14-198 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Panel Meeting Action: Accept
Panel Statement: See Panel Comment 14-88a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-101 Log #158 NEC-P14 **Final Action: Accept**
(505.16(E)(3))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-204
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered since it violates the Manual of Style for NFPA Technical Committee Documents section 2.3.1.2.4 which requires dates of publication for referenced documents.

In addition, the Technical Correlating directs that that panel revise the meeting action text to comply with the NEC Style Manual.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The correct date is 2003.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-102 Log #1130 NEC-P14 **Final Action: Reject**
(505.21 Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-212
Recommendation: Accept the proposal with the following revisions:
... "without the use of removable handle ties."
Substantiation: Handle ties that can be removed should not be permitted for safety reasons.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no additional substantiation to support the recommendation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-103 Log #1127 NEC-P14 **Final Action: Reject**
(505.25(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-215a
Recommendation: Accept the proposal with the following revisions:

Types of Equipment Grounding Conductors and Equipment Bonding Conductors. Flexible metal conduit, liquidtight flexible metal conduit, and flexible metal fittings shall contain a separate equipment grounding conductor or equipment bonding conductor.
Substantiation: The heading should reflect what is in the text and the text should include equipment grounding conductors. 250.102(E) and 250.134(B) apply.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-103a Log #CC1409 NEC-P14 **Final Action: Accept in Principle**
(505.26)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Accept in Principle" by accepting all the proposed changes indicated by the panel, except revising the last sentence to read as follows:

"Process-connected electrical equipment that does not rely on a single process seal or is listed and marked "single seal" or "dual seal" shall not be required to be provided with an additional means of sealing." to conform with the NEC Style Manual.
Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-204
Recommendation: Revise text to read as follows:

505.26 Process Sealing

This section applies to process connected equipment which includes, but is not limited to, canned pumps, submersible pumps, flow, pressure, temperature, or analysis measurement instruments. A process seal is a device to prevent the migration of process fluids from the designed containment into the external electrical system.

Process connected electrical equipment that incorporates a single process seal, such as a single compression seal, diaphragm, or tube to prevent flammable or combustible fluids from entering a conduit or cable system capable of transmitting fluids, shall be provided with an additional means to mitigate a single process seal failure. The additional means may include, but is not limited to the following: ~~One of the following means shall be provided to prevent process fluids from entering the electrical raceway or cable system:~~

~~(1) Process connected electrical equipment that incorporates a single process seal, such as single compression seal, diaphragm, or tube to isolate flammable or combustible fluids from entering a conduit or cable system capable of transmitting fluids, shall be provided with an additional means to mitigate a single process seal failure. The additional means may include, but is not limited to the following:~~

(1) ~~a.~~ A suitable barrier meeting the process temperature and pressure conditions that the barrier will be subjected to upon failure of the single process seal. There shall be a vent or drain between the single process seal and the suitable barrier. Indication of the single process seal failure shall be provided by visible leakage, an audible whistle, or other means of monitoring.

(2) ~~b.~~ A listed Type MI cable assembly, rated at not less than 125 percent of the process pressure and not less than 125 percent of the maximum process temperature (in degrees Celsius), installed between the cable or conduit and the single process seal.

(3) ~~c.~~ A drain or vent located between the single process seal and a conduit or cable seal. The drain or vent shall be sufficiently sized to prevent overpressuring the conduit or cable seal above 6 in. water column (1493 Pa). Indication of the single process seal failure shall be provided by visible leakage, an audible whistle, or other means of monitoring.

~~(2)~~ Process-connected electrical equipment that does not rely on a single process seal or is listed and marked "single seal" or "dual seal" need not be provided with an additional means of sealing.

FPN: For construction and testing requirements for process sealing for listed and marked "single seal" or "dual seal" requirements refer to ANSI/ISA-12.27.01:2003, Requirements for Process Sealing Between Electrical Systems and Potentially Flammable or Combustible Process Fluids.
Substantiation: This is a companion comment to 14-38 which addressed the same issue in Article 501. The changes indicated will maintain alignment between identical process sealing requirements that exist in Article 501 and 505.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 506 — ZONE 20, 21, AND 22 LOCATIONS FOR COMBUSTIBLE DUSTS, FIBERS, AND FLYINGS

14-104 Log #1282 NEC-P14 **Final Action: Reject**
(506.1)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-218
Recommendation: Proposal 14-218 should be accepted. This proposal was rejected since it was contingent upon acceptance of Proposal 14-228. Proposal 14-228 was rejected since the standard involved was not published. ISA-60079-0 and UL 60079-0 have been approved by their respective organizations and are now published.
Substantiation: Proposal 14-218 should be accepted. This proposal was rejected since it was contingent upon acceptance of Proposal 14-228. Proposal 14-228 was rejected since the standard involved was not published. ISA-60079-0 and UL 60079-0 have been approved by their respective organizations and are now published.

Panel Meeting Action: Reject
Panel Statement: See Panel Comment 14-88a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 9 Negative: 5
Explanation of Negative:

BRIESCH, E.: The Comment to accept Proposal 14-218 should be accepted. See my explanation of Negative on Comments 14-88a and 14-114.

KUCZKA, J.: The comment should be Accepted. The panel statement to reject proposal 14-218 was contingent upon acceptance of proposal 14-228. The panel statement to reject proposal 14-228 indicated that the proposal could not be accepted because the standard involved had not yet been published. Since the standard is now published the panel's action to reject this comment offers a new substantiation to reject based on a total different statement in that the panel members had not had time to review the standard. See explanation of negative on comment 14-88a.

LAWRENCE, JR., W.: The comment to accept Proposal 14-218 should be accepted. See my reasons for vote on Comment 14-88a and Comment 14-114.

MASSEY, L.: This panel action should be REJECTED based on the following:
1. The 2009 edition of ANSI/ISA 60079-0 was available for review by the entire panel several weeks prior to the ROC meeting. Contrary to the statement made during the meeting, the published standard was available from ISA as of October 14, 2009. In addition, of the current CMP14, there are ten members directly involved in the development of the ANSI/ISA60079 series of standards who had ample time to review these documents during the development process.
2. The applicable panel statement for rejecting the inclusion of updated ISA standards was "The panel agrees with the concept of the proposal, but cannot accept it because the standard involved has not been published." This requirement has been satisfied with the publication of the subject standard. As no other objections were included in the ROP, the most current ISA standard should be referenced in the FPNs. Section 4.3.5.1 of the NFPA Regulations Governing Committee Projects clearly indicates that the panel statement shall be "...sufficiently detailed so as to convey the TC's rationale for its action so that rebuttal may, if desired, be submitted during the Comment period." Considering that the CMP-14 concerns related to Proposal 14-218 have been FULLY SATISFIED, one could infer that the only logical CMP-14 action is to ACCEPT Comment 14-104.

NEAGLE, J.: This comment was rejected based on the action on comment 14-88a. The standard in question was available as of October 14, 2009. See reasons for negative vote on comment 14-88a.

Comment on Affirmative:

JONES, R.: CMP-14's action on this comment was appropriate. Members of a technical committee are not required to purchase a document that is being requested to be referenced. The entity submitting the proposal is required to include copies of the document with the proposal. The NFPA Regulations Governing Committee Projects, section 4.3.3(f), states: "Two copies of any document(s) (other than an NFPA document) being proposed as a reference standard or publication are to be submitted with the proposal."

At the ROP stage, CMP-14 agreed that an updated version of the ISA standard would be appropriate; however, the proposed version had not been published. The ten members involved with the development of the ANSI/ISA 60079 series of standards were not in agreement at the ROC stage, therefore, all members of CMP-14 needed to review the proposed standard in order to determine if it was proper to reference the new version in the NEC.

14-105 Log #1815 NEC-P14 **Final Action: Accept**
(506.1, FPN)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 14-217
Recommendation: Restore the publication and revision dates for referenced documents mentioned in the Fine Print Notes (FPNs) as they appeared in 506.1of the 2008 NEC.
Substantiation: While fine print notes are intended to provide reference information only, document publication and revision dates are important. Just like the date of the NEC revision needs to be retained for general information affecting designs and installations made at a point in time, these dated references also serve an important task. Deleting the publication and revision information would be a disservice for users and practitioners of this Code.
Panel Meeting Action: Accept
Panel Statement: The correct dates are 2004.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-106 Log #159 NEC-P14 **Final Action: Accept**
(506.2)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-219
Recommendation: The Technical Correlating Committee directs that the number, title and edition of the document from which this extract is taken be listed at the end of the extract in accordance with the NEC Style Manual 4.3.2.3.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See Panel Comment 14-88a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-107 Log #160 NEC-P14 **Final Action: Accept**
(506.2)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-221
Recommendation: The Technical Correlating Committee directs that the number, title and edition of the document from which this extract is taken be listed at the end of the extract in accordance with NEC Style Manual 4.3.2.3.

The action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See Panel Comment 14-88a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-108 Log #1293 NEC-P14 **Final Action: Reject**
(506.2.Combustible Dust)

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 14-221
Recommendation: We request CMP-14 reconsider the action on Proposal 14-221 and reject the proposal.
Substantiation: The definition of combustible dust is covered in NFPA 499, which is referenced in 500.4(B). The classification of the area should be determined by professionals using NFPA 499. That complete process is required to be documented in accordance with 500.4(A). The area classification process and documentation is supposed to occur as part of the design process and prior to the installation. NEC 90.1(C) indicates this "Code" is not intended as a design manual. NEC 90.2(A) indicates the "Code" covers installation requirements for electrical systems. The proper place for the definition of "Combustible Dust" is NFPA 499. In an effort to minimize the chance of owner/operators assuming area classification is an installation responsibility, enforcement recommends this information be excluded from the NEC and remain in NFPA 499. Including the definition in multiple locations, including the NEC, increases the number of correlation responsibilities required as documents are revised without increasing safety.
Panel Meeting Action: Reject
Panel Statement: See Panel Statement on Comment 14-7.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:

JONES, R.: See negative explanation on Comment 14-7.

OFFERDAHL, D.: See My Explanation of Negative on 14-7.

Comment on Affirmative:

SIMMONS, J.: James Carpenter is correct in his assessment of the negative effects of adding this definition to the NEC. Section 90.1 tells us, in subsection (A) that "the purpose of this Code is the practical safeguarding of persons and property from the hazards arising from the use of electricity." The addition of the definition does not increase the safety of Class II installations. Subsection (C) (Intention) of Section 90.1 goes on to indicate that "this Code is not intended as a design specification or an instruction manual for untrained persons."

The addition of a definition that states a combustible dust is "any finely divided solid material that is 420 microns or smaller in diameter and presents a fire or explosion hazard" does nothing to help an inspection agency insure the safety of a Class II installation. It also does not help the installer have a better understanding of what is required to safely install Class II wiring.

Area classification is a design function which requires the use of many standards in addition to the NEC. Typically the design professional determines the area classification and provides that information to the inspection agency and installer in the form of plans and specifications. The design professional may need to refer to more than one standard to determine the appropriate area classification.

The inclusion of selected references from other standards in the NEC could, in some cases, lead to unsafe installations where uninformed designers rely strictly on the NEC to design projects for hazardous locations believing that the important parts of the other standards have been referenced in the NEC. There has been a tendency in the past few code cycles to add more and more "design" references, particularly in the form of FPNs, to the NEC. As the number of design references increase, the NEC becomes more difficult for inspectors and installers to use. As 90.1 indicates, the NEC is not intended to be used as a design manual.

14-109 Log #1816 NEC-P14 **Final Action: Accept**
(506.5(1) FPN 1, 506.5(2), FPN No. 1, and 506.5(3), FPN No. 1)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 14-223
Recommendation: Restore the publication and revision dates for referenced documents mentioned in the Fine Print Notes (FPNs) as they appeared in 2008 NEC, 506.5 (1) FPN 1, 506.5(2) FPN 1, and 506.5(3) FPN 1.
Substantiation: While fine print notes are intended to provide reference information only, document publication and revision dates are important. Just like the date of the NEC revision needs to be retained for general information affecting designs and installations made at a point in time, these dated references also serve an important task. Deleting the publication and revision information would be a disservice for users and practitioners of this Code.
Panel Meeting Action: Accept
Panel Statement: The correct dates are 2004.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-110 Log #1128 NEC-P14 **Final Action: Reject**
(506.5(B)(3)(c))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-225
Recommendation: Accept the proposal.
Substantiation: There are no means to prevent ventilation failure due to a tripped circuit breaker, blown fuse, utility power outage, or motor failure.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no additional information to support the recommendation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-111 Log #161 NEC-P14 **Final Action: Accept**
(506.5(B)(3), FPN 2)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-226
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal and correlate with the action taken on Proposal 14-227.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel confirms that its action on Proposal 14-226 is correct.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-112 Log #162 NEC-P14 **Final Action: Accept**
(506.5(B)(3), FPN 2)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-227
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal and correlate with the action taken on Proposal 14-226.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See Comment 14-111.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-113 Log #1043 NEC-P14 **Final Action: Reject**
(506.5(B)(3), FPN 2)

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 14-226
Recommendation: Revise text as follows:

FPN No. 2: Zone 22 locations usually include outlets from bag filter vents, because in the event of a malfunction there can be emission of combustible mixtures; locations near equipment that has to be opened at infrequent intervals or equipment that from experience can easily form leaks where, due to pressure above atmospheric, dust will blow out; pneumatic equipment, flexible connections that can become damaged, etc.; storage locations for bags containing dusty product, since failure of bags can occur during handling, causing dust leakage; and locations where controllable dust layers are formed that are likely to be raised into explosive dust –air mixtures. Only if the layer is removed by cleaning before hazardous dust–air mixtures can be formed is the area designated as unclassified.
Substantiation: Adding the term "as" as shown provides greater clarity and understanding in the context.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that adding the word "as" adds clarity.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-114 Log #1283 NEC-P14 **Final Action: Reject**
(506.6)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-228
Recommendation: Proposal 14-228 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Substantiation: Proposal 14-228 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Panel Meeting Action: Reject
Panel Statement: The Technical Committee on Electrical Equipment in Chemical Atmospheres is responsible for Group definitions in combustible dust atmospheres.

See also action on Panel Comment 14-88a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 9 Negative: 5
Explanation of Negative:

BRIESCH, E.: This Comment to accept Proposal 14-228 should be accepted. Proposal 14-228 was rejected based on the fact that the 2009 editions of ANSI/UL60079-0 and ANSI/ISA-60079-0 had not yet been published. These documents are now published. In addition, the Panel Statement rejecting this Comment is incorrect. The Standards Council ruling of April 27, 1995 states, "the National Electrical Code has the authority to establish classifications, divisions and group structure. The Technical Committee on Electrical Equipment in Chemical Atmospheres has the authority to classify chemical hazards into the appropriate Groups, including the criteria providing the basis for group structure such as test methods for determining the chemical atmospheres." Therefore, CMP14 is acting within its authority in establishing the dust groups in Article 506.

KUCZKA, J.: The comment should be Accepted. The panel statement to reject proposal 14-228 indicated that the proposal could not be accepted because the standard involved had not yet been published. The panel statement to reject the comment stipulates that the Technical Committee on Electrical Equipment in Chemical Atmospheres is responsible for Group definitions in combustible dust atmospheres, however the NFPA Standards Council has previously ruled that the NEC has the authority to establish such classification groups.

LAWRENCE, JR., W.: The comment to accept Proposal 14-228 should be accepted.

The Panel statement on Proposal 14-228 was "The panel cannot accept the proposal because the standard involved has not been published." Comment 14-114 confirmed that the standards in question had been published, thus addressing the Panel statement as shown in the ROP. The NFPA Regulations Governing Committee Projects includes requirements for statements as follows: "… shall include a statement, preferably technical in nature, on the reason for the TC action. Such statement shall be sufficiently detailed so as to convey the TC's rationale for its action so that rebuttal may, if desired, be submitted during the Comment period…." It would appear that the Panel statement was addressed by the submitted comment. However, in rejecting the comment, a new and different Panel statement was prepared. Was the initial statement then not in conformance with the Regulations? Did it represent the position of the Panel? Further complicating the issue is that fact that this new Panel statement that "The Technical Committee on Electrical Equipment in Chemical Atmospheres is responsible for Group definition in combustible dust atmospheres" is not correct. Panel 14 members were misled at the ROC meeting by incorrect quoting of the NFPA Standards Council direction regarding "groups". NFPA Standards Council Decision SC 95-6 states "…the *National Electrical Code* has the authority to establish classification, divisions, and group structure. …" Panel 14 therefore does have the authority to establish the dust Groups in Article 506 and should do so.

MASSEY, L.: This panel action should be REJECTED based on the following:

1. The 2009 edition of ANSI/ISA 60079-0 was available for review by the entire panel several weeks prior to the ROC meeting. Contrary to the statement made during the meeting, the published standard was available from ISA as of October 14, 2009. In addition, of the current CMP14, there are ten members directly involved in the development of the ANSI/ISA60079 series of standards who had ample time to review these documents during the development process.

2. The applicable panel statement for rejecting the inclusion of updated ISA standards was "The panel agrees with the concept of the proposal but cannot accept it because the standard involved has not been published." This requirement has been satisfied with the publication of the subject standard. As no other objections were included in the ROP, the most current ISA standard should be referenced in the FPNs. Section 4.3.5.1 of the NFPA Regulations Governing Committee Projects clearly indicates that the Panel statement shall be "...sufficiently detailed so as to convey the TC's rationale for its action so that rebuttal may, if desired, be submitted during the Comment period." Considering that the CMP-14 concerns related to Proposal 14-228 have been FULLY SATISFIED, one could infer that the only logical CMP-14 action is to ACCEPT Comment 14-114. The new concerns raised by CMP-14 in the Panel Statement to Comment 14-114 were not part of the original Panel Statement on Proposal 14-228 and, therefore, should not be used as a basis to reject this comment as they were not subject to rebuttal during the Comment period as required by section 4.3.5.1 of the NFPA Regulations Governing Committee Projects.

3. Even if it were appropriate to include an entirely new technical justification during the comment period, the Panel Statement to Comment 14-114 is inaccurate. The panel was presented with a misrepresentation of fact contrary to the unsubstantiated statement included in the ROC regarding responsibility for defining material groups, NFPA Standards Council Decision SC 95-6 makes it clear that "... the National Electrical Code has the authority to establish classifications, divisions, and group structure." The same decision made it clear that "...The Technical Committee on Electrical Equipment in Chemical Atmospheres has the authority to CLASSIFY chemical hazards in the appropriate Groups." Based on this, Comment 14-114 should be ACCEPTED.

NEAGLE, J.: The panel statement states that material Group definitions are the responsibility of the Technical Committee on Electrical Equipment in Chemical Atmospheres. The NFPA Standards Council has previously confirmed that CMP-14 has the responsibility for establishing material Groups.

Comment on Affirmative:

JONES, R.: CMP-14's action on this comment was appropriate. Members of a technical committee are not required to purchase a document that is being requested to be referenced. The entity submitting the proposal is required to include copies of the document with the proposal. The NFPA Regulations Governing Committee Projects, section 4.3.3(f), states: "Two copies of any document(s) (other than an NFPA document) being proposed as a reference standard or publication are to be submitted with the proposal."

At the ROP stage, CMP-14 agreed that an updated version of the ISA standard would be appropriate; however, the proposed version had not been published. The ten members involved with the development of the ANSI/ISA 60079 series of standards were not in agreement at the ROC stage, therefore, all members of CMP-14 needed to review the proposed standard in order to determine if it was proper to reference the new version in the NEC.

14-115 Log #1284 NEC-P14 **Final Action: Accept**
(Table 506.9(C)(2)(2))

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-230
Recommendation: Proposal 14-230 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Substantiation: Proposal 14-230 should be accepted as ISA-60079-11 and UL 60079-11 have been approved by their respective organizations and are published.
Panel Meeting Action: Accept
Panel Statement: See Panel Comment 14-88a.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-116 Log #1921 NEC-P14 **Final Action: Accept**
(Table 506.9(C)(2)(2))

Submitter: Evans Massey, Baldor Electric Company
Comment on Proposal No: 14-230
Recommendation: Recommendation: Change order of marking for Zone Equipment in 506.9(C)(2) to match US convention established in Article 505 where Zone precedes Symbol AEx proposed order would be (1) Zone; (2) Symbol " AEx" ; (3) Protection technique(s) in accordance with Table 506.9(C)(2)(2) ; (4) Temperature classification, marked as a temperature value, in degrees C, preceded by T; (5) Ambient temperature marking in accordance with 506.9(D)
Substantiation: Inconsistency between Article 505 and 506, comment provided to correct inconsistency.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-117 Log #12 NEC-P14 **Final Action: Reject**
(506.9(F))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 14-233
Recommendation: Accept this proposal in principle in part by accepting the recommended text for 506.9(F) with the second reference to 506.15 corrected to 506.16 and continuing to reject the recommendation for a fine print note.
Substantiation: The panel statement about adding conductive optical fiber cables assumes that conductive optical fiber cables are not already covered. The current text covers optical fiber cables that have "conductors that are capable of carrying current". See the definition of conductive optical fiber cable in 770.2; a cable that has "conductors that are capable of carrying current" is a conductive optical fiber cable. A typical conductive optical fiber cable has a metallic strength member.

Composite optical fiber cables have electrical conductors that are intentionally current-carrying. Section 770.3(A) states that conductive optical fiber cables are classified as electrical cables in accordance with the type of electrical conductors.
Panel Meeting Action: Reject
Panel Statement: No additional substantiation has been provided for the addition of "conductive optical fiber cable".
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-118 Log #163 NEC-P14 **Final Action: Accept**
(506.15(A))

TCC Action: The Technical Correlating Committee understands that the words "gas/vaportight", in the first sentence of (3), are deleted to correlate with the panel action on Comment 14-119.
Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-234
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action as it relates to 4.1.1 of the NEC Style Manual concerning references to entire articles.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise text to read as follows:
506.15 Wiring Methods. Wiring methods shall maintain the integrity of the protection techniques and shall comply with 506.15(A), (B), or (C).
(A) Zone 20. In Zone 20 locations, the wiring methods in (1) through (5) shall be permitted.
(1) Threaded rigid metal conduit or threaded steel intermediate metal conduit.
(2) Type MI cable terminated with fittings listed for the location. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings.
Exception: MI cable and fittings listed for Class II, Division 1 locations are permitted to be used.
(3) In industrial establishments with limited public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation,
Type MC-HL cable, listed for use in Zone 20 locations, with a gas/vaportight continuous corrugated metallic sheath and overall jacket of suitable polymeric material, a separate equipment grounding conductor(s) in accordance with 250.122, and ~~provided with termination~~ terminated with fittings listed for the application, shall be permitted.
Exception: Type MC-HL cable and fittings listed for Class II, Division 1 locations ~~are~~ shall be permitted to be used. Type MC-HL cable shall be installed in accordance with the provisions of Article 330, Part II.
~~FPN: See 330.12 for restrictions on use of Type MC cable.~~
(4) Fittings and boxes shall be identified for use in Zone 20 locations.
Exception: Boxes and fittings listed for Class II, Division 1 locations ~~are~~ shall be permitted to be used.
(5) Where necessary to employ flexible connections, liquidtight flexible metal conduit with listed fittings, liquidtight flexible nonmetallic conduit with listed fittings, or flexible cord listed for extra-hard usage and provided with listed fittings shall be used. Where flexible cords are used, they shall also comply with 506.17. Where flexible connections are subject to oil or other corrosive conditions, the insulation of the conductors shall be of a type listed for the condition or shall be protected by means of a suitable sheath.
Exception: Flexible conduit and flexible conduit and cord fittings listed for Class II, Division 1 locations ~~are~~ shall be permitted to be used.
FPN: See 506.25 for grounding requirements where flexible conduit is used.
Panel Statement: As there is no "Article" for Type MC-HL Cable, a reference to Part II of Article 330 (Type MC Cable) is required to specify what installation requirements are to be applied for Type MC-HL Cable. (Add Part II, as shown.) The Panel believes that a reference to all of Article 727 is appropriate as the application of ITC-HL cable requires the application of all sections of Article 727.
See also Comment 14-26.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-119 Log #2164 NEC-P14 **Final Action: Accept in Principle**
(506.15(A))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Accept in Principle" by accepting the deletion of the words "gas/vaportight" as recommended.
See Comment 14-118 for the final text of this section.
Submitter: Jeremy Neagle, Intertek Testing Services
Comment on Proposal No: 14-234
Recommendation: 506.15(A)(3) should be revised to read as follows:
"(3) In industrial establishments with limited public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type MC-HL cable, listed for use in Zone 20 locations, with a ~~gas/vaportight~~ continuous corrugated metallic sheath and overall jacket of suitable polymeric material, a separate equipment grounding conductor(s) in accordance with 250.122, and provided with termination fittings listed for the application, shall be permitted."
Substantiation: I agree with the panel action and statement. However, as this section deals with dust locations, gas/vaportight cable sheaths are not necessary.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-120 Log #1126 NEC-P14 **Final Action: Reject**
(506.15(A)(5) and (C)(7))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-235
Recommendation: Accept the second sentence of the proposal with the following revisions:
Nonincendtive field wiring shall be permitted using any approved wiring method included in this Code.
Substantiation: Any approved wiring method including those for classified locations should be permitted.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-121 Log #164 NEC-P14 **Final Action: Accept**
(506.15(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-237
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action as it relates to 4.1.1 of the NEC Style Manual concerning references to entire articles.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel believes that a reference to all of Article 725 is appropriate as the application of PLTC and PLTC-ER cable requires the application of all parts of Article 725.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-122 Log #2625 NEC-P14 **Final Action: Reject**
(506.15(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-236
Recommendation: Accept the panel action in principle.
In 506.15(C)(1)(4) change "the provisions of Article 725" to "the provisions of 725.154 and 725.179."
Substantiation: This comment resolves a violation of the whole article referencing prohibition in the NEC Style Manual at 4.1.1.
Panel Meeting Action: Reject
Panel Statement: The panel believes that a reference to all of Article 725 is appropriate as the application of PLTC and PLTC-ER cable requires the application of all parts of Article 725.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-123 Log #1115 NEC-P14 **Final Action: Reject**
(506.17)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-238
Recommendation: Delete and substitute the following text to read as follows:
(1) Be an extra-hard usage type that complies with 400.3.
(2) Be installed in a manner that prevents strain on terminations or be provided with approved strain relief.
(3) Be provided with approved seals to prevent the entrance of combustible dust and ignitable fibers/flyings where the flexible cord enters fittings, boxes, or other enclosures.
Substantiation: All extra-hard usage cords may not be suitable for the use and conditions: e.g., electric vehicle type, and those not suitable for wet locations or sunlight resistance (without a W designation).
Panel Meeting Action: Reject
Panel Statement: The submitter has provided insufficient information to support the recommendation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-124 Log #508 NEC-P14 **Final Action: Reject**
(506.20(E))

Submitter: Edward M. Briesch, Underwriters Laboratories Inc.
Comment on Proposal No: 14-220
Recommendation: Revise 506.20(E) and add a new 506.20(E)(3) as follows:
(E) Temperature. The temperature classification marking specified in 506.9(~~C~~D)~~(2)(5)~~ shall comply with (E)(1), (E)(2) or (E)(2~~3~~):
(1) For combustible dusts, less than the lower of either the layer or cloud ignition temperature of the specific combustible dust. For organic dusts that may dehydrate or carbonize, the temperature marking shall not exceed the lower of either the ignition temperature or 165°C (329°F).
(2) For ignitible fibers/flyings, less than 165°C (329°F) for equipment that is

not subject to overloading, or 120°C (248°F) for equipment (such as motors or power transformers) that may be overloaded.

(3) For types of protection "i", "m", "p", or "t" the temperature marking shall not exceed 75C less than the values in (E)(1) or (E)(2).

FPN: See NFPA 499-2004, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Processing Areas*, for minimum ignition temperatures of specific dusts.

Substantiation: The applicable product standards specified in Proposal 14-220 do not account for the temperature rise on equipment for Zone 20 and 21 when blanketed with dust or fibers as do the product standards for Class II, Division 1 and Class III, Division 1. The product standards for Zones 20 and 21 are based on the IEC61241 series of standards. These standards rely on IEC60079-14 (formerly IEC61241-14) for proper installation. IEC60079-14 requires that the marked operating temperature on the equipment be 75C less than the ignition temperature of the combustible material. This is done to account for the fact that the operating temperature of the equipment is determined in air and not with a dust blanket. The reference to 506.9(C)(2)(5) was revised to 506.9(D) since that is where the subject of temperature classification is addressed.

Panel Meeting Action: Reject

Panel Statement: This comment introduces new material that has not had public review. Also, the product standards, as published, do address this topic.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-125 Log #1124 NEC-P14 **Final Action: Reject**
(506.20(E)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-240
Recommendation: Accept the proposal.
Substantiation: See the Explanation of Negative Vote for Proposal 7-9, 320.12(1) in the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: The substantiation provided supports the removal of the word "likely", not its inclusion.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-126 Log #1125 NEC-P14 **Final Action: Reject**
(506.20(E)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-240
Recommendation: Accept the proposal with the following revisions:

For ignitable fibers/flyings, the temperature marking shall not exceed 165°C, (329° F) for equipment not likely to be subject to overloading, or 120°C, (248°F) for equipment such as motors or power transformers.

Substantiation: Most motors have overload protection which permits short periods of overload heating: many power transformers can sustain overloads. See Explanation of Negative Vote for Proposal 7-9, 320.12(1) in the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-127 Log #1122 NEC-P14 **Final Action: Reject**
(506.25)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-244
Recommendation: Accept the proposal with the following revisions:

Grounding and Bonding. Grounding and bonding shall comply with applicable provisions of Article 250 and 506.25(A) and (B).

Exception: Nonincendive field wiring.

(A) Bonding. The single locknut, double-locknut, and locknut/bushing types of connections shall not be the sole means of bonding. Bonding jumpers with approved fittings, threaded metal raceway connections to threaded fittings, threaded openings or bosses or other approved means shall be used. Such means of bonding shall also apply to all intervening metal raceways, cables, boxes, and other enclosures and equipment between Zone 20, Zone 21, and Zone 22 locations and the point of grounding for service equipment and separately derived systems.

Exception: The specific bonding means of this section shall be required only to the building or other structure disconnecting means grounding terminal(s) or bus(es), provided branch circuit overcurrent protection is located on the load side of such disconnecting means.

FPN: No change.

Substantiation: Nonincendive wiring should be excluded as it poses no fire or explosion hazard. (A) presently does not prohibit single locknut connections normally used with Type MI and MC cables, LFMC, FMC permitted in 506.15. Threaded raceway connections should be noted; their absence begs the question: are these "other approved means?" Regarding the Exception, there may not be a grounded circuit conductor (ungrounded system, or not provided), or a grounding electrode, per 250.32(A), Exception.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-128 Log #1121 NEC-P14 **Final Action: Reject**
(506.25(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-245a
Recommendation: Accept the proposal with the following revisions:

(B) Types of Equipment Grounding and Bonding Conductors. Flexible metal conduit and liquidtight flexible metal conduit shall contain or include a separate equipment grounding or bonding conductor.

Substantiation: Flexible metal conduit is permitted in 506.15 and should be included. Bonding conductors should be included in the heading as that is what the text addresses. "Include" permits a bonding conductor in accordance with 250.102(E). 250.102 already applies.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 511 — COMMERCIAL GARAGES, REPAIR AND STORAGE

14-129 Log #679 NEC-P14 **Final Action: Reject**
(511.1)

Submitter: David Wechsler, Freeport, TX
Comment on Proposal No: 2-122
Recommendation: Revise text to read as follows:

These occupancies shall include locations used for service and repair operations in connection with self-propelled vehicles (including, but not limited to, passenger automobiles, buses, trucks, and tractors) in which volatile flammable liquids or flammable gases or diesel oils are used for fuel or power.

Substantiation: As indicated in Proposal 2-122, an unintended loophole was discovered and the amended text corrects this issue by including diesel oils.
Panel Meeting Action: Reject
Panel Statement: Diesel fuels are outside the scope of Article 511. To accept this comment would require a change in the scope of the Article, which is outside the purview of Panel 14. The Panel agrees with the concept and refers the matter to the TCC for their consideration. It is our recommendation to substitute the phrase "or fuel oils, such as diesel fuel, fuel oil No. 2, or biofuels" in place of "or diesel oils", as shown in the submitter's recommendation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-130 Log #1123 NEC-P14 **Final Action: Reject**
(511.3)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-248
Recommendation: Accept the proposal.
Substantiation: "Mechanical" implies nonelectrical and includes louvers and roof turbines which are not reliable for ventiation. Malfunction of ventilation systems should be indicated, since it may result in hazardous conditions.
Panel Meeting Action: Reject
Panel Statement: The substantiation provided with this comment provides no additional justification for the recommendation than was submitted with the original proposal.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-131 Log #383 NEC-P14 **Final Action: Accept**
(511.3(C)(1)(a))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-249
Recommendation: Continue to reject the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-132 Log #987 NEC-P14 **Final Action: Accept in Principle in Part**
(511.3(C)(1)(a))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 14-249
Recommendation: In Principal by changing "…one cubic foot per minute…" to "…one ft3/min…". In Part by Accepting the proposed revision "…four air changes each ~~per~~ hour…".
Substantiation: The NEC Style Manual, Annex B, Units of Measurement (page 31) specifies that "In the Code text, all units of measurement, when accompanied by a number value, will be styled as follows:" and shows "ft^3/ min".

The second revision uses a more appropriate term for a standard and conveys the same meaning. "Per" is not included as a recommended word in either the NEC Style Manual nor the Manual of Style for Technical Committee Documents.
Panel Meeting Action: Accept in Principle in Part

Revise text to read as follows:

"The floor area shall be unclassified where there is mechanical ventilation providing a minimum of four air changes per hour or 0.3 m^3/ min / m^2 (1 cfm / ft2) ~~one cubic foot per minute~~ of exchanged air for each square foot of floor area. Ventilation shall provide for air exchange across the entire floor area, and exhaust air shall be taken at a point within 0.3 m (12 in.) of the floor."
Panel Statement: The changes accepted here align with the text in 511.3(C)(2)(a). The recommendation to replace "per" with "each" is not accepted, as it would change the meaning of this provision. The intent of the requirement is require a flow rate, not a specific volume.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-133 Log #384 NEC-P14 **Final Action: Accept**
(511.3(C)(3)(a))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-251
Recommendation: Continue to reject the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-134 Log #988 NEC-P14 **Final Action: Reject**
(511.3(C)(3)(a))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 14-251
Recommendation: The Proposal should be Accepted.
Substantiation: The proposed revision uses a more appropriate term for a standard and conveys the same meaning. "Per" is not included as a recommended word in either the NEC Style Manual nor the Manual of Style for Technical Committee Documents.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no additional substantiation to support the recommendation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-135 Log #385 NEC-P14 **Final Action: Accept**
(511.3(D)(1)(a))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-252
Recommendation: Continue to reject the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-136 Log #989 NEC-P14 **Final Action: Accept in Principle in Part**
(511.3(D)(3)(a))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 14-252
Recommendation: The Proposal should be Accepted in Principle in Part.
In Principal by changing "…one cubic foot per minute…" to "…one ft3/ min…". In Part by Accepting the proposed revision "…four air changes each ~~per~~ hour…".
Substantiation: The NEC Style Manual, Annex B, Units of Measurement (page 31) specifies that "In the Code text, all units of measurement, when accompanied by a number value, will be styled as follows:" and shows "ft^3/ min".
The second revision uses a more appropriate term for a standard and conveys the same meaning. "Per" is not included as a recommended word in either the NEC Style Manual nor the Manual of Style for Technical Committee Documents.
Panel Meeting Action: Accept in Principle in Part
Revise the first sentence as shown:
The entire floor area shall be unclassified where there is mechanical ventilation providing a minimum of four air changes per hour or 0.3 m^3/ min / m^2 (1 cfm / ft2) ~~one cubic foot per minute~~ of exchanged air for each square foot of floor area.
Panel Statement: The comment incorrectly refers to 511.3(D)(3)(a) and should refer to 511.3 (D)(1)(a). The first recommendation to revise text is accepted in principle and is aligned with that of 511.3(D)(3)(a). The recommendation to replace "per" with "each" is not accepted, as it would change the meaning of this provision. The intent of the requirement is require a flow rate, not a specific volume.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-137 Log #386 NEC-P14 **Final Action: Accept**
(511.3(E)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-253
Recommendation: Continue to reject the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-138 Log #990 NEC-P14 **Final Action: Reject**
(511.3(E)(1))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 14-253
Recommendation: The Proposal should be Accepted.
Substantiation: The proposed revision uses a more appropriate term for a standard and conveys the same meaning. "Per" is not included as a recommended word in either the NEC Style Manual nor the Manual of Style for Technical Committee Documents.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no additional substantiation to support the recommendation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-139 Log #1138 NEC-P14 **Final Action: Reject**
(511.7)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-255
Recommendation: Accept the proposal with the following revisions:
Extra-hard usage or hard usage types of flexible cords and cables in accordance with 400.3 shall be permitted as pendants if in accordance with all of the following: (remainder of proposal unchanged).
Substantiation: All cords and cables may not be suitable for the use, e.g., electric vehicle cables, cords without a W in their designation for wet locations and sunlight resistance. Vehicles may be used in areas which are not "lanes." See Explanation of Negative Vote on Proposal 7-9, 320.12(1) in the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-139a Log #CC1408 NEC-P14 **Final Action: Accept**
(511.12)

Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-122
Recommendation: Panel 14 agrees with the principle that Panel 2 acted upon on Proposal 2-122, in that personnel protection in garages is improved by the installation / use of GFCI protection.
Substantiation: This Panel has no proposal or comment to act upon to change the requirements currently found in 511.12 for commercial garages. If Panel 14 made any changes to 511.12, it would introduce new material. Panel 14 does not see a correlation issue, as 90.3 establishes the hierarchy of the Code requirements.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
BATTA, JR., D.: On the ballot, Panel Comment 14-139a (CC1408) is incorrectly referenced to Proposal 14-222. This comment should be referenced to Proposal 2-222.

ARTICLE 513 — AIRCRAFT HANGARS

14-140 Log #2706 NEC-P14 **Final Action: Reject**
(513.2)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 14-261
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See Comment 14-143. The Panel notes that there is no product standard for this device.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-141 Log #2388 NEC-P14 **Final Action: Reject**
(513.8(A))

Submitter: James S. Conrad, Tyco Thermal Controls
Comment on Proposal No: 14-265
Recommendation: This proposal should be accepted in part as follows: 513.8 (A) Wiring and Equipment ~~Embedded~~, Under Slab, or Under Ground
All wiring installed ~~in or~~ under the hangar floor shall comply with the requirements for Class 1, Division 1 locations. Where such wiring is located in vaults, pits, or ducts adequate drainage shall be provided.
Substantiation: Delete "Embedded" and "in or" from 513.8(A) only. Cables and conduits embedded (or encased) in the concrete floor do not meet the definition of a hazardous location. Section 5.9.2 NFPA 409 is only concerned with electrical equipment below the hangar floor level where vapors or fuel can accumulate such as in a pit, duct or tunnel. A sealed conduit or MI heating cable embedded in the concrete floor does not pose a hazard and should not be classifies as hazardous equipment.
Panel Meeting Action: Reject
Panel Statement: Because this represents a special application, the submitter should direct his proposals to the NFPA Technical Committee on Airport Facilities and other affected committees and should address specific applications of the product. Panel 14 would then be in a position to consider appropriate changes to Chapter 5 of the Code.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-142 Log #1137 NEC-P14 **Final Action: Reject**
(513.8(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-267
Recommendation: Accept the proposal with the following revisions:
Raceways and Cables Underground or Embedded. Raceways or cables underground or embedded in a cement concrete hanger floor shall be considered to be within the Class 1 location above the floor.
Substantiation: Whether a raceway is interrupted by a stub up to equipment is irrelevant and the provision doesn't apply to such "interruption." Cables should be included. "Point of Emerence" is superfluous.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-143 Log #2705 NEC-P14 **Final Action: Reject**
(513.12)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 14-270
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The report submitted as supporting material does not convince the panel that this device is equivalent to GFCI protection.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-144 Log #1136 NEC-P14 **Final Action: Reject**
(513.16)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-271
Recommendation: Accept the proposal with the following revisions:
Grounding and Bonding. All metal raceways and metal covering of cables and non-current-carrying metal parts of fixed or portable electrical equipment shall be bonded and grounded.
Substantiation: Article 250 already applies, as do grounding and bonding provisions for Class 1 and II locations.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 514 – MOTOR FUEL DISPENSING FACILITIES

14-144a Log #CC1407 NEC-P14 **Final Action: Accept**
(Table 514.3(B)(1))

Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-273
Recommendation: Replace the current version of Table 514.3(B)(1) with the new version of Table 8.3.1 of NFPA 30A that has been issued as Tentative Interim Amendment 30A-08-1, shown here:
See Table 514.3(B)(1) on Pages 350 and 351

Substantiation: NFPA 30A has issued a TIA 30A-08-1 to amend Table 8.3.1. Panel 14 has created this comment to Proposal 14-273 to include the applicable portions of the revised table relevant to Article 514 in the 2011 edition of the Code. This is done to avoid conflicts between the two documents and recognize the importance of consistent information. This represents a coordinated effort between Panel 14 and the AUV to ensure correlation. Panel 14 encourages the establishment of a Task Group consisting of members of Panel 14 and the AUV to develop proposals related to Articles 511 and 514 for the next Code cycle.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
BRIESCH, E.: While I agree with the Panel Action, the introduction of Zone classified locations into Article 514 requires revisions to Sections 514.3(B)(2) and 514.8 and Figure 514.3 as well as Table 514.3(B)(1). Applying Table 514.3(B)(1) without revisions to these other Sections and the Figure may present a problem since requirements relative to Zone classified areas are not addressed in them. Since much of this is extracted text from NFPA30A, the TC on Automotive and Marine Service Stations needs to revise NFPA30A to completely address Zone classified locations and submit a TIA for Article 514 to address these other Sections before the 2014 Code cycle.

14-145 Log #595 NEC-P14 **Final Action: Accept in Part**
(514.8 Exception No. 2)

TCC Action: The Technical Correlating Committee directs that the word "Type" be inserted prior to "PVC" and "RTRC" in this section to conform with the NEC Style Manual.
Submitter: John L. Simmons, Florida East Coast JATC / Rep. IBEW
Comment on Proposal No: 14-274
Recommendation: Revise the text to read as follows:
Exception No. 2: ~~Rigid nonmetallic~~ Schedule 80 PVC, conduit and XW-type RTRC conduit shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where ~~rigid nonmetallic~~ Schedule 80 PVC conduit or XW-type RTRC conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (2 ft) of the underground run to emergence or to the point of connection to the aboveground raceway, and an equipment grounding conductor shall be included to provide electrical continuity of the raceway system and for grounding of non-current-carrying metal parts.
Substantiation: This comment was generated by a Task Group from CMP-14. The submitter of Proposal 14-274 is absolutely correct in recognizing that the terminology associated with rigid nonmetallic conduit has changed. His proposed change, however, only addressed one of the wiring methods that were included in the 2005 NEC under Article 352. The 2005 NEC Handbook references the 2004 UL General Information for Electrical Equipment Directory (White Book) in its commentary under the definition of Rigid Nonmetallic Conduit in 352.2. "The White Book describes two types of rigid nonmetallic conduit recognized for use in accordance with 352.

Table 514.3(B)(1) Class I Locations — Motor Fuel Dispensing Facilities

Location	Class I		Extent of Classified Location[1]
	Division (Group D)	Zone (Group IIA)	
Dispensing Device (except Overhead Type) [2,3]			
Under dispenser containment	1	1	Entire space within and under dispenser pit or containment
Dispenser	2	2	Within 450 mm (18 in.) of dispenser enclosure or that portion of dispenser enclosure containing liquid handling components, extending horizontally in all directions and down to grade level
			Up to 450 mm (18 in.) above grade level, extending 6m (20 ft) horizontally in all directions from dispenser enclosure
Outdoor	2	2	Up to 450 mm (18 in.) above floor level, extending 6m (20 ft) horizontally in all directions from dispenser enclosure
Indoor - with mechanical ventilation	2	2	Up to 450 mm (18 in.) above floor level, extending 7.5 m (25 ft) horizontally in all directions from dispenser enclosure
- with gravity ventilation	2	2	
Dispensing Device — Overhead Type[4]	1	1	Space within dispenser enclosure and all electrical equipment integral with dispensing hose or nozzle
	2	2	Within 450 mm (18 in.) of dispenser enclosure, extending horizontally in all directions and down to grade level
	2	2	Up to 450 mm (18 in.) above grade level, extending 6m (20 ft) horizontally in all directions from a point vertically below edge of dispenser enclosure
Remote Pump —			
Outdoor	1	1	Entire space within any pit or box below grade level, any part of which is within 3 m (10 ft) horizontally from any edge of pump
	2	2	Within 900mm (3 ft) of any edge of pump, extending horizontally in all directions
	2	2	Up to 450 mm (18 in.) above grade level, extending 3m (10 ft) horizontally in all directions from any edge of pump
			Entire space within any pit
Indoor	1	1	Within 1.5 m (5 ft) of any edge of pump, extending in all directions
	2	2	Up to 900 mm (3 ft) above floor level, extending 7.5 m (25 ft) horizontally in all directions from any edge of pump
	2	2	
Sales, Storage, Rest Rooms including structures (such as the attendant's kiosk)on or adjacent to dispensers	unclassified	unclassified	Except as noted below
	1	1	Entire volume, if there is any opening to room within the extent of a Division 1 or Zone 1 location
	2	2	Entire volume, if there is any opening to room within the extent of a Division 2 or Zone 2 location

Table 514.3(B)(1) Class I Locations — Motor Fuel Dispensing Facilities *continued*

Location	Class I Division (Group D)	Class I Zone (Group IIA)	Extent of Classified Location[1]
Tank, Aboveground			
Inside tank	1	0	Entire inside volume
Shell, ends, roof, dike area	1	1	Entire space within dike, where dike height exceeds distance from tank shell to inside of dike wall for more than 50 percent of tank circumference
	2	2	Entire space within dike, where dike height does not exceed distance from tank shell to inside of dike wall for more than 50 percent of tank circumference
			Within 3m (10 ft) of shell, ends, or roof of tank
Vent	2	2	Within 1.5 m (5 ft) of open end of vent, extending in all directions
	1	1	Between 1.5 m and 3 m (5 ft and 10 ft) from open end of vent, extending in all directions
	2	2	
Tank, Underground			
Inside tank	1	0	Entire inside volume
Fill Opening	1	1	Entire space within any pit or box below grade level, any part of which is within a Division 1 or Division 2 classified location or within a Zone 1 or Zone 2 classified location
	2	2	Up to 450 mm (18 in.) above grade level, extending 1.5m (5 ft) horizontally in all directions from any tight-fill connection and extending 3m (10 ft) horizontally in all directions from any loose-fill connection
			Within 1.5 m (5 ft) of open end of vent, extending in all directions
Vent	1	1	Between 1.5 m and 3 m (5 ft and 10 ft) from open end of vent, extending in all directions
	2	2	
Vapor Processing System			
Pits	1	1	Entire space within any pit or box below grade level, any part of which: (1) is within a Division 1 or Division 2 classified location; (2) is within a Zone 1 or Zone 2 classified location; (3) houses any equipment used to transfer or process vapors
Equipment in protective enclosures	2	2	Entire space within enclosure
Equipment not within protective enclosure	2	2	Within 450 mm (18 in.) of equipment containing flammable vapors or liquid, extending horizontally in all directions and down to grade level
	2	2	Up to 450 mm (18 in.) above grade level within 3 m (10 ft) horizontally of the vapor processing equipment
			Entire space within enclosure, if flammable vapor or liquid is present under normal operating conditions
- Equipment enclosure	1	1	Entire space within enclosure, if flammable vapor or liquid is not present under normal operating conditions
	2	2	Within 450 mm (18 in.) of blower, extending horizontally in all directions and down to grade level
- Vacuum assist blower	2	2	Up to 450 mm (18 in.) above grade level, extending 3m (10 ft) horizontally in all directions
	2	2	
Vault	1	1	Entire interior space, if Class I liquids are stored within

[1]For marine application, *grade level* means the surface of a pier, extending down to water level.
[2]Refer to Figure 514.3 for an illustration of classified location around dispensing devices.
[3]Area classification inside the dispenser enclosure is covered in UL 87, *Standard for Power-Operated Dispensing Devices for Petroleum Products.*
[4]Ceiling-mounted hose reel.

1. Rigid nonmetallic Schedule 40 and Schedule 80 PVC Conduit (DZYR) and,

2. Reinforced thermosetting resin conduit (DZKT).” The 2008 NEC gave RTRC its own article and revised the title of Article 352, but it did not change the fact that both are still rigid nonmetallic conduit. This is evidenced by the fact that the definition of PVC in 352.2 states that it is a “rigid nonmetallic conduit” and the definition of RTRC in 355.2 states that it is a “rigid nonmetallic conduit”. Schedule 80 PVC is being specified to provide protection where subject to physical damage. Historically conduit used in hazardous locations has been metal which will provide protection from physical damage. Plastic conduits, when used, should provide the same protection, SW-type RTRC conduit is suitable, according to the UL “White Book”, for use in locations subject to physical damage.

The revised text will address the proposer’s concern with the existing ext, but will not eliminate the use of RTRC conduit for the application described in 514.8, Exception No. 2.

Panel Meeting Action: Accept in Part

Revise text to read as follows:

Exception No. 2: ~~Rigid~~ PVC ~~nonmetallic~~ conduit and RTRC conduit shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where ~~rigid~~ PVC ~~nonmetallic~~ conduit or RTRC conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (2 ft) of the underground run to emergence or to the point of connection to the aboveground raceway, and an equipment grounding conductor shall be included to provide electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.

Panel Statement: The Panel agrees with the submitter’s revision, but does not believe that the substantiation provides a reason to restrict PVC conduit to Schedule 80 or RTRC to type XW. As such, the Panel accepts the proposal with Schedule 80 and XW type references removed.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-146 Log #599 NEC-P14 **Final Action: Accept in Principle in Part**
(514.8 Exception No. 2)

TCC Action: The Technical Correlating Committee directs that the word “Type” be inserted before “PVC” and “RTRC” in this section to conform to the NEC Style Manual.

Submitter: John L. Simmons, Florida East Coast JATC

Comment on Proposal No: 14-277

Recommendation: Revise the proposed text to read as follows:

Exception No.2: ~~Rigid Type~~ Schedule 80 PVC conduit, or XW-type RTRC ~~or HDPE nonmetallic conduit~~ shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where ~~rigid Type~~ Schedule 80 PVC conduit, or XW-type RTRC, ~~or HDPE nonmetallic conduit~~ is used...

Substantiation: This comment was generated by a Task Group from CMP-14. The proposed changes will make the terminology consistent with Article 352 and Article 355. The 2005 NEC Handbook references references the 2004 UL General Information for Electrical Equipment Directory (White Book) in its commentary under the definition of Rigid Nonmetallic Conduit in 352.2. “The White Book describes two types of rigid nonmetallic conduit recognized for use in accordance with Article 352.

1. Rigid nonmetallic Schedule 40 and Schedule 80 PVC conduit (DZYR), and

2. Reinforced thermosetting resin conduit (DZKT).”

The 2008 NEC gave RTRC its own article and revised the title of Article 352, but it did not change the fact that both are still rigid nonmetallic conduit. This is evidenced by the fact that the definition of PVC in 352.2 states that it is a “rigid nonmetallic conduit” and the definition of RTRC in 355.2 states that it is a “rigid nonmetallic conduit”. HDPE is not defined as rigid nonmetallic conduit in 353.2. The 2008 NEC 518.8(C) text uses the term “rigid nonmetallic conduit”. HDPE should not be included.

Historically, conduit used in hazardous locations has been metal which will provide protection from physical damage. Plastic conduits, when used, should provide the same protection. XW-Type RTRC conduit marked as AG, XW, RTRC is suitable according to the UL “White Book” for use in locations subject to physical damage.

Panel Meeting Action: Accept in Principle in Part

Revise the proposed text to read as follows:

Exception No.2: ~~Rigid Type~~ Schedule 80 PVC conduit, or ~~XW-type RTRC or HDPE nonmetallic~~ conduit shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where ~~rigid Type~~ Schedule 80 PVC conduit, or ~~XW-type~~ RTRC, ~~or HDPE nonmetallic~~ conduit is used...

Revise Proposal 14-277 to read:

Exception No. 2: ~~Rigid~~ PVC *conduit* or RTRC *~~nonmetallic~~ conduit shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where ~~rigid~~* PVC *conduit* or RTRC *~~nonmetallic~~ conduit is used...*

Panel Statement: The panel agrees with the submitter’s revision, but does not believe that the substantiation provides a reason to restrict PVC conduit to Schedule 80 or RTRC to type XW. As such, the panel accepts the proposal with Schedule 80 and XW type references removed. The word “conduit” has been added for consistency with other provisions of Chapter 5.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-147 Log #1142 NEC-P14 **Final Action: Reject**
(514.8 Exception No. 2)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 14-275

Recommendation: Accept the proposal with the following revisions:

Exception No. 2: Type PVC conduit containing an equipment grounding conductor shall be permitted where buried under not less than 600 mm (2 ft) of earth cover or 102 mm (4 in.) of cement concrete or encased in not less than 50.8 mm (2 in.) of cement concrete.

Substantiation: Cement concrete slab or encasement should be suitable protection. Threaded connection should be specified for RMC and IMC. Aboveground wiring may not be a raceway, it may be a cable or enclosure. The purpose of an EGC is defined in the Article 100 definition of “EGC.”

Panel Meeting Action: Reject

Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must “include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted”. The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-148 Log #1140 NEC-P14 **Final Action: Reject**
(514.11)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 14-279

Recommendation: Add the following to the panel action text:

The disconnecting means shall be provided with an approved permanent means for locking in the open (off) position.

Substantiation: The panel action did not require the disconnecting means to be within sight of dispensers or indicate whether 430.102(B)(1) or the Exception to (1) and (2) of that section is intended to apply.

Panel Meeting Action: Reject

Panel Statement: The Panel notes that this device is referred to in NFPA 30A as an “emergency electrical disconnect” and is intended as an emergency power off device to be used should an emergency, such as a fuel spill, occur. The lockable disconnect means is addressed in 514.13.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-149 Log #1141 NEC-P14 **Final Action: Reject**
(514.13)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 14-280

Recommendation: Delete or revise current text as follows:

Where the disconnecting means is not within sight of the dispensing equipment, each equipment shall be provided with approved means to simultaneously disconnect all circuit conductors installed to or through the dispensing equipment and it shall be within sight of the dispensing equipment. The disconnecting means for each dispensing equipment shall be provided with approved permanent means for locking in the open (off) position.

Substantiation: “During periods of maintenance and service” is irrelevant. This section apparently requires an additional disconnecting means which can be provided by 514.11.

Panel Meeting Action: Reject

Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must “include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted”. The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

ARTICLE 515 — BULK STORAGE PLANTS

14-150 Log #165 NEC-P14 **Final Action: Accept**
(515.7(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-283
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal with regard to which cables require the listed fitting.

In addition, the Technical Correlating Committee directs that the panel clarify the panel action as it relates to 4.1.1 of the NEC Style Manual concerning references to entire articles.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel believes that a reference to all of Article 725 is appropriate as the application of PLTC and PLTC-ER cable requires the application of all parts of Article 725. The panel confirms that all the cable types shown require termination with listed fittings.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-151 Log #1139 NEC-P14 **Final Action: Reject**
(515.7(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-284
Recommendation: Accept the proposal.
Substantiation: See Explanation of Negative Vote on Proposal 7-9, 320.12(1) in the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: The term "may" is the correct term and it is not a violation of the style manual as it is not used as part of the mandatory rule. It is part of the conditional statement that sets up the mandatory rule.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-152 Log #596 NEC-P14 **Final Action: Accept in Part**
(515.8(A))

TCC Action: The Technical Correlating Committee directs that the word "Type" be inserted before the words "PVC" and "RTRC" in this section to conform to the NEC Style Manual.

The Technical Correlating Committee notes that all other wording changes indicated by the panel action are accepted.
Submitter: John L. Simmons, Florida East Coast JATC / Rep. IBEW
Comment on Proposal No: 14-288
Recommendation: Revise the text to read as follows:

515.8 Underground Wiring.

(A) Underground wiring shall be installed in threaded rigid metal conduit or threaded steel intermediate metal conduit or, where buried under not less than 600 mm (2 ft) of cover, shall be permitted in ~~rigid nonmetallic~~ Schedule 80 PVC conduit XW-type RTRC or a listed cable. Where ~~rigid nonmetallic~~ Schedule 80 PVC conduit or XW-type RTRC is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for not less than the last 600 mm (2 ft) of the conduit run to the conduit's point of emergence from the underground location or to the point of connection to ~~the~~ an aboveground raceway. Where cable is used, it shall be enclosed in threaded rigid metal conduit or threaded steel intermediate metal conduit from the point of lowest buried cable level to the point of connection to the aboveground raceway.
Substantiation: This comment was generated by a Task Group from CMP-14. The revised wording addresses some of the submitter's concerns and corrects the misuse of the term rigid nonmetallic conduit. The 2008 NEC changed the term rigid nonmetallic conduit to rigid polyvinyl chloride conduit: Type PVC. The change also moved RTRC conduit to a new Article 355. The 2005 NEC Handbook references the 2004 UL General Information for Electrical Equipment Directory (White Book) in its commentary under the definition of Rigid Nonmetallic Conduit in 352.2. "The White Book describes two types of rigid nonmetallic conduit recognized for use in accordance with Article 352.

1. Rigid nonmetallic Schedule 40 and Schedule 80 PVC conduit (DZYR) and,

2. Reinforced thermosetting resin conduit (DZKT)." The 2008 NEC gave RTRC its own article and revised the title of Article 352, but it did not change the fact that both are still rigid nonmetallic conduit. This is evidenced by the fact that the definition of PVC in 352.2 states that it is a "rigid nonmetallic conduit" and the definition of RTRC in 355.2 states that it is a "rigid nonmetallic conduit". Historically conduit used in hazardous locations has been metal which will provide protection from physical damage. Plastic conduits should, when used, should provide the same protection, SW-type RTRC conduit is suitable, according to the UL "White Book" for use in locations subject to physical damage.
Panel Meeting Action: Accept in Part

Revise (A) to read as follows:

(A) Wiring Method. Underground wiring shall be installed in threaded rigid metal conduit or threaded steel intermediate metal conduit or, where buried under not less than 600 mm (2 ft) of cover, shall be permitted in ~~rigid nonmetallic~~ PVC conduit, RTRC conduit, or a listed cable. Where ~~rigid nonmetallic~~ PVC conduit or RTRC conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for not less than the last 600 mm (2 ft) of the conduit run to the conduit point of emergence from the underground location or to the point of connection to an ~~the~~ aboveground raceway. Where cable is used, it shall be enclosed in threaded rigid metal conduit or threaded steel intermediate metal conduit from the point of lowest buried cable level to the point of connection to the aboveground raceway.
Panel Statement: The Panel agrees with the submitter's revision, but does not believe that the substantiation provides a reason to restrict PVC conduit to Schedule 80 or RTRC to type XW. As such, the Panel accepts the proposal with Schedule 80 and XW type references removed.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-153 Log #1191 NEC-P14 **Final Action: Reject**
(515.8(A) and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-288
Recommendation: Accept the proposal with the following revisions:

Underground wiring shall be installed in a threaded rigid metal conduit or threaded steel intermediate metal conduit, with threaded fittings, or where buried under not less than 600 mm (2 ft) of cover or encased in cement concrete envelope not less than 50.8 mm (2 in.) thick shall be permitted to be Type PVC conduit or Type MI cable or other approved cable. Where Type PVC conduit is used, rigid metal conduit or steel intermediate metal conduit shall be used for the last 600 mm (2 ft) or more of the underground conduit run to the aboveground wiring method. Where cable is used, it shall be enclosed in rigid metal conduit or steel intermediate metal conduit from the lowest required direct-burial depth of the cable, or where concrete encasement ends, to the point of connection to an aboveground wiring method or connection to an enclosure or other equipment.
Substantiation: A concrete encasement should permit a lesser burial depth. Underground runs do not necessarily connect to an above ground wiring raceways; they may connect to other approved wiring methods or terminate at aboveground equipment. The proposed deletion for part of (C) is superfluous; the purpose of an EGC doesn't need explanation, it is covered in the Article 100 definition.
Panel Meeting Action: Reject
Panel Statement: Section 4.4.5 of the Regulations Governing Committee Projects requires that comments submitted on a Report on Proposals (ROP) must "include the proposed text of the comment, including the wording to be added, revised (and how revised) or deleted". The submitter has failed to indicate what is revised, how it is revised, and what is deleted. The Panel notes that the standard form for submitting proposals and comments recommends the use of underlines and strikethroughs (legislative text) as a method of indicating recommended changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-154 Log #597 NEC-P14 **Final Action: Accept**
(515.8(C))

Submitter: John L. Simmons, Florida East Coast JATC / Rep. IBEW
Comment on Proposal No: 14-289
Recommendation: Revise the text to read as follows:

(C) Nonmetallic Wiring. Where PVC ~~rigid nonmetallic~~ conduit, RTRC conduit or cable with a nonmetallic sheath is used, an equipment grounding conductor shall be included to provide for electrical continuity of the raceway system and for grounding of non-current-carrying metal parts.
Substantiation: This comment was generated by a Task Group from CMP-14. The submitter of Proposal 14-289 is absolutely correct in recognizing that the terminology associated with rigid nonmetallic conduit had changed. His proposed change, however, only addressed one of the wiring methods that were included in the 2005 NEC under Article 352. The 2005 NEC Handbook references the 2004 UL General Information for Electrical Equipment Directory (White Book) in its commentary under the definition of Rigid Nonmetallic Conduit in 352.2. "The White Book describes two types of rigid nonmetallic conduit recognized for use in accordance with Article 352.

1. Rigid nonmetallic Schedule 40 and Schedule 80 PVC conduit (DZYR), and

2. Reinforced thermosetting resin conduit (DZKT)." The 2008 NEC gave RTRC its own article and revised the title of Article 352, but it did not change the fact that both are still rigid nonmetallic conduit. This is evidenced by the fact that the definition of PVC in 352.2 states that it is a "rigid nonmetallic conduit" and the definition of RTRC in 355.2 states that it is a "rigid

nonmetallic conduit".

The revised text will address the proposer's concern with the existing text, but will not eliminate the use of RTRC conduit for the application described in 515.8(C) as the proposal would do. It also makes this section consistent with the text found in 501.10(A)(1), exception.

Panel Meeting Action: Accept

Panel Statement: The panel agrees with the submitter's revision, but does not believe that the substantiation provides a reason to restrict PVC conduit to Schedule 80 or RTRC to type XW. As such, the panel accepts the proposal with Schedule 80 and XW type references removed.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

ARTICLE 516 — SPRAY APPLICATION, DIPPING, AND COATING PROCESSES

14-155 Log #1818 NEC-P14 **Final Action: Reject**
(516.4(D) Exception No. 2)

Submitter: Michael P. Walls, American Chemistry Council

Comment on Proposal No: 14-297

Recommendation: Change 'vehicle' to 'automotive', so that this exception reads as follows (2008 NEC text):

Exception No. 2: Where portable electric drying apparatus is used in automotive ~~automobile vehicle~~ refinishing spray booths and the following requirements are met:

Substantiation: The Panel action should have been to accept in principle. As suggested by the Proposer, 'automobile' was not the correct word. However, neither was 'vehicle', which the panel action accepted. The correct term is 'automotive' refinishing.

Panel Meeting Action: Reject

Panel Statement: See Comment 14-156.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-156 Log #2156 NEC-P14 **Final Action: Accept**
(516.4(D) Exception No. 2)

Submitter: Jeremy Neagle, Intertek Testing Services

Comment on Proposal No: 14-297

Recommendation: 516.4(D) Exception No. 2 should be revised as follows:

"Exception No. 2: Where portable electric drying apparatus is used in ~~automobile refinishing~~ spray booths and the following requirements are met:…"

Retain items (a) through (d).

Substantiation: The provision for portable electric drying apparatus should not be limited to use in automotive refinishing type spray booths. Such equipment has application in industrial and other spray coating operations also falling within the scope of NFPA 33 and NEC Article 516.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-157 Log #598 NEC-P14 **Final Action: Accept**
(516.7(A))

Submitter: John L. Simmons, Florida East Coast JATC / Rep. IBEW

Comment on Proposal No: 14-298

Recommendation: Revise the text to read as follows:

(A) Wiring. All fixed wiring above the Class I and II locations shall be in metal raceways, ~~rigid nonmetallic~~ PVC conduit, RTRC conduit or electrical nonmetallic tubing ~~or~~ where cables are used, they shall be Type MI, Type TC, or Type MC cable. Cellular metal floor raceways shall only be permitted ~~only for supplying~~ to supply ceiling outlets or as extensions to the area below the floor of a Class I or II location~~, but such~~. Where cellular metal raceways, are used, they shall ~~have no~~ not have connections leading into or passing through the Class I or II location ~~above the floor~~ unless suitable seals are provided.

Substantiation: This comment was generated by a Task Group from CMP14. The submitter's concern appears to be the clarity of the wording of the subsection. The revised text will provide clarity. It will also correct the misuse of the term rigid nonmetallic conduit. The 2008 NEC changed the term rigid nonmetallic conduit to rigid polyvinyl chloride conduit: Type PVC. The change also moved RTRC conduit to a new Article 355. The 2005 NEC Handbook references the 2004 UL General Information for Electrical Equipment Directory (White Book) in its commentary under the definition of Rigid Nonmetallic Conduit in 352.2. "The White Book describes two types of rigid nonmetallic conduit recognized for use in accordance with Article 352.

1. Rigid nonmetallic Schedule 40 and Schedule 80 PVC conduit (DZYR,) and

2. Reinforced thermosetting resin conduit (DZKT)." The 2008 NEC gave RTRC its own article and revised the title of Article 352, but it did not change the fact that both are still rigid nonmetallic conduit. This is evidenced by the fact that the definition of PVC in 352.2 states that it is a "rigid nonmetallic conduit" and the definition of RTRC in 355.2 states that it is a "rigid nonmetallic conduit".

Panel Meeting Action: Accept

Panel Statement: The panel agrees with the submitter's revision, but does not believe that the substantiation provides a reason to restrict PVC conduit to Schedule 80 or RTRC to type XW. As such, the panel accepts the proposal with Schedule 80 and XW type references removed.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-158 Log #1190 NEC-P14 **Final Action: Reject**
(516.7(A) and (B))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 14-298

Recommendation: Accept the proposal with the following revisions:

Change "suitable" to "approved" and "may" to "is likely to."

Substantiation: "Suitable" is not defined and a term not to be used without conditions. "May" is a discretionary term to be used by the AHJ. "Likely" is a term used over 80 times in the NEC.

Panel Meeting Action: Reject

Panel Statement: The current text is correct. "May" is not subjective, but denotes physical possibility and is the appropriate term. The term "is likely to be" denotes probability, or a greater chance of occurrence. The word "suitable" as used in this section is not unenforceable and does not create confusion, as indicated in the requirements of the NEC Style Manual. As such, it does not need to be replaced.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-159 Log #765 NEC-P14 **Final Action: Reject**
(516.10(A)(2) and (3))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 14-300

Recommendation: Accept with the following revisions:

"(2) Electrostatic Equipment. Electrodes and electrostatic atomizing heads shall be securely supported and fixed in place, and shall be effectively insulated from ground." (Remainder unchanged).

"(3) High Voltage Leads. High voltage leads shall have an insulation voltage rating not less than the voltage employed, and shall be protected from physical damage and destructive elements by approved means." (Remainder unchanged).

Substantiation: "Adequately" and "properly", in and of themselves, are terms that 3.2.1 of the NEC Style Manual states: "shall not be used".

"Mechanical" implies tools or machinery.

Panel Meeting Action: Reject

Panel Statement: The substantiation provided with this comment provides no additional justification for the recommendation than was submitted with the original proposal.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-160 Log #1189 NEC-P14 **Final Action: Reject**
(516.10(A)(2) and (3))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 14-300

Recommendation: Accept the proposal with the following revisions:

(A)(2) Electrodes and electrostatic atomizing leads shall be securely supported...(remainder unchanged).

In (A)(3), change "qualified" to "authorized".

Substantiation: "Securely supported" is the common NEC phrase. A painter may not meet the definition of "qualified."

Panel Meeting Action: Reject

Panel Statement: The substantiation provided with this comment provides no additional justification for the recommendation than was submitted with the original proposal.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

ARTICLE 517 — HEALTH CARE FACILITIES

15-1 Log #166 NEC-P15 **Final Action: Accept**
(517.2 (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-3a
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comment expressed in the voting.

In addition, the Technical Correlating Committee directs the panel to clarify the action on this proposal as it relates to 2.2.2 of the NEC Style Manual concerning the use of mandatory text in a definition.

This action shall be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise text to read as follows:

Battery Powered Lighting Units.

Individual unit equipment for back up illumination consisting of the following:

(1) A rechargeable battery

(2) A battery charging means

(3) Provisions for one or more lamps mounted on the equipment, or with terminals for remote lamps, or both

(4) A relaying device arranged to energize the lamps automatically upon failure of the supply to the unit equipment.

Panel Statement: The panel accepts the direction of the TCC to clarify the action on this proposal as it relates the use of mandatory text in a definition.

The panel has eliminated the mandatory text in the definition.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-2 Log #924 NEC-P15 **Final Action: Reject**
(517)

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: N/A
Recommendation: Reject all proposals in Article 517 that were intended to maintain consistency between the revisions to the next edition of NFPA 99 and the 2011 NEC (NFPA 70).
Substantiation: The NEC Technical Correlating Committee identified several proposals to revise Article 517 that were the direct result of proposed changes to NFPA 99. Since NFPA 99 was not accepted and turned back to the committee at the 2009 NFPA Annual Meeting, the appropriate course of action would be to reject all proposals related to the NFPA 99 development process.
Panel Meeting Action: Reject
Panel Statement: The submitter's recommendation did not provide the specific references as required by the Regulations Governing Committee Projects, Section 4.4.5(c), to allow the panel to act.

The panel has acted on the comments in Article 517 that were intended to maintain consistency between the proposed revisions to NFPA 99 and the NEC (NFPA 70) individually.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:

LIPSTER, S.: In fact, the comment meets the requirements of 4.4.5(c) of the Regulations Governing Committee Projects. The comment should be accepted, the submitters substantiation is valid as evidenced by the action taken by this panel on all comments identified by the TCC as linked to NFPA 99.

15-3 Log #766 NEC-P15 **Final Action: Reject**
(517.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-3a
Recommendation: Accept or delete.
Substantiation: Section 90.3 states the NEC is an installation code. The interpretation of 2.2.2 of the NEC Style Manual that mandatory text shall not be used in a definition should not apply to a description. Many definitions have mandatory text, e.g., accessible, readily, ampacity, automatic, bonded, branch circuit, branch circuit overcurrent device, cabinet, circuit breaker, conduit body, cooking unit counter mounted, disconnecting means, enclosure, explosionproof apparatus, exposed, externally operable, grounded, solidly, etc.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide any clear direction. The recommendation to accept or delete is unclear.

See panel action and statement on Comment 15-1.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-4 Log #925 NEC-P15 **Final Action: Accept**
(517.2)

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 15-7
Recommendation: Reject the proposal and restore to the 2008 NEC language. Restore all instances of the term "emergency system" back in the sections where it was removed resulting from this action.
Substantiation: The NEC Technical Correlating Committee identified several proposals to revise Article 517 that were the direct result of proposed changes to NFPA 99. NFPA 99 was not accepted and returned back to the committee at the 2009 NFPA Annual Meeting, the appropriate course of action is to reject all proposals related to the NFPA 99 development process, since it is uncertain how those requirements appear in the final accepted version of NFPA 99. The substantiation indicates that the proposal "eliminates an unnecessary hierarchal level." This is not substantiated and, in fact, the three branches addressed in Article 517 have worked well for NEC cycles. Why is the need for differentiating between the branches of the essential system different now? Deleting the definition of the term "emergency system" from Article 517 has unintended consequences that lessen the current requirements without technical substantiation. Whether addressing a performance requirement or an installation requirement, the terms should be clear and be accurate in describing how a system functions. Other Codes and Standards are impacted by such a drastic change, such as product standards that evaluate and list equipment as suitable for use on "emergency systems" and "identified for use on emergency systems" as required by Article 700 (for example, see 700.6). 700.4, 700.7, 700.9, 700.12, 700.16, 700.18, 700.25 and 700.27 all include requirements that must be applied to health care facilities. No such requirements currently exist in Article 517. Building codes and other standards use the term "emergency system" when addressing health care facilities, deleting this term from Article 517 has unintended and far-reaching correlation consequences between codes and standards as a result. The substantiation includes removing essential requirements that should apply to the respective branches (including the critical branch) of the essential system in health care facilities. As stated in Proposal 15-7, "the fundamental purpose of this proposal is to coordinate with the 2010 version of NFPA 99." NFPA 99 has problems (including the electrical provisions) as evidenced at the 2009 Annual meeting action to return the document back to the committee. The appropriate action is to restore the 2008 NEC requirements that were deleted or modified in Article 517 as directed by the NEC TCC.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-5 Log #1158 NEC-P15 **Final Action: Reject**
(517.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-10
Recommendation: Accept the proposal with the following revisions:
A system comprised of one or more of the following:
(1) An isolation transformer(s)
(2) A generator(s)
(3) An electrically isolated battery
(4) A combination of such equipment.
Substantiation: "Equivalent" is not specific as in 517.160(A)(1).
Panel Meeting Action: Reject
Panel Statement: The panel upholds its position on Proposal 15-10. The recommended change does not add clarity.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-6 Log #1193 NEC-P15 **Final Action: Reject**
(517.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-10
Recommendation: Accept the proposal.
Substantiation: There is an NEC definition for "Isolating Transformer", but the definition immediately following Isolated Power Systems is the definition for isolation transformer; are they different? The secondary should be specified as ungrounded since ungrounded conductors can be supplied from a grounded secondary, as commonly done with a 2-wire 240 volt secondary which complies with this section, but doesn't meet the intent. A consistent use of "isolation" would be clearly understood by Code users who may not be versed in the fine points of the panel statement. The proposed definition is descriptive as almost all definitions in Article 100 contain requirements, but are not Code "rules", per se.
Panel Meeting Action: Reject
Panel Statement: The existing text is clear and concise. The submitter has no new substantiation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-7 Log #2174 NEC-P15 **Final Action: Accept**
(517.2)

Submitter: Barry F. O'Connell, Tyco Thermal Controls
Comment on Proposal No: 15-6
Recommendation: These proposals should be rejected because of the implication in regard to life safety in hospitals.
Substantiation: These proposals are apparently all about aligning with NFPA 99, but have far-reaching consequences in the breaking of the tie to Life Safety Circuits in Article 700. Revising the definition for the Life Safety Branch, and the other proposals that in effect break the link to Article 700, does not remove the fundamental need for Emergency Systems in hospitals.
The intent of Emergency Systems is described in the scope of Article 700:
Emergency systems are those systems legally required and classed as emergency by municipal, state, federal, or other codes… intended…in the event of failure of the normal supply... to supply, distribute, and control power and illumination essential for safety to human life.
FPN No. 3: Emergency systems are generally installed in places of assembly where artificial illumination is required
for safe exiting and for panic control in buildings subject to occupancy by large numbers of persons, such as hotels,
theaters, sports arenas, health care facilities, and similar institutions. Emergency systems may also provide power
for such functions as ventilation where essential to maintain life, fire detection and alarm systems, elevators, fire pumps,
public safety communications systems, industrial processes where current interruption would produce serious life
safety or health hazards, and similar functions.
The NEC is a minimum requirement. In a hospital in particular, removing the tie-in to Article 700 is a serious disconnect and should be reconsidered.
Note: Supporting Material is available for review at NFPA headquarters.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
LIPSTER, S.: Health care facility staff, patients, and visitors must be afforded the life-safety protection essential for human life described in the scope of Article 700. The submitter is correct stating health care facilities should continue to be included in the scope of Article 700.

15-8 Log #2328 NEC-P15 **Final Action: Reject**
(517.2)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 15-16
Recommendation: Continue to accept this proposal, but substitute the term "patient care area" with "patient care room" in the following areas: 517.2Reference Grounding Point; 517.10(A); 517.13 and 13(A); 517.18(C); 517.20(A); 517.30(C)(3)(1), (C)(3)(2) and FPN; 517.33(A)(3); 517.43(A)(1); 517.80; 517.81; 517.82(A) FPN.
Substantiation: The ROP draft seemed only to replace this term in a few instances and missed the above stated areas. This comment is intended only to assist in correlating and should not be considered a technical change.
Panel Meeting Action: Reject
Panel Statement: This comment is moot as the result of the return of NFPA 99 to committee.
See panel action on Comment 15-26.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-9 Log #167 NEC-P15 **Final Action: Accept**
(517.2.Critical Branch)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-6
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-10 and 15-11.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-10 Log #659 NEC-P15 **Final Action: Accept**
(517.2.Critical Branch)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-6
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-11.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-11 Log #1732 NEC-P15 **Final Action: Accept**
(517.2.Critical Branch)

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-6
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The submitters substantiation, "*To Coordinate with the 2010 Edition of NFPA 99.*" is not valid since the 2010 Edition of NFPA was returned to committee at the June 2009 NFPA Association Technical Meeting.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-12 Log #168 NEC-P15 **Final Action: Accept**
(517.2.Emergency System)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-7
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-13 and 15-14.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-13 Log #660 NEC-P15 **Final Action: Accept**
(517.2.Emergency System)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-7
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 15-14.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-14 Log #1750 NEC-P15 **Final Action: Accept**
(517.2.Emergency Systems)

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-7
Recommendation: Reject this proposal and restore the 2008 NEC text.
Substantiation: The submitters substantiation for this proposal relies on two points. One point claims the conditions of Article 700 are not easily applicable to health care facilities “essential” electrical systems and these systems should be relieved of the Article 700 requirements. The second point asserts that the 2010 Edition of NFPA 99 as already made the change and the NEC should accept this proposal for coordination purposes.
The panel statement affirms *“The panel does not necessarily agree with the substantiation provided by the submitter with regard to Article 700.”* The clear implication is that the panel action relied solely on the coordination point raised by the proposal. The 2010 Edition of NFPA 99 was returned to committee at the June 2009 NFPA Technical Association Meeting in Chicago, therefore the coordination issue is moot and the proposal should be rejected and text restored to the 2008 NEC.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-15 Log #169 NEC-P15 **Final Action: Accept**
(517.2.Equipment System Branch)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-8
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-16 and 15-17.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-16 Log #661 NEC-P15 **Final Action: Accept**
(517.2.Equipment System Branch)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-8
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-17.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-17 Log #1749 NEC-P15 **Final Action: Accept**
(517.2.Equipment System Branch)

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-8
Recommendation: Reject this proposal and restore the 2008 NEC text.
Substantiation: The substantiation is based solely on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009. he coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-18 Log #170 NEC-P15 **Final Action: Accept**
(517.2.Life Safety Branch)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-13
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-19 and 15-20.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-19 Log #662 NEC-P15 **Final Action: Accept**
(517.2.Life Safety Branch)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-13
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-20.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-20 Log #1733 NEC-P15 **Final Action: Accept**
(517.2.Life Safety Branch)

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-13
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The substantiation is based on two points, one is the assertion that Article 700 does not apply to the life safety branch. And the second cites coordination with the 2010 Edition of NFPA 99. The assertion that Article 700 does not apply to this branch is based on the action taken by the NFPA 99 Electrical Systems Technical Committee. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 both the action by the techncial committee and coordination issue are now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-4 Log #171 NEC-P12 **Final Action: Accept**
(517.2.Long-Time Rating (X-Ray Equipment) and Momentary Rating (X-Ray Equipment) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-14
Recommendation: The Technical Correlating Committee directs that this proposal be referred to Code-Making Panel 12 for correlating action in Article 660.
This action will be considered by Code-Making Panel 12 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to correlate action with Article 660.
See action on Comment 12-102.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-21 Log #172 NEC-P15 **Final Action: Accept**
(517.2.Patient Bed Location)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-15
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-22 and 15-23.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-22 Log #663 NEC-P15 **Final Action: Accept**
(517.2.Patient Bed Location)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-15
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-23.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-23 Log #1748 NEC-P15 **Final Action: Accept**
(517.2.Patient Bed Location)

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-15
Recommendation: Reject this proposal and restore the 2008 NEC text.
Substantiation: The substantiation is based solely on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-24 Log #173 NEC-P15 **Final Action: Accept**
(517.2.Patient Care Area)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-16
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
The Technical Correlating Committee further directs that the panel clarify the panel action related to the word “portion”.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-25 and 15-26.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-25 Log #664 NEC-P15 **Final Action: Accept**
(517.2.Patient Care Area)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-16
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-26.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-26 Log #1747 NEC-P15 **Final Action: Accept**
(517.2.Patient Care Area)

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-16
Recommendation: Reject this proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is based on two points. One states that NFPA 99 uses the phrase in a manner differently than the NEC and the NFPA 99 usage should prevail. The second point involves coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 both the usage and coordination issues are now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-27 Log #1752 NEC-P15 **Final Action: Accept**
(517.2.Patient Care Area)

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-17
Recommendation: Reject this proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is based on two points. One states that NFPA 99 uses the phrase in a manner differently than the NEC and the NFPA 99 usage should prevail. The second point involves coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 both the usage and coordination issues are now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-28 Log #174 NEC-P15 **Final Action: Accept**
(517.2.Patient Care Areas, General Care Area)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-17
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-27 and 15-29.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-29 Log #665 NEC-P15 **Final Action: Accept**
(517.2.Patient Care Areas, General Care Area)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-17
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-27.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-30 Log #2707 NEC-P15 **Final Action: Reject**
(517.2.Power Safe Protector (PSP))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 15-19
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The proposal and comment are not specific to Article 517. The submitter has provided no new substantiation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-31 Log #175 NEC-P15 **Final Action: Accept**
(517.2. X-ray Installations Transportable)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-21
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal since it accepted the proposal, and then modified the text in the panel statement.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise definition to read as follows:
"X-ray equipment to be conveyed by a vehicle or that is readily disassembled…".
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal.
The panel action on Proposal 15-21 should have been Accept in Principle. The panel statement reflects this action. It is the panel's desire to have the definition read: Definition to read "X-ray equipment to be conveyed by a vehicle or that is readily disassembled…".
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-32 Log #1192 NEC-P15 **Final Action: Reject**
(517.11)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-23
Recommendation: Delete the existing text or revise as follows:
This article contains provisions necessary for the practical safeguarding of persons and property from hazards arising from the use of electricity.
Substantiation: The proposed wording is from 90.1, but since that section applies to the entire NEC, this section seems redundant. In reality, this article does more than relate to low potential differences and conductive surfaces and applies to persons other than a patient.
Panel Meeting Action: Reject
Panel Statement: Simply restating the text, already in 90.1, is unnecessary. The submitter has provided no new substantiation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-33 Log #176 NEC-P15 **Final Action: Accept**
(517.13(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-25
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 15-29 in relation to isolated ground receptacles.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider and correlate with the action on Proposal 15-29.
See action on Comment 15-35.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-34 Log #2319 NEC-P15 **Final Action: Accept in Principle**
(517.13(B))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 15-25
Recommendation: Delete exception No. 2 to (2) and renumber the exceptions.
Substantiation: This comment is intended to help correlate action taken ROP 5-29.
Panel Meeting Action: Accept in Principle
Panel Statement: See action on Comment 15-35. This achieves what the submitter asked the panel to do.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-35 Log #2445 NEC-P15 **Final Action: Accept**
(517.13(B))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 15-25
Recommendation: Revise the text of the 2008 NEC ROP Draft as follows:

(B) Insulated Equipment Grounding Conductor.

(1) General. The following shall be directly connected to an insulated copper equipment grounding conductor that is installed with the branch circuit conductors in the wiring methods as provided in (A) ~~metal raceways or as a part of listed cables having a metallic armor or sheath assembly with the branch-circuit conductors supplying these receptacles or fixed equipment~~:
Exception: An insulated equipment bonding jumper that directly connects to the equipment grounding conductor is permitted to connect the box and receptacle(s) to the equipment grounding conductor.

(1) The grounding terminals of all receptacles.

(2) Metal boxes and enclosures containing receptacles.

(3) All non–current carrying conductive surfaces of fixed electrical equipment likely to become energized that are subject to personal contact, operating at over 100 volts.

~~Exception No. 1 to (1): The equipment grounding terminal of a receptacle shall be permitted to be connected to an insulated equipment bonding jumper that extends from a metal box or enclosure that is connected to an insulated equipment grounding conductor.~~
~~Exception No. 2 to (2): Metal boxes and enclosures containing an isolated ground receptacle(s) as permitted by 250.146(D).~~
Exception No. 1 ~~3~~ to (3): Metal faceplates shall be permitted to be connected to the equipment grounding conductor by means of a metal mounting screw(s) securing the faceplate to a grounded outlet box or grounded wiring device.
Exception No. 2 ~~4~~ to (3): Luminaires more than 2.3 m (71/2 ft) above the floor and switches located outside of the patient care vicinity shall be permitted to be connected to an equipment grounding return path complying with 517.13(A).

(2) Sizing. Equipment grounding conductors and equipment bonding jumpers shall be sized in accordance with ~~Table~~ 250.122.

Substantiation: This Comment intends to make editorial improvements to the changes made by The Panel in the ROP. The opening paragraph of (B)(1) needs to simply refer to the wiring methods covered in 517.13(A) rather than restate them in (B)(1). This allows each section to stand alone and yet allow (B) to supplement the rules in (A).

The exception to (B)(1) as suggested in this Comment is needed as requiring the equipment grounding conductor to connect directly to a metal box and then a bonding jumper be installed to the receptacle is overly restrictive. The rule, without the exception, unnecessarily restricts a long-standing installation practice of connecting an equipment bonding jumper from the equipment grounding conductor to the receptacle and box. Another problem the exception suggested in this Comment prevents is stacking of equipment grounding conductor connections to the metal box. Metal boxes used at switch and receptacle outlets typically have only one threaded hole for a grounding screw. Another option that might remove the necessity for the proposed exception to (B)(1) is to remove the word "directly" in the first line.

Exception No. 1 following the list is not needed with the addition of the exception suggested to follow (B)(1) and is recommended for deletion.

Exception No. 2 following the list is not needed since the Panel removed the permission to install isolated grounding receptacles in the ROP.

The final two exceptions in the proposed text have been renumbered.

Finally, it is suggested that the reference be to 250.122 rather than to Table 250.122 as some rules such as increasing the size of the equipment grounding conductor if the ungrounded conductors are increased in size have application in this installation.

Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-36 Log #177 NEC-P15 **Final Action: Accept**
(517.15 (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-27
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.

After the consideration of the return of NFPA 99 to committee, the panel changes its action on Proposal 15-27 to Reject.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-37 Log #1426 NEC-P15 **Final Action: Reject**
(517.15 (New))

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 15-27
Recommendation: Revise the proposed new 517.15 to be Section 517.3 and to read:

517.13 Panelboard Location. Panelboards in other than clinics, and medical offices, and dental offices, shall not be located in public access spaces. Isolated power panels shall be permitted to be located in patient care rooms.

Substantiation: As proposed, the new requirement, numbered as 517.15, falls within part II of Article 517. Section 517.10(A) states that Part II only applies to patient care areas. That does not include hallways. See also 517.10(A) which states that corridors are not covered.

Section 517.10(B) further states that Part II does not apply to "clinics, medical and dental offices". The proposed new words preserve that exclusion.

Panel Meeting Action: Reject
Panel Statement: This comment is moot as the result of the return of NFPA 99 to committee.

See panel action on Comment 15-36.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-38 Log #1427 NEC-P15 **Final Action: Accept**
(517.15 (New))

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 15-27
Recommendation: Reject the proposed new 517.15.
Substantiation: Even the best intentioned actions have unintended negative consequences. The practical result of this proposal would be to create electrical closets for panelboards. Unfortunately, "electrical" closets do not exist. (And I, for one, have certainly tried.) When the electricians move all of the stored junk and materials out of the way of the panels in order to work in them, where the materials be moved? Out into the hallways; thus creating the same obstructions and traffic jams in the hallways that the proposal is trying to avoid.

Furthermore, all an architect needs to do to comply with the requirement to keep panelboards out of hallways, is to create a closet that is a few inches deep – which still leaves the electricians working in the hallway.

Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-39 Log #178 NEC-P15 **Final Action: Accept**
(517.16)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-29
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 15-25.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider and correlate with the action on Proposal 15-25.

See panel action on Comments 15-35, 15-41 and 15-42.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-40 Log #446 NEC-P15 **Final Action: Reject**
(517.16)

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 15-28
Recommendation: Accept the proposal and revise as follows:

517.16 Receptacles with Insulated Grounding Terminals.

(A) Identification. Receptacles with insulated grounding terminals, as permitted in 250.146(D), shall be identified; such identification shall be visible after installation.

(B) Equipment Grounding Conductors. Isolated ground receptacles installed in branch circuits for patient care areas shall be connected to an insulated equipment grounding conductor in accordance with 250.146(D) in addition to the insulated copper equipment grounding conductor required in 517.13(B).

(C) Equipment Grounding Conductor Identification. The equipment grounding conductor installed for isolated grounding receptacles in patient care areas shall be clearly identified in accordance with 250.119 so as to distinguish it from the insulated equipment grounding conductor required by 517.13(B).
Substantiation: Section 4.3.2.2.7.1 of NFPA 99 continues to address isolated grounding circuits (quiet grounds) and receptacles in health care facilities. Proposal 15-28 addresses the confusion that currently exists regarding installations of isolated grounding receptacles and circuits installed in patient care locations. The proposal removes the need for the current FPN following 517.16 and provides users with clear direction regarding the installation and use of IG receptacles and circuits in patient care locations. The proposed language clarifies that the two equipment grounding conductor paths required by 517.13(A) and (B) create the redundant equipment grounding necessary to ensure equipment grounding and an effective ground fault current path in patient care locations. Where engineering designs or manufacturers of medical equipment require use of IG circuits and receptacles, the installation of the insulated and isolated equipment grounding conductor should be in addition to the two equipment grounding conductors required in 517.13 without disturbing them. Isolated grounding circuits and receptacles, when properly installed, do not offer the functional benefits of two equipment grounding conductors as required in 517.13 because the IG equipment grounding conductor is not in parallel with the metal equipment grounding conductor path addressed in 517.13(A). I encourage CMP-15 to reconsider its initial action on Proposals 15-28 and 15-29 to preserve current provisions in the NEC that are still necessary for branch circuits serving patient care locations that are required to provide isolated grounding benefits that are often specified by manufacturers or engineered designs for health care facilities.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comments 15-41 and 15-42.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-41 Log #447 NEC-P15 **Final Action: Reject**
(517.16)

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 15-29
Recommendation: Reject the proposal.
Substantiation: Accepting this proposal removes provisions for installing isolated grounding receptacles and IG circuits without technical substantiation. Chapter 4 of NFPA 99 (the current edition and the proposed revised standard) still includes provisions and requirements for IG circuits and receptacles (quiet grounds) installed in health care facilities. Medical equipment and appliance manufacturers continue to produce equipment that recommends use of isolated ground receptacles and circuits in their installation instructions. Electrical device manufacturers continue to produce hospital grade IG receptacles for use in patient care areas when required according to design and performance specifications and engineered plans. Removing the provisions for installing isolated grounding receptacles and circuits in patient care areas also appears to create a conflict with NFPA 99 (both the current edition and the proposed revised edition that was returned to committee during the 2009 NFPA Annual Meeting and Conference). I recommend CMP-15 carefully consider its action on this proposal and accept this comment to reverse the acceptance of this proposal and reconsider its action on Proposal 15-28. Section 4.3.2.2.7.1 of NFPA 99 continues to address isolated grounding circuits (quiet grounds) and receptacles in health care facilities.
Panel Meeting Action: Reject
Panel Statement: The panel agrees with the substantiation brought forth in Proposal 15-29.

The panel does not agree with the submitter's substantiation regarding NFPA 99. NFPA 99 states "quiet grounds, if used, shall not defeat the purposes of the safety features of the grounding systems herein."

The panel contends that one cannot have a redundant ground system and at the same time adequately maintain an isolated ground system.

The panel further contends that patient safety should take precedence over noise reduction.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-42 Log #1248 NEC-P15 **Final Action: Reject**
(517.16)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 15-29
Recommendation: The panel should reject the proposal and revise the FPN as follows:

FPN: Caution is important in specifying such a system with receptacles having insulated grounding terminals since the grounding impedance is controlled only by the equipment grounding conductors. ~~and does not benefit functionally from any parallel grounding paths~~. Isolated ground receptacles would require two insulated grounding conductors connected to the receptacle grounding terminal to maintain the functional benefit of the parallel grounding paths. This type of installation is typically used where a reduction of electrical noise (electromagnetic interference) is necessary ~~and parallel grounding paths are to be avoided~~.
Substantiation: Acceptance of this proposal prohibits the installation of Isolated Ground (IG) receptacles in patient care areas of Health Care Facilities. The substantiation for this proposal asserts that existence of the FPN implies that the installation of IG receptacles in patient care areas is a "bad idea" without clearly describing the hazard that may be associated with the installation of IG receptacles in patient care areas. The reduction of electrical noise provided by Isolated Ground receptacles may be critical to the proper operation of sensitive medical instrumentation. If the installation of IG receptacles were to be prohibited the result may be the additional hazard to patient safety introduced by the possible malfunctioning of sensitive medical instrumentation due to electrical noise.

The proposal substantiation is based on the FPN stating that caution must be used when installing IG receptacles. As noted in the NEC Handbook, 517.16 is intended to prevent indiscriminate use of IG receptacles in patient care areas. The FPN expresses the need for caution when installing IG receptacles in patient care areas. Due to construction features of the IG receptacle that isolate the receptacle grounding terminal from the receptacle strap caution must be exercised when installing IG receptacles where redundant grounding is required by 517.13. The proposed connection of two insulated grounding conductors to an IG receptacle provides the redundant grounding scheme required by 517.13.
Panel Meeting Action: Reject
Panel Statement: The panel agrees with the substantiation brought forth in Proposal 15-29.

The panel contends that one cannot have a redundant ground system and at the same time adequately maintain an isolated ground system.

The panel further contends that patient safety should take precedence over noise reduction.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-43 Log #1249 NEC-P15 **Final Action: Reject**
(517.16)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 15-28
Recommendation: The panel should accept this proposal.
Substantiation: This proposal clearly states the requirements for maintaining the redundant grounding scheme required by 517.13 when Isolated ground receptacles are installed in Patient Care Areas. Please refer to the comment on proposal 15-29 for additional information regarding Isolated Ground receptacle installation in patient care areas.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comments 15-41 and 15-42.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-44 Log #2320 NEC-P15 **Final Action: Accept**
(517.16)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 15-29
Recommendation: Continue to accept this proposal.
Substantiation: I agree with the submitter's substantiation.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-45 Log #179 NEC-P15 **Final Action: Accept**
(517.17(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-32
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.

See panel action and statement on Comments 15-46 and 15-47.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-46 Log #666 NEC-P15 **Final Action: Accept**
(517.17(A))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-32
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-47.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-47 Log #1746 NEC-P15 **Final Action: Accept**
(517.17(A))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-32
Recommendation: Reject this proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is based solely on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-48 Log #2166 NEC-P15 **Final Action: Reject**
(517.17(B))

Submitter: Vincent J. Saporita, Cooper Bussmann
Comment on Proposal No: 15-39
Recommendation: Modify the wording of the proposed new text and place it as a new item (2) after the list of three conditions where ground fault protection is not allowed. Change the current material in (B) to (B) (1) and add the new paragraph as (B) (2).
(B) Feeders.
(1) Additional Level of Ground Fault Protection Required. Where ground-fault protection is provided for operation of the service disconnecting means or feeder disconnecting means as specified by 230.95 or 215.10, an additional step of ground-fault protection shall be provided in all next level feeder disconnecting means downstream toward the load. Such protection shall consist of overcurrent devices and current transformers or other equivalent protective equipment that shall cause the feeder disconnecting means to open.
The additional levels of ground fault protection shall not be installed as follows:
(1) On the load side of an essential electrical system transfer switch
(2) Between the on-site generating unit(s) described in 517.35(B) and the essential system transfer switch(es)
(3) On electrical systems that are not solidly grounded wye systems with greater than 150 volts to ground but not exceeding 600 volts phase-to-phase
(2) Additional Level of Ground Fault Protection Not Required. Ground fault protection shall not be required on feeders where the ground fault selectivity requirements are met by the feeder's phase protection without the need for the additional level of dedicated ground fault protection.
Substantiation: CMP 15 was correct in its statement "The submitter's proposal prohibits this arrangement.", because, as written, the original proposal indeed prohibited the second level of ground fault protection. This comment removes that prohibition and makes the second level of ground fault protection optional when the overcurrent protective devices (circuit breakers or fuses) provide the required selective coordination. This eliminates the redundant need for a second level of ground fault protection and enhances overall system reliability.
Panel Meeting Action: Reject
Panel Statement: The proposed change to the original proposal diminishes rather than enhances protection. The substantiation does not justify the proposed change.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-49 Log #667 NEC-P15 **Final Action: Accept**
(517.17(E))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-61
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: The panel understands that the submitter was referencing 517.19(E) which deals with Proposal 15-61.
See panel action and statement on Comment 15-68.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-50 Log #1578 NEC-P15 **Final Action: Accept**
(517.17(E))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 15-43
Recommendation: Continue to reject the proposal.
Substantiation: This proposal should continue to be rejected, not only for the reasons given in the panel statement, but because it jeopardizes life-safety. The reasons for requiring ground-fault protection of equipment in certain applications are well documented. The damage than can result from a ground fault on such a system may render a substantial portion of the system inoperative, resulting in a lengthy outage potentially worse than that envisioned by the submitter, or worse yet start a life threatening fire. Further, restraint of the GFPE may increase the downstream arc flash hazard for maintenance workers.
The late J.R. Dunki-Jacobs, a recognized authority on ground-fault protection, stated in his book *Industrial Power System Grounding Design Handbook* (pages 186, 189) that, "If an arcing line-to ground fault is initiated in a solidly grounded system on one of three bare buses in a metal enclosure, the hot ionized gases that are developed by the fault can be expected to cause escalation to an arcing multi-phase fault within 1 or 2 cycles (0.0167 to 0.033 sec) of time." He went on to state, "Escalating arcing-ground faults have shown themselves to be extremely devastating…" and "Unquestionably then, engineering attention to their immediate suppression must be proactive and immediate, rather than reactive. Not only for reason of minimizing the released arc energy to maximize personnel safety, but also to avert arcing-fault escalation." The suggestion that an audible and visual signal device would be of any value is ludicrous.
System reliability and blackout prevention can be achieved by proper system design, equipment selection and coordination. The GFPE restraint called for in this proposal is unnecessary and a potential threat to life-safety.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-51 Log #2228 NEC-P15 **Final Action: Reject**
(517.17(E))

Submitter: Malcolm Allison, Ferraz Shawmut / Rep. National Electric Fuse Association
Comment on Proposal No: 15-43
Recommendation: Modify, for improved clarity, the proposed text to read:
(E) Restraint. Normal Source ground fault protection on the line side of a transfer switch supplying essential systems shall be permitted to be restrained for ground faults on the loadside of the transfer switch, provided that audible and visual signal devices indicate whenever a ground fault relay has been restrained, and instructions, on the course of action to be taken in the event of an indicated ground fault, are located at or near the sensor location.
Substantiation: This proposal should be accepted for the following safety and reliability reasons: Safety and reliability are improved whenever both levels of ground fault protection are on the normal side of the transfer switch and a ground fault occurs on the load side of the transfer switch, causing the downstream ground fault protective device to open, potentially blacking out life-safety related loads. Additionally, this causes the transfer switch to transfer to the alternate source. Designers need to utilize ground fault protection for the normal source, and at the same time, provide selective coordination for essential system devices with all overcurrent devices on their line side. This can be readily accomplished by allowing the normal side ground fault protection to be restrained for all ground faults on the load side of the transfer switch. It provides a provision, similar to that found in 700.26 and 701.17. These sections permit ground fault protection to be totally omitted on the alternate source side of emergency and legally required standby systems.

This comment provides additional design flexibility that improves safety and reliability of the total system. The requirement for indication is included to correlate with the requirement found in 700.7(D).
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided additional technical substantiation.
The panel supports the substantiation provided on Comment 15-50.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-52 Log #180 NEC-P15 **Final Action: Accept**
(517.18(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-44
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comment 15-53.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-53 Log #1745 NEC-P15 **Final Action: Accept**
(517.18(A))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-44
Recommendation: Reject this proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is based solely on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-54 Log #2409 NEC-P15 **Final Action: Accept in Principle**
(517.18(B))

Submitter: Brian E. Rock, Hubbell Inc.
Comment on Proposal No: 15-46
Recommendation: Continue to Accept but revise text to read:
(B) Patient Bed Location Receptacles. Each patient bed location shall be provided with a minimum of four receptacles. They shall be permitted to be of the single, duplex, or quadruplex types, or any combination of the three~~, or duplex types or a combination of both~~. All receptacles, whether four or more, shall be listed "hospital grade" and so identified. The grounding terminal of each receptacle shall be connected to an insulated copper equipment grounding conductor sized in accordance with Table 250.122.
Substantiation: "Quadplex", as proposed by the Submitter of P15-46 and as Accepted by Code Panel 15, is a registered trademark (U.S. Patent & Trademark Office No. 1,595,041) of Hubbell Incorporated for receptacles of the quadruplex construction (four contact devices on the same device mounting means). Change to generic "quadruplex" adjective and add the noun "types" and delete the comma after "three."
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 15-60 which satisfies the submitter's concern.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-55 Log #2410 NEC-P15 **Final Action: Accept in Principle**
(517.18(B))

Submitter: Brian E. Rock, Hubbell Inc.
Comment on Proposal No: 15-49
Recommendation: Continue to Accept but revise text to read:
(B) Patient Bed Location Receptacles. Each patient bed location shall be provided with a minimum of four receptacles. They shall be permitted to be of the single, duplex, or quadruplex types, or any combination of the three~~, or duplex types or a combination of both~~. All receptacles, whether four or more, shall be listed "hospital grade" and so identified. The grounding terminal of each receptacle shall be connected to an insulated copper equipment grounding conductor sized in accordance with Table 250.122.
Substantiation: "Quadplex", as proposed by the Submitter of P15-49 and as Accepted by Code Panel 15, is a registered trademark (U.S. Patent & Trademark Office No. 1,595,041) of Hubbell Incorporated for receptacles of the quadruplex construction (four contact devices on the same device mounting means). Change to generic "quadruplex" adjective and add the noun "types" and delete the comma after "three."
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 15-60 which satisfies the submitter's concern.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-56 Log #181 NEC-P15 **Final Action: Accept**
(517.18(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-50
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal to correlate with its action on Proposal 15-53.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comment 15-58.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-57 Log #182 NEC-P15 **Final Action: Accept**
(517.18(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-51
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal to correlate with its action on Proposal 15-53.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comment 15-58.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-58 Log #183 NEC-P15 **Final Action: Accept**
(517.18(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-53
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal to correlate with its actions on Proposals 15-50 and 15-51.
In addition, the Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal to correlate with its actions on Proposals 15-50 and 15-51.

After the consideration of the return of NFPA 99 to committee, the panel changes its action on Proposal 15-53 to reject. This action will correlate with the panel actions on Proposals 15-50 and 15-51.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-59 Log #184 NEC-P15 **Final Action: Accept**
(517.19(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-55
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal to correlate with its actions on Proposals 15-57 and 15-58.

In addition, the Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal to correlate with its actions on Proposals 15-57 and 15-58.

See panel action and statement on Comment 15-60.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-60 Log #1744 NEC-P15 **Final Action: Accept in Part**
(517.19(B))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-55
Recommendation: Accept the proposal in part with the following revision: (Legislative text removed for clarity)
(B) Patient Bed Location Receptacles

(1) Minimum Number and Supply. Each patient bed location shall be provided with a minimum of fourteen receptacles at least four of which shall be connected to either of the following:

(a) The normal system branch circuit required in 517.19(A)

(b) An emergency system circuit supplied by a different transfer switch than the other receptacles at the same patient bed location

(2) Receptacle requirements. The receptacles required in 517.19(B)(1) shall be permitted to be single, duplex or quadruplex types or any combination thereof. All receptacles shall be listed "hospital grade" and shall be so identified. The grounding terminal of each receptacle shall be connected to the reference grounding point by means of a insulated copper equipment grounding conductor.
Substantiation: The substantiation for this proposal is primarily based on coordination with the 2010 Edition of NFPA 99. The coordination issue is now moot since NFPA 99 was
returned to committee at the June 2009 NFPA Technical Association Meeting. With that being said, the proposal does have considerable merit when considering
increasing the number of receptacles in patient bed locations. The language proposed in this comment returns the text to the 2008 NEC version, yet increases the
number of required receptacles and allows for the use of quadruplex receptacles in these locations.
Panel Meeting Action: Accept in Part
Revise text to read as follows:
(B) Patient Bed Location Receptacles

(1) Minimum Number and Supply. Each patient bed location shall be provided with a minimum of six receptacles at least one of which shall be connected to either of the following:

(a) The normal system branch circuit required in 517.19(A)

(b) An emergency system circuit supplied by a different transfer switch than the other receptacles at the same patient bed location

(2) Receptacle requirements. The receptacles required in 517.19(B)(1) shall be permitted to be single, duplex or quadruplex types or any combination thereof. All receptacles shall be listed "hospital grade" and shall be so identified. The grounding terminal of each receptacle shall be connected to the reference grounding point by means of a insulated copper equipment grounding conductor.
Panel Statement: The panel does not accept changing the number of receptacles from six to fourteen and one to four.

The panel accepts the remainder of the comment proposed in this comment.

This returns the text to the 2008 NEC version and allows for the use of quadruplex receptacles in these locations as addressed in Comments 15-64 and 15-65.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-61 Log #2125 NEC-P15 **Final Action: Reject**
(517.19(B)(1))

Submitter: James Harvey, University of Michigan Hospitals
Comment on Proposal No: 15-54
Recommendation: Accept the proposal *In Principle in Part* with the following deletion to the original 2008 text of Section 517.19(1):
Each patient bed location shall have a minimum of six receptacles, ~~at least one of~~ which shall be connected to either or the following:
Substantiation: The original wording of my proposal was rejected since "The code should not specify performance or design criteria". In that light I see the current wording as 'design criteria'. And this code provided 'design criteria' is then thrown back to the owner by construction managers and/or A/E's, as a cost savings strategy; to override owner direction to provide more emergency receptacles. The end result often is that very few emergency power receptacles, per Critical Care bed, are provided - certainly not the previously proposed 50%. Eliminating the *'at least one' of*' wording will remove this 'design criteria' from the code, and will force a better dialogue between construction managers, the A/E's, and the owner. As noted in my original proposal, the current wording could become a life and death issue, for severely ill Critical Care (ICU) patients, when insufficient outlets are available upon loss of normal power.
Panel Meeting Action: Reject
Panel Statement: See action and statement on Comment 15-60.

The submitter raises an interesting point relative to design/performance criteria in his substantiation. However, the panel upholds its position which is consistent with NFPA 99, 2005 edition, requiring at least one duplex receptacle per patient bedroom.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-62 Log #185 NEC-P15 **Final Action: Accept**
(517.19(B)(2))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-57
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal to correlate with its action on Proposal 15-55.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal to correlate with its actions on Proposal 15-55.

See panel action and statement on Comment 15-60.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-63 Log #186 NEC-P15 **Final Action: Accept**
(517.19(B)(2))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-58
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal to correlate with its action on Proposal 15-55.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal to correlate with its actions on Proposal 15-55.

See panel action on Comment 15-60.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-64 Log #2411 NEC-P15 **Final Action: Accept in Principle**
(517.19(B)(2))

Submitter: Brian E. Rock, Hubbell Inc.
Comment on Proposal No: 15-57
Recommendation: Continue to Accept but revise text to read:

(B) Patient Bed Location Receptacles.

(1) Minimum Number and Supply. Each patient bed location shall be provided with a minimum of six receptacles, at least one of which shall be connected to either of the following:

(1) The normal system branch circuit required in 517.19(A)

(2) An emergency system branch circuit supplied by a different transfer switch than the other receptacles at the same location.

(2) Receptacle Requirements. The receptacles required in 517.19(B)(1) shall be permitted to be of the single, duplex, or quadruplex types, or any combination of the three. ~~or duplex types or a combination of both.~~ All receptacles, whether six or more, shall be listed "hospital grade" and so identified. The grounding terminal of each receptacle shall be connected to the reference grounding point by means of an insulated copper equipment grounding conductor.

Substantiation: "Quadplex", as proposed by the Submitter of P15-57 and as Accepted by Code Panel 15, is a registered trademark (U.S. Patent & Trademark Office No. 1,595,041) of Hubbell Incorporated for receptacles of the quadruplex construction (four contact devices on the same device mounting means). Change to generic "quadruplex" adjective and add the noun "types".

Panel Meeting Action: Accept in Principle

Panel Statement: See action and statement on Comment 15-60.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-65 Log #2412 NEC-P15 **Final Action: Accept in Principle**
(517.19(B)(2))

Submitter: Brian E. Rock, Hubbell Inc.

Comment on Proposal No: 15-58

Recommendation: Continue to Accept but revise text to read:

(B) Patient Bed Location Receptacles.

(1) Minimum Number and Supply. Each patient bed location shall be provided with a minimum of six receptacles, at least one of which shall be connected to either of the following:

(1) The normal system branch circuit required in 517.19(A)

(2) An emergency system branch circuit supplied by a different transfer switch than the other receptacles at the same location.

(2) Receptacle Requirements. The receptacles required in 517.19(B)(1) shall be permitted to be of the single, duplex, or quadruplex types, or any combination of the three. ~~or duplex types or a combination of both.~~ All receptacles, whether six or more, shall be listed "hospital grade" and so identified. The grounding terminal of each receptacle shall be connected to the reference grounding point by means of an insulated copper equipment grounding conductor.

Substantiation: "Quadplex", as proposed by the Submitter of P15-58 and as Accepted by Code Panel 15, is a registered trademark (U.S. Patent & Trademark Office No. 1,595,041) of Hubbell Incorporated for receptacles of the quadruplex construction (four contact devices on the same device mounting means). Change to generic "quadruplex" adjective and add the noun "types".

Panel Meeting Action: Accept in Principle

Panel Statement: See action and statement on Comment 15-60.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-66 Log #187 NEC-P15 **Final Action: Accept**
(517.19(C))

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 15-59

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal to correlate with its action on Proposals 15-57 and 15-58.

The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to reconsider.

After the consideration of the return of NFPA 99 to committee, the panel changes its action on Proposal 15-59 to Reject.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-67 Log #188 NEC-P15 **Final Action: Accept**
(517.19(E))

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 15-61

Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to reconsider.

See panel action and statement on Comments 15-49 and 15-68.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-68 Log #1740 NEC-P15 **Final Action: Accept**
(517.19(E))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers

Comment on Proposal No: 15-61

Recommendation: Reject the proposal and restore the 2008 NEC text.

Substantiation: The proposal substantiation is based solely on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.

Panel Meeting Action: Accept

Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-69 Log #189 NEC-P15 **Final Action: Accept**
(517.20(A))

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 15-64

Recommendation: The Technical Correlating Committee directs that the panel reconsider the action taken on this proposal as to whether both list items are required together or individually.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Revise text to read as follows:

(A) **Receptacles and Fixed Equipment.** Wet procedure location patient care areas shall be provided with special protection against electric shock by either (1) or (2):

(1) A power distribution system that inherently limits the possible ground-fault current due to a first fault to a low value, without interrupting the power supply.

(2) A power distribution system in which the power supply is interrupted if the ground-fault current does, in fact, exceed a value of 6 mA.

Panel Statement: The panel accepts the direction of the TCC to reconsider the action taken on this proposal.

The panel edits the text in (A) and (1).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-70 Log #2708 NEC-P15 **Final Action: Reject**
(517.20(A))

Submitter: Michael Baxter, Energy Safe Technologies Inc.

Comment on Proposal No: 15-63

Recommendation: Same as originally submitted.

Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The fact finding report addressed overheating terminals and not shock protection as this section requires. The panel is also aware there is no product yet available.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-71 Log #2709 NEC-P15 **Final Action: Reject**
(517.21)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 15-66
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The fact finding report addressed overheating terminals and not shock protection as this section requires. The panel is also aware there is no product yet available.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-72 Log #190 NEC-P15 **Final Action: Accept**
(517.26)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-66a
Recommendation: The Technical Correlating Committee directs that the panel add the publication date of the referenced NFPA document to conform with the Manual of Style for NFPA Technical Committee Documents Section 2.4.1.4.4 which requires dates of publication for referenced NFPA documents.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Add 2010 to the reference of NFPA 110.
Panel Statement: The panel accepts the direction of the TCC to provide the date reference.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-73 Log #191 NEC-P15 **Final Action: Accept**
(517.26)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-68
Recommendation: The Technical Correlating Committee directs that the panel reconsider the panel action on this proposal and correlate it with the action taken on Proposal 15-13.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider the panel action on this proposal and correlate it with the action taken on Proposal 15-13.
See panel action on Comments 15-20 and 15-75.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-74 Log #926 NEC-P15 **Final Action: Reject**
(517.26)

TCC Action: The Technical Correlating Committee directs that Comment 15-74 be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
In addition, the Technical Correlating Committee directs that Proposal 15-68 also be reported as "Reject" since consensus of the panel was not reached on this issue, therefore, the text as it appears in the 2008 Edition of the NEC is retained.
Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 15-68
Recommendation: This proposal should be rejected. Restore the text to as it appears in the 2008 NEC.
Substantiation: Accepting this proposal creates an unsubstantiated disconnect between NEC Article 700 and Article 517 that results in lessening the current rules in Article 700 that are necessary for hospital essential systems (critical branch and equipment branch) design and installation. The critical branch of a hospital is necessary for life safety purposes and the safety and the health and welfare of patients. Life support equipment and other equipment for critical care in health care facilities are typically connected to the critical branch. Article 700 contains the requirements for transfer equipment to be identified for use on emergency systems. Products standards evaluate and list equipment for use on emergency systems. The critical branch of a hospital is an emergency system, no matter what it is called. 700.9(D) contains fire protection requirements for feeders of emergency systems, and this requirement must apply to the critical branch. If not, the current minimum requirements are lessened without substantiation. The critical branch of a hospital qualifies as an emergency as indicated in Article 517 by the nature of the loads supplied and how it is intended to perform during adverse conditions, no matter what it is called. Removing the reference and the tie to Article 700 for the critical branch from 517.26 lessens current requirements and has unintended consequences for systems essential for safety and health of patients in a hospital. Changing the name of a system in a hospital does not change how the system must function. 700.12 contains important requirements (not found in Article 517) related to critical branch power sources and their operation. There are other necessary requirements from Article 700 that would be lost. If a proposal like this is accepted, then all the requirements in Article 700 that are currently applied to essential systems in hospitals would have to be included in Article 517. There was no such proposal (that I am aware of) to ensure that the correlation of necessary requirements was not lost. Hospital essential systems have to be designed and installed using a defend -in place philosophy that includes selective coordination of overcurrent devices such that a ground fault or short circuit event does not cause unnecessary interruption of power to loads critical to patient safety and health. A similar proposal was attempted in the 2008 NEC cycle and ultimately rejected in the Standards Council appeal process stages, thus preserving the requirements in 517.26. Nothing has changed about how these systems are required to be installed or how they should be expected to perform since that action in the 2008 NEC cycle. The Final Action (Reject) on Proposal 15-90 also reflects the appropriate approach to not lessen current minimum requirements without technical substantiation.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 15-75.
The panel action clarifies that Article 700 is not the appropriate article to include as applicable in its entirety for the critical branch and certainly not the equipment system.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 8 Negative: 5
Explanation of Negative:
LIPSTER, S.: I strongly disagree with the panel's action and statement. My negative vote is based on four criteria:
1) The action on proposal 15-68 was undertaken in an environment that assumed NFPA 99 would be published. The understanding at the time was the nomenclature change was simply editorial to bring it in line with the substantial changes in NFPA 99. The panel statement for proposal 15-68 clearly shows the action on this proposal was taken to bring 15-68 in line with action taken on proposal 15-72. To quote the panel statement: "The panel revised the wording 'emergency' to 'essential electrical' for consistency with proposal 15-72." Proposal 15-72 dealt with the wholesale restructuring of health care essential electrical systems. NFPA 99 was returned to committee at the June 2009 Association Technical Meeting. Rejecting this comment and accepting comment 15-75 is taking the original action on proposal 15-68 completely out of context.
2) For some time there has been a conflict between certain members of this panel and certain members of the NFPA 99 electrical systems technical committee on the relationship of these two committees and indeed the relationship between Article 517 and NFPA 99. For the last several code cycles the assertion has been NFPA 99 electrical systems technical committee action on electrical design elements found in NFPA 99 would be adopted by NEC code making panel 15 into Article 517. This assertion is based on the premise that the National Electrical Code is an installation code while NFPA 99 is a design standard. While personally disagreeing with this assertion, many of my colleagues on this panel see logic in this scheme. Keeping this design - installation dichotomy in mind, the issue proposal 15-68 addresses is purely a design concern. If one truly believes that this panel should limit itself to installation issues, how can the rejection of 15-74 and the acceptance of 15-75 be seen as nothing less than hypocritical?
3) Removing the requirements of Article 700 from the critical branch without the addition of common sense restrictions on the critical branch is extremely dangerous. The panel should consider the ramifications of a critical branch without restrictions such as: Circuit identification and separation, equipment and component location, generator and transfer switch requirements and emergency duty listing requirements. Dropping the requirements of Article 700 for the critical branch provides relief from selective coordination rules, but it also loses many valuable protections that are necessary in the critical branch.
4) For many years some designers have declared that the regulations of Article 700 (particularly selective coordination) are far too restrictive for the complex electrical systems found in health care facilities. Through the years I have noted fully selective coordinated systems, every bit as complex as those found in health care facilities, installed in check processing centers, credit card processing facilities and many government/military installations. When dollars are on the line, effective systems can be designed, are installed and become operational. Why aren't human lives given the same consideration?
SAMPSON, M.: The submitter raises valid points and this comment should be accepted.

There is no substantiation to support the sudden elimination of the *equipment system* and the *critical branch of the emergency system* from the testing, maintenance, capacity, signage, selective coordination, fire protection requirements and control requirements of the emergency systems as covered by Article 700.

The requirement that all the loads connected to the essential system have a higher degree of reliability is intentional. All of the items that have been so carefully selected to be on the *essential electrical system* are vital to life safety.

The inherent flaw in the argument to have the provisions required for an Article 700 emergency system only apply to the *life safety branch of the essential electrical system*, is an assumption. That assumption is that because Article 700 applies to those systems that supply reliable power to facilitate building egress, then the provisions of Article 700 can only apply to those systems that supply reliable power to facilitate building egress.

That reasoning is backward and couldn't be further from the truth. The fact that the scope of Article 700 is the reliability of the installation, operation and maintenance of the power systems that facilitate building egress has absolutely no bearing on the fact that those same reliability requirements also apply to the entire essential electrical system of a hospital.

It is true that the *life safety branch of the essential system* of a hospital is comparable to the *emergency system* of other building types, since both provide power that affords those precious moments needed to evacuate a building in the event of an emergency.

But the more stringent requirements found in Article 700 that are necessary to guarantee power for the "life safety" of the people finding their way out of the hospital building, are also necessary to guarantee power for the "life safety" of those who will not be moving quickly, in an orderly fashion, to the nearest exit.

That "life safety" is afforded by the *critical branch* and the *equipment system*, inseparable parts of the essential electrical system - a system that must have the same dependability as an Article 700 *emergency system*.

The entire essential electrical system - not just the life safety branch - needs to meet the requirements of Article 700.

SHELLY, B.: The submitter's comment should be accepted and subsequently reject the proposal, lessening the requirements on the emergency system. The proposal would not provide the safety needed by the critical and essential branch circuits in a health care facility.

TALKA, D.: I believe Mr. Lipster makes valid points in Items 1 and 3 of his Explanation of Negative Vote. The fact that Code-Making Panel 15's actions were based upon anticipated actions within NFPA 99 makes me believe that until NFPA 99 is settled it is best to leave 517.26 as presently written.

Mr. Lipster also makes a valid point that additional guiding principles are needed if we are to remove the reference to Article 700.

WISEMAN, J.: The Panel Action results in the removal of the critical branch from the requirements for emergency systems found in Article 700. The critical branch includes task illumination and selected receptacles for critical care areas, isolated power systems, patient care areas, nurse call systems, blood banks, bone banks, tissue banks, telephone equipment rooms, and task illumination for cardiac test labs, coronary care units, emergency rooms, and intensive care units.

15-75 Log #1088 NEC-P15 **Final Action: Reject**
(517.26)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-68
Recommendation: This proposal should be Accepted since the panel action to Accept in Principal is based on actions in NFPA 99 that did not occur.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 8 Negative: 5
Explanation of Negative:

LIPSTER, S.: See my Explanation of Negative statement on Comment 15-74.

SAMPSON, M.: I respectfully request the panel to reject this comment and reverse the action taken on Proposal 15-68. The issues contained in Proposal 15-68 have a greater significance than the return of NFPA 99 to committee. The entire essential electrical system - not just the life safety branch - deserves the reliability afforded to Article 700 systems. See my statement for voting against the panel action on Comment 15-74.

SHELLY, B.: The submitter's comment should be rejected as the acceptance of the proposal would certainly lessen the safety for the critical branch circuits in a hospital's emergency system.

TALKA, D.: See my Explanation of Negative Vote on Comment 15-74.

WISEMAN, J.: The Panel Action results in the removal of the critical branch from the requirements for emergency systems found in Article 700. The critical branch includes task illumination and selected receptacles for critical care areas, isolated power systems, patient care areas, nurse call systems, blood banks, bone banks, tissue banks, telephone equipment rooms, and task illumination for cardiac test labs, coronary care units, emergency rooms, and intensive care units.

15-76 Log #2376 NEC-P15 **Final Action: Accept in Principle**
(517.26)

Submitter: James E. Degnan, Sparling
Comment on Proposal No: 15-68
Recommendation: I support the panel vote on this proposal. It is appropriate to retain the life safety branch's ties to the emergency system.
Substantiation: The reliability and redundancy of the critical branch in Article 517 are different from the approach being used in Article 700 for the emergency system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 15-75.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:

SAMPSON, M.: I respectfully request the panel to reject this comment and reverse the action taken on Proposal 15-68. The entire essential electrical system - not just the life safety branch - deserves the reliability afforded to Article 700 systems. See my statement for voting against the panel action on Comment 15-74.

15-77 Log #1418 NEC-P15 **Final Action: Accept**
(517.30)

Submitter: John E. Staires, City of Tulsa, Oklahoma
Comment on Proposal No: 15-84
Recommendation: Continue to reject.
Substantiation: I agree with the committee's substantiation for rejecting Proposals 15-78, 15-81 and 15-84. Physical protection is paramount for these conductors. Far too often we see flexible raceways and cables pulled out of their connectors or with damaged side-walls. There are a number of materials and wall thicknesses used to manufacture these flexible raceways and cables. It would be difficult to control which type is being used, as they are all very similar in appearance and markings are typically on the carton or on a tape in the cable. Their use should continue to be limited, and only in protected locations where physical protection is not necessary.
Panel Meeting Action: Accept
Panel Statement: The panel understands the submitter is addressing 517.30(C)(3).

See panel action on Comment 15-101.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-78 Log #668 NEC-P15 **Final Action: Accept**
(Figure 517.30, FPN 1 and 2)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-70a
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-79 Log #1742 NEC-P15 **Final Action: Accept**
(517.30(1), (2), and (3))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-72
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is based on three points: One point asserts that the requirements of Article 700 some how do not "work" in a health care facility. The second point contends that the NFPA 99 Electrical Systems Technical Committee is better able to define these systems and has taken action to eliminate emergency systems in favor of "branches". The third point states that coordination with the 2010 Edition of NFPA 99 is critical to avoid confusion. Previous panel statements (see 15-7 and 15-13) plainly state this Code Making Panel is not entirely comfortable with severing the requirements of Article 700 from emergency systems. These panel statements

cast doubt on the validity of the first point of the substantiation. Furthermore, because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 both the second and third points, namely, the action by the NFPA 99 technical committee and the coordination issue, are now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-80 Log #192 NEC-P15 **Final Action: Accept**
(517.30(3) and 517.41(E))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-71
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-81 and 15-82.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-81 Log #669 NEC-P15 **Final Action: Accept**
(517.30(3) and 517.41(E))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-71
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-82.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-82 Log #1741 NEC-P15 **Final Action: Accept**
(517.30(3) and 517.41(E))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-71
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is based solely on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-83 Log #193 NEC-P15 **Final Action: Accept**
(517.30(B)(1), (2), and (3))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-72
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-79 and 15-84.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-84 Log #670 NEC-P15 **Final Action: Accept**
(517.30(B)(1), (2), and (3))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-72
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-79.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-85 Log #1081 NEC-P15 **Final Action: Reject**
(517.30(B)(1), (2), and (3))

Submitter: James H. Costley, Jr., Newcomb & Boyd Consultants & Engineers
Comment on Proposal No: 15-72
Recommendation: Support the "Accept" Action of Code-Making Panel 15 in the Comments Stage.
Substantiation: It is important that the electrical distribution systems in health care facilities be identified using terminology in conformance with other Articles of NFPA 70 as well as NFPA 99 so that appropriate requirements are applied by AHJs in a uniform manner.
Panel Meeting Action: Reject
Panel Statement: This comment is moot as the result of the return of NFPA 99 to committee.
See panel action on Comment 15-79.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-86 Log #194 NEC-P15 **Final Action: Accept**
(517.30(B)(4))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-73
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-87 and 15-88.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-87 Log #671 NEC-P15 **Final Action: Accept**
(517.30(B)(4))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-73
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-88.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-88 Log #1743 NEC-P15 **Final Action: Accept**
(517.30(B)(4))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-73
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is generally based on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-89 Log #195 NEC-P15 **Final Action: Accept**
(517.30(C)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-75
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-91 and 15-92.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-90 Log #672 NEC-P15 **Final Action: Accept**
(517.30(C)(1))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-74
Recommendation: This proposal should be Accepted since the panel action to Accept in Principal is based on actions in NFPA 99 that did not occur.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012.
Panel Meeting Action: Accept
Panel Statement: It is the panel's intent to have the text modified as requested by the submitter in his original Proposal 15-74.
The panel notes that the original proposal is not affected by the return of NFPA 99 to committee.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-91 Log #673 NEC-P15 **Final Action: Accept**
(517.30(C)(1))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-75
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-92.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-92 Log #1737 NEC-P15 **Final Action: Accept**
(517.30(C)(1))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-75
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is solely based on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-93 Log #196 NEC-P15 **Final Action: Accept**
(517.30(C)(3))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-82
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-95 and 15-96.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-94 Log #577 NEC-P15 **Final Action: Reject**
(517.30(C)(3))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 15-81
Recommendation: Accept the proposal in principle. Revise 517.30(C)(3) as follows:
(3) Listed flexible metal raceways and listed metal sheathed cable assemblies where not subject to physical damage. ~~in any of the following:~~
~~a. Where used in listed prefabricated medical headwalls~~
~~b. In listed office furnishings~~
~~c. Where fished into existing walls or ceilings, not otherwise accessible and not subject to physical damage~~
~~d. Where necessary for flexible connection to equipment~~
Substantiation: The revised text adds the requirement that the wiring methods be permitted where not subject to physical damage. Flexible metal raceway and metallic sheathed cables have been permitted in essential electrical systems for hospitals where it is fished and not subject to physical damage since the 2005 NEC without any reported problems. Since these wiring methods are already permitted there is no reason to limit their use to installations where it is fished.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 15-97.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-95 Log #674 NEC-P15 **Final Action: Accept**
(517.30(C)(3))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-82
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-96.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-96 Log #1738 NEC-P15 **Final Action: Accept**
(517.30(C)(3))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-82
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is solely based on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-97 Log #1863 NEC-P15 **Final Action: Reject**
(517.30(C)(3))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 15-81
Recommendation: Revise the existing text of the 2008 NEC as follows:
(3) Listed flexible metal raceways and listed Type MC or Type AC cables ~~metal sheathed cable assemblies~~ if not subject to physical damage ~~in any of the following:~~
~~a. Where used in listed prefabricated medical headwalls~~
~~b. In listed office furnishings~~
~~c. Where fished into existing walls or ceilings, not otherwise accessible and not subject to physical damage~~
~~d. Where necessary for flexible connection to equipment~~
Substantiation: Revising the text as proposed harmonizes this section with Sections 320.12(1) for Type AC cable and with 330.12(1) for Type MC cable. Both sections state the cables are not permitted to be installed where subject to physical damage. Additional restrictions are not needed in this section. Cables are evaluated for suitability for wiring of listed prefabricated medical headwalls and in listed office furnishings so the text in a. and b. is not needed.
Listed cables have been permitted where fished into existing walls or ceilings, not otherwise accessible and not subject to physical damage since the 2005 NEC with no reports of problems. It makes sense to remove the unneeded language.
These cables have to undergo extensive testing in the UL Safety Standards (UL-4 for Type AC cables and UL-1569 for Type MC Cables) and provide more than adequate mechanical protection of the life safety and critical branches of the emergency system.
Panel Meeting Action: Reject
Panel Statement: The panel contends that the action taken on Comment 15-101 provides a safer installation using flexible cable than this submitter's recommendation.
The panel continues to support items (3)a, b, c and d. Without this list, the submitter's proposed wording would be too ambiguous and would conflict with panel action on Comment 15-101.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-98 Log #2132 NEC-P15 **Final Action: Accept**
(517.30(C)(3))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 15-84
Recommendation: Continue to reject this proposal.
Substantiation: It is important to emphasize that this section of the Code does not deal with ordinary (or primary) wiring systems. This is the *Essential Electrical System.* Use of MC and AC cable should not be extended beyond the permitted uses in the 2008 Code. The Code contains many wiring methods and they provide varying degrees of protection. Making the requested changes would be tantamount to using EMT when the application required the heavier wall of GRC or IMC. This section covers one of the most critical applications in 517 – the Essential Electrical System.
The Panel was correct when they expressed concern about damage other than that caused by nail or screw penetration, both during and after installation. The proposal specifically considers damage to be interpreted as nail or screw penetration and then only if installed through or parallel to framing members. Furthermore, there is no differentiation between types of MC.
The proponent states in his substantiation, "Type MC cables are suitable to be installed in most *ordinary* locations." The Essential Electrical System is not *ordinary,* as the title indicates. (Note that although AC cable is included in this proposal it is not included in the statement, even for ordinary locations.)
In the 2998 Code cycle the proponent requested MC Cable *equivalent to EMT* (See 2008 Proposal 15-54) be permitted. There was no fact-finding investigation at that time and none has been provided this cycle. In addition, the equivalency criterion that was suggested was not complete. It was noted at the ROP meeting that criteria for comparing has not been developed. The Panel is also correct that the Code should not be changed for a product that does not exist.
It should be noted that most MC cable is aluminum and logically more subject to damage than steel. The Panel was correct that, "The proposal includes all types of MC and AC cable, "even those that did not fair well during the previously conducted fact-finding investigation."
The term not "likely" to be damaged is proposed. 517.30(C)(3) is designed to address protecting the integrity of the Essential Electrical System even in *unlikely* situations due to the critical nature of the application. Panel 7 does not permit use where the cable is subject to physical damage even in ordinary locations. The current Code text has served patient safety well for many years and should not be downgraded.
We also disagree with the proposed deletion of the reference to 517.13(A) and (B). It needs to be very clear that 517.30 *does not* override 517.13 requirements. Patient safety is primary and if healthcare facilities did not require exceptional care in the electrical system then why not just use Chapter 3. This particular proposal applies to two of the most important areas of this special article – life safety and critical care essential (emergency) systems. We urge you to continue to put patient safety first and continue to reject.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-99 Log #2133 NEC-P15 **Final Action: Accept**
(517.30(C)(3))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 15-81
Recommendation: Continue to reject this proposal.
Substantiation: This Section as it appears in the 2008 Code appropriately limits the use of flexible raceways and cables to areas requiring flexibility and where access is difficult. No testing has been supplied for AC cable, or for flexible metal raceway, even though both are proposed for unlimited use in this special application. If this proposal is accepted both would be accepted for unrestricted use. This would be without even having to comply with Chapter 3, and could be used where subject to physical damage which is not permitted in Chapter 3. The proposal does not stipulate the type of MC and these cables vary considerably in physical and grounding aspects.
Currently there has been no proof that MC would provide physical aspects equivalent to EMT. This Code Section covers mechanical protection for the crucial Essential Electrical System, and the Panel has continued to express that protection from more than nail and screw penetration is required. If this proposal is accepted that will not be accomplished. There is a use for every product in the Code, but every product is not suitable for every use. This proposal would be like saying EMT should be allowed everywhere GRC and IMC are allowed. The Code currently contains the uses necessary.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-100 Log #2134 NEC-P15 **Final Action: Reject**
(517.30(C)(3))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 15-78
Recommendation: Continue to reject this proposal.
Substantiation: This proposal was a left-over comment (15-39) to Proposal 15-54 from the 2007 ROP. Nothing has changed except that even broader use of MC and AC cable and flexible metal raceways has been requested without any valid substantiation.
It is important to emphasize that this section of the Code does not deal with ordinary (or primary) wiring systems. This is the *Essential Electrical System.* Use of MC and AC cable should not be extended beyond the permitted uses in the 2008 Code. The Code contains many wiring methods and they provide varying degrees of protection. Making the requested changes would be tantamount to using EMT when the application required the heavier wall of GRC or IMC. This section covers one of the most critical applications in 517 – the Essential Electrical System.
The Panel was correct when they expressed concern about damage other than that caused by nail or screw penetration, both during and after installation. The proposal specifically considers damage to be interpreted as nail or screw penetration and then only if installed through or parallel to framing members. Furthermore, there is no differentiation between types of MC.
The proponent states in his substantiation, "Type MC cables are suitable to be installed in most *ordinary* locations." The Essential Electrical System is not *ordinary,* as the title indicates. (Note that although AC cable is included in this proposal it is not included in the statement, even for ordinary locations.)

In the 2998 Code cycle the proponent requested MC Cable *equivalent to EMT* (See 2008 Proposal 15-54) be permitted. There was no fact-finding investigation at that time and none has been provided this cycle. In addition, the equivalency criterion that was suggested was not complete. It was noted at the ROP meeting that criteria for comparing has not been developed. The Panel is also correct that the Code should not be changed for a product that does not exist.

It should be noted that most MC cable is aluminum and logically more subject to damage than steel. The Panel was correct that, "The proposal includes all types of MC and AC cable, "even those that did not fair well during the previously conducted fact-finding investigation."

The term not "likely" to be damaged is proposed. 517.30(C)(3) is designed to address protecting the integrity of the Essential Electrical System even in *unlikely* situations due to the critical nature of the application. Panel 7 does not permit use where the cable is subject to physical damage even in ordinary locations. The current Code text has served patient safety well for many years and should not be downgraded.

We also disagree with the proposed deletion of the reference to 517.13(A) and (B). It needs to be very clear that 517.30 *does not* override 517.13 requirements. Patient safety is primary and if healthcare facilities did not require exceptional care in the electrical system then why not just use Chapter 3. This particular proposal applies to two of the most important areas of this special article – life safety and critical care essential (emergency) systems. We urge you to continue to put patient safety first and continue to reject.

Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 15-101.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-101 Log #2797 NEC-P15 **Final Action: Reject**
(517.30(C)(3))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Accept in Principle" by accepting the new (3) and its language, plus the renumbering of (4), (5), and (6).

The Technical Correlating Committee also directs that the remainder of the text remains as written in the 2008 Edition of the National Electrical Code.

Submitter: Richard Temblador, Southwire Company
Comment on Proposal No: 15-78
Recommendation: (3) Mechanical Protection of the Emergency System. The wiring of the emergency system in hospitals shall be mechanically protected. Where installed as branch circuits in patient care areas, the installation shall comply with the requirements of 517.13(A) and 517.13(B). The following wiring methods shall be permitted:

(1) Nonflexible metal raceways, Type MI cable, or Schedule 80 rigid nonmetallic conduit. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.

(2) Listed MC cable identified as providing crush, impact and penetration circuit protection performance comparable to electrical metallic tubing.

(~~2~~3) Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 rigid nonmetallic conduit, flexible nonmetallic or jacketed metallic raceways, or jacketed metallic cable assemblies listed for installation in concrete. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.

(~~3~~4) Listed flexible metal raceways and listed metal sheathed cable assemblies in any of the following:

a. Where used in listed prefabricated medical headwalls
b. In listed office furnishings
c. Where fished into existing walls or ceilings, not otherwise accessible and not subject to physical damage
d. Where necessary for flexible connection to equipment

(~~4~~5) Flexible power cords of appliances or other utilization equipment connected to the emergency system.

(5~~6~~) Secondary circuits of Class 2 or Class 3 communication or signaling systems

Substantiation: Type MC cable can be constructed to provide enhanced mechanical protection comparable to EMT while maintaining ground path integrity before, during and after
installation. The revised proposal should be accepted. I have provided supporting information.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 11 Negative: 2

Explanation of Negative:

LIPSTER, S.: I disagree with the panel action and statement permitting an unproven wiring method not yet available to installers, with limited laboratory testing and no field installation record, to be used in health care facilities. The panel is prematurely approving a product that is not in production and not available on the market. There are several opportunities for the use of a crush resistant MC cable in other occupancies where a track record for this nonexistent wiring method can be established. Health care installations are not a place to test new cable wiring methods and hope they are safety-compatible with EMT. The panel was presented a Underwriters Laboratories fact finding report that detailed the testing of two prototype cables. The crush and impact tests of the two prototype cables vs. EMT concluded that one of the prototype cables evaluated better and one was worse than that of listed EMT, however, it is important to note that product standards do not exist for crush resistant cable so the test have limited value. The means for cable termination at a box connection (the prototype cable being much larger than standard MC cable) were not investigated by UL creating concerns about real life performance and grounding/bonding at connection points. The acceptance of this comment by the panel was clearly made with the hope and desire of a supposably cheaper alternative to EMT. It remains to be seen that a manufactured cable product with the same protective qualities as EMT can be fabricated and made available to the market. Patient safety, should be foremost over unproven installation methods.

The aforementioned Underwriters Laboratory fact finding report presented to the code making panel was dated December 3, 2009. The comment period for this code cycle closed on October 23, 2009, therefore the introduction of this material after the published comment closing date is a violation of the Regulations Governing Committee Projects, 4.4.1, 4.4.3.1, 4.4.4, 4.4.5 and 4.4.6.

SHELLY, B.: The use of MC cable identified as providing crush impact and penetration circuit protection performance equivalent to EMT is not an improvement to the codes as there will be a severe hazard created in the installation of the emergency wiring.

Field installation of EMT has an integrity that has not been maintained in the installation of MC. The areas above the drop ceilings in Health Care Facilities are burdened with many systems, and subsequently the inadequate installation methods used for MC will jeopardize the safety of the patients.

15-102 Log #2138 NEC-P15 **Final Action: Reject**
(517.30(C)(3)(1))

Submitter: Thomas Guida, TJG Services, Inc. / Rep. Champion Fiberglass, Inc.
Comment on Proposal No: 15-85
Recommendation: The Panel Action on this proposal should be Accept.
Substantiation: Type RTRC-XW conduit is described in the UL Guide Information for category DZKT: Reinforced Thermosetting Resin Conduit. The following is the relevant paragraph from that document. The whole text is available in the UL White Book or online at the UL website.
"*XW-type reinforced thermosetting resin conduit is Listed as suitable for use where exposed to physical damage in accordance with the NEC and is suitable for use wherever IPS, ID, RTRC 40 and RTRC 80 conduit may be used. The marking "AG, XW, RTRC" identifies conduit suitable for aboveground use and use where exposed to physical damage in accordance with the NEC".*
Panel Meeting Action: Reject
Panel Statement: The submitter's substantiation does not technically equate this product with PVC Schedule 80. The UL guide card DZKT does not reference PVC Schedule 80.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-103 Log #2451 NEC-P15 **Final Action: Reject**
(517.30(C)(3)(6) (New))

Submitter: Robert Konnik, RSCC
Comment on Proposal No: 15-88
Recommendation: This proposal should be accepted as amended below:

(6) Type MC cable that employs a continuous, gas/vaportight ~~metal~~ copper sheath and is listed as an electrical circuit protective system.

Substantiation: The type MC cable tested for nail penetration was aluminum. The above proposal was changed to copper sheath, which is the same as Type MI cable.
Panel Meeting Action: Reject
Panel Statement: Type MC cable with a copper sheath is not equal to Type MI cable.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-104 Log #1082 NEC-P15 **Final Action: Reject**
(517.30(F))

Submitter: James H. Costley, Jr., Newcomb & Boyd Consultants & Engineers
Comment on Proposal No: 15-90
Recommendation: Accept the Proposal.
Substantiation: The submitter's substantiation is sound and correct. The blanket requirement for complete selectivity is impossible to design using available engineering tools for generic devices. Specific manufacturer's test data for uniquely specified equipment is required, and even then any one manufacturer's options are limited. The number of sequential overcurrent protection devices in any design must be minimized, reducing the segmentation and isolation capabilities of distribution systems, which also reduces operational safety and reliability that multiple switching levels affords. In order to provide selectivity, upstream devices must be intrinsically slower in operation, or be Paradoxically, since one of the reasons often quoted for selective coordination is safety in an accident, the arc flash energy for a given point in a system will increase in almost every system design because of the mandate to selectively coordinate every level of the overcurrent protection.

This Comment is a companion to a similar Comment made for Code-Making Panel 13 for 700.27 referring to Proposal 13-195.
Panel Meeting Action: Reject
Panel Statement: The submitter's substantiation of Proposal 15-90 was based on correlation with NFPA 99.

The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-105 Log #1881 NEC-P15 **Final Action: Reject**
(517.30(F))

Submitter: Jason D'Antona, Partners HealthCare System Inc.
Comment on Proposal No: 15-90
Recommendation: Proposal 15-90 should be accepted.
Substantiation: "Selective coordination is only one of several competing factors that must be considered in the selection of appropriate over current protection devices."
Panel Meeting Action: Reject
Panel Statement: The submitter's substantiation of Proposal 15-90 was based on correlation with NFPA 99.

The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-106 Log #2238 NEC-P15 **Final Action: Accept**
(517.30(F))

Submitter: Malcolm Allison, Ferraz Shawmut / Rep. National Electric Fuse Association
Comment on Proposal No: 15-90
Recommendation: The Panel should continue to reject this proposal in the interest of safety and reliability.
Substantiation: The original proposal would allow non-coordinated operation of multiple levels of overcurrent protective devices (cascading) under fault current conditions which reduces the reliability of the system to deliver power to vital loads. This proposal permits coordination for only overloads and does not provide assurance that typical ground faults, arcing faults, and bolted faults will not cascade multiple levels of overcurrent protective devices, thereby unnecessarily losing power to critical loads.

Graphs A and B depict the time-current curves of the same 30A, 200A, and 800A system. Graph A shows the portion of the circuit breaker time-current curves that would be analyzed for this proposal (times down to 0.1 seconds). Graph B depicts the circuit breaker curves showing the crossover of the circuit breakers in their instantaneous trip region. The cross over is a lack of selective coordination for overcurrents at that level and greater. Graph B shows a lack of coordination between the 30A and 200A circuit breakers for ground, arcing, and any combination of phase faults as low as 800A. Any type of fault as low as 2200A can take out the 800A circuit breaker as well. These are low available fault currents easily achieved in almost every essential electrical system via a line-ground fault, line-line fault or three phase fault.

All circuit breakers with an instantaneous trip will open in less than 0.1 seconds when fault current is above the instantaneous trip setting. This proposal will permit the design of essential electrical systems without regard to proper engineering attention being given to the instantaneous trip region.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.

The submitter's recommendation should not contain rationale for substantiation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-107 Log #197 NEC-P15 **Final Action: Accept**
(517.30(G) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-91
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.

See panel action and statement on Comments 15-108 and 15-110.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-108 Log #675 NEC-P15 **Final Action: Accept**
(517.30(G) (New))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-91
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-110.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-109 Log #1083 NEC-P15 **Final Action: Reject**
(517.30(G) (New))

Submitter: James H. Costley, Jr., Newcomb & Boyd Consultants & Engineers
Comment on Proposal No: 15-91
Recommendation: Support the "Accept" Action of Code-Making Panel 15 in the Comments Stage.
Substantiation: This new section is necessary to provide for uniform application by AHJs of distribution system requirements on a multibuilding health care campus where generators are grouped in a central plant, rather than located in individual campus buildings.
Panel Meeting Action: Reject
Panel Statement: This comment is moot as the result of the return of NFPA 99 to committee.

See panel action on Comment 15-110.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-110 Log #1739 NEC-P15 **Final Action: Accept**
(517.30(G) (New))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-91
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is entirely based on coordination with action taken by the NFPA 99 Electrical Systems Technical Committee and coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 both coordination issues are now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept

Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-111 Log #198 NEC-P15 **Final Action: Accept**
(517.31)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-92
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-112 and 15-113.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-112 Log #676 NEC-P15 **Final Action: Accept**
(517.31)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-92
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-113.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-113 Log #1736 NEC-P15 **Final Action: Accept**
(517.31)

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-92
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is entirely based on coordination with action taken by the NFPA 99 Electrical Systems Technical Committee and coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 both coordination issues are now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-114 Log #199 NEC-P15 **Final Action: Accept**
(517.31(D) and (4))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-94
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
The panel's action on the original proposal was to reject on technical merit. The panel upholds its action as it is appropriate.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-115 Log #200 NEC-P15 **Final Action: Accept**
(517.32)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-95
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comments 15-116 and 15-117.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-116 Log #677 NEC-P15 **Final Action: Accept**
(517.32)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 15-95
Recommendation: This proposal should be Rejected since the Substantiation is not valid.
Substantiation: The proposed 2010 Edition of NFPA 99 has been returned to committee and the document will be processed through a full revision cycle without a call for new public proposals. It is now scheduled to be published in 2012. I agree with the explanation of negatives by Sampson and White.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 15-117.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-117 Log #1734 NEC-P15 **Final Action: Accept**
(517.32)

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-95
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is solely based on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-118 Log #201 NEC-P15 **Final Action: Accept**
(517.32(F))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-97
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
After the consideration of the return of NFPA 99 to committee, the panel changes its action on Proposal 15-97 to reject. As such, the text remains as in the 2008 edition.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-119 Log #202 NEC-P15 **Final Action: Accept**
(517.33(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-99
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comment 15-120.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-120 Log #1735 NEC-P15 **Final Action: Accept**
(517.33(A))

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-99
Recommendation: Reject the proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is solely based on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-121 Log #387 NEC-P15 **Final Action: Reject**
(517.33(A)(8)(a))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 15-100
Recommendation: The proposal should be rejected.
Substantiation: The preposition “per” in the English language carries the precise meaning of “for each” in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in “Table 3.2.1, Possibly Unenforceable and Vague Terms.” Section 3.3.4 of the same document requires that “NEC language shall be brief, clear, and emphatic.” Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: “Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel.”
There are instances where there are better choices of wording, such as where it is used as a slang expression meaning “in accordance with” and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Reject
Panel Statement: “In each” aptly describes where this requirement applies. The change does not add clarity.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-122 Log #203 NEC-P15 **Final Action: Accept**
(517.34)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-101
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the final text of NFPA 99 after its adoption.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider.
See panel action and statement on Comment 15-124.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-123 Log #1148 NEC-P15 **Final Action: Reject**
(517.34)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-102
Recommendation: Change “throw over” to “a transfer switch”
Substantiation: “Throw over” is not defined and not used elsewhere. A transfer switch is defined as an automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. It is preferable to use defined terms.
Panel Meeting Action: Reject
Panel Statement: Once again, the panel would like to point out that the term is used to describe a selector switch, not a transfer switch, so it should not be changed.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-124 Log #1751 NEC-P15 **Final Action: Accept**
(517.34)

Submitter: Stephen M. Lipster, The Electrical Trades Center / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 15-101
Recommendation: Reject this proposal and restore the 2008 NEC text.
Substantiation: The proposal substantiation is solely based on coordination with the 2010 Edition of NFPA 99. Because NFPA 99 was returned to committee at the NFPA Technical Association Meeting in June 2009 the coordination issue is now moot. The proposal should be rejected and the text restored to the 2008 NEC version.
Panel Meeting Action: Accept
Panel Statement: The panel elected to return to the 2008 NEC text because NFPA 99 was returned to committee. This action was taken without deliberation on other substantiation offered in the comments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-125 Log #1146 NEC-P15 **Final Action: Reject**
(517.35(B)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-103
Recommendation: Accept the proposal.
Substantiation: “External” may or may not imply outdoors, but generally means outside of something. The term is confusing as to intent and is unnecessary.
Panel Meeting Action: Reject
Panel Statement: “Externally” is not “generally” as the submitter believes, but rather, “acting or coming from without” per Webster’s dictionary.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-126 Log #1147 NEC-P15 **Final Action: Reject**
(517.61(B)(2) Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-106
Recommendation: Revise the exception as follows:
Exception: Receptacles located more than 1.52 m (5 ft) above the floor or flammable anesthetizing locations shall not be required to comply with 517.61(B).
Substantiation: The proposal includes ceiling mounted receptacles and specifies the dimension that constitutes "above."
Panel Meeting Action: Reject
Panel Statement: The panel does not agree with the submitter. Receptacles are permitted to drop down into the 5 ft space.
The submitter did not provide adequate substantiation to support the change.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-127 Log #204 NEC-P15 **Final Action: Accept**
(517.63(A) Exception (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-109
Recommendation: The Technical Correlating Committee directs that the panel correlate the action taken in this proposal with the action taken on Proposal 15-3a.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to correlate the action taken in this proposal with the action taken on Proposal 15-3a.
See action and statement on Comment 15-1.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-128 Log #1144 NEC-P15 **Final Action: Reject**
(517.64(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-111
Recommendation: Accept the proposal with the following revisions:
Low-voltage equipment that is designed and intended for contact with the bodies of persons... (remainder unchanged).
Substantiation: This provision should apply whether or not contact is frequent (not defined). Many sections use the terms "designed" and "intended."
Panel Meeting Action: Reject
Panel Statement: The proposed change does not enhance the understanding of the existing provision.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-129 Log #1145 NEC-P15 **Final Action: Reject**
(517.64(B), (C), and (E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-112
Recommendation: Accept the proposal.
Substantiation: The proposal should be judged on merit not whether it is consistent with another document. Perhaps NFPA 99 should be consistent with NFPA 70.
Panel Meeting Action: Reject
Panel Statement: The existing definition is consistent with NFPA 99.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-130 Log #771 NEC-P15 **Final Action: Reject**
(517.71(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-113
Recommendation: Accept the following revised text:
"(A) Fixed and stationary X-ray equipment shall be supplied by an approved fixed wiring method.
Exception: Equipment supplied by a branch circuit rated at not more than 30 amperes shall be permitted to be supplied by an extra-hard usage or hard usage type of flexible cord or cable that complies with 400.3, and contains an equipment grounding conductor.
(B) Individual branch circuits shall not be required for portable, mobile, or transportable medical X-ray equipment rated not over 60 amperes.
Substantiation: The basic requirement in (A) should be a permanent fixed wiring method.
"Suitable" attachment plugs are covered by the references to 517.72 and 517.73.
Reference to 400.3 will clarify that the section is not amended.
"Hard service" under "trade name" in Table 400.4 does not include portable power cable G, GCE.
"Capacity" is not code-defined.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its original panel statement on Proposal 15-113.
Identified wiring for X-ray equipment should be part of the specification for that equipment. The wiring need not be identified for the purpose.
The submitter has not provided any new substantiation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-131 Log #205 NEC-P15 **Final Action: Accept**
(517.80)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-116
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action in relation to the report of "Reject"on this proposal.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal.
The panel contends that the panel action to reject is correct and there should have been no additional action stated. The panel statement as written is correct. The panel notes that the change is correct in the draft.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-132 Log #1070 NEC-P15 **Final Action: Accept in Principle**
(517.80)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 15-120
Recommendation: Revise the second sentence of this section as follows:
"Circuits of ~~these~~ Class 2 and Class 3 signaling and communications systems and power-limited fire alarm systems shall not be required to... ". (remainder unchanged).
Substantiation: This is intended to provide some clarification as to the intent of this section. The assumption in this comment is that the primary issue is shock protection. The text as accepted exempts certain circuits based on power limitations and use alone (Class 2 and Class 3 circuits). If that is the intent, then power-limited fire alarm circuits should be included here. If the intent is to only exempt those circuits that are not part of the emergency system (such as the nurse call systems mentioned in the substantiation for this proposal) or do not otherwise require mechanical protection under 517.30(C)(3), then some other language change is needed. The language "Circuits of these Class 2 and Class 3 communication or signaling systems..." implies that all the circuits mentioned in the first sentence are Class 2 or Class 3 when in fact they may not be. The data and communications circuits may not be Class 2 or 3 (such as when communications and data are combined in a single cable and the Class 2 data circuits are required to be reclassified as communications), and "circuits less than 120 volts" does not say anything about power limitations and may or may not be Class 2 or Class 3. Previously it has been unclear as to what insulation, isolation, or grounding are required or how this was to be done, now it is unclear as to what circuits are covered or exempted or why. As presently worded, it cannot be only about shock hazards because Class 3 circuits may be a shock hazard even in dry locations (see Tables 11A and 11B as noted in the comment by White explaining the negative vote). It cannot be about the emergency system because some Class 2 and Class 3 circuits are part of the emergency system [see 517.32(C)(2) & (3)] as are some communications systems. I anticipate a "reject" and an explanation as to what is intended, but I am offering another comment to clarify the language to more clearly correlate this section with 517.30(C)(3).
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
"~~Circuits of these~~ Class 2 and Class 3 signaling and communications systems and power-limited fire alarm systems shall not be required to... ". (remainder unchanged).
Panel Statement: The panel accepts the submitter's text but edits for clarity. "Circuits of" is also unnecessary.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
LIPSTER, S.: See Explanation of Negative statement on comment 15-133.

15-133 Log #1071 NEC-P15 **Final Action: Accept in Principle**
(517.80)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 15-120
Recommendation: Revise the accepted text of the second sentence as follows: "Circuits of ~~these~~ those signaling or communications systems supplied solely by Class 2 or Class 3 ~~signaling and communications systems~~ power sources shall not be required...". (remainder unchanged).
Substantiation: This is intended to provide some clarification as to the intent of this section. If the intent is to only exempt those circuits that are not part of the emergency system (such as the nurse call systems mentioned in the substantiation for this proposal) or do not otherwise require mechanical protection under 517.30(C)(3), then some clarification is still needed. The language "Circuits of these Class 2 and Class 3 communication or signaling systems..." implies that all the circuits mentioned in the first sentence are Class 2 or Class 3 when in fact they may not be. The data and communications circuits may not be Class 2 or 3 (such as when communications and data are combined in a single cable and the Class 2 data circuits are required to be reclassified as communications), and "circuits less than 120 volts" says nothing about power limitations and may or may not be Class 2 or Class 3.

Previously it has been unclear as to what insulation, isolation, or grounding are required or how this was to be done, now it is unclear as to precisely what circuits are covered or exempted or why. As presently worded, or as worded in the revision in the 2008 NEC, it cannot be only about shock hazards because Class 3 circuits may be a shock hazard even in dry locations (see Tables 11A and 11B as noted in the comment by White explaining the negative vote). It cannot be about the emergency system because some Class 2 and Class 3 circuits are part of the emergency system [see 517.32(C)(2) & (3)] as are some communications systems. This will make it clearer that fire alarm systems or ordinary communications systems as defined and covered in Chapter 8 that are part of the emergency system are required to be installed in raceways per 517.30(C)(3) because they are not Class 2 or Class 3, and are also required to comply with the first sentence of 517.80 for the same reason. According to this comment or the present language as accepted, communications circuits that are powered by communications equipment as defined in Chapter 8 (communications, CATV, and some data circuits) are required to have insulation, isolation, and grounding because they are not Class 2 or Class 3, but may require raceways in patient care areas. This may be true even though raceways are often not required outside patient care areas because the telephone and CATV are not part of the emergency system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 15-132, which is a similar comment by the same submitter. This change addresses the submitter's concern.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
LIPSTER, S.: As demonstrated in Chapter 9, Table 11(A) and Table 11(B) Class 2 and Class 3 circuits in dry locations can have resultant current levels that create a danger of electrical shock. Patient safety, not economics should be foremost in addressing patient safety. Patent bed and care locations often become wet contact areas and current levels as low as 5 mA can pose a shock danger to the patient from these circuits. Class 2 and Class 3 circuits should be both mechanically protected and grounded to protect both patients and staff. The panel should have clarified that only signaling and communication systems supplied solely by Class 2 or Class 3 power sources not part of the emergency system do not require mechanical protection under 517.30(C)(3).

15-134 Log #2167 NEC-P15 **Final Action: Reject**
(517.80 Exception No. 3)

Submitter: Patricia B. Horton, Let's Call Pat Consulting
Comment on Proposal No: 15-120
Recommendation: Delete the second sentence of the Panel revised text.
Substantiation: This proposal as revised in the first sentence by the Panel provides more assurance that the intent of the Panel regarding equivalent insulation and isolation would now be required. That aids in increasing safety as suggested in 15-116.

However, the second sentence should not be accepted. As little as 5 milliamps can cause shock for an ill person. (See Chapter 9 – Tables 11A and 11B –pages 683 and 684 of the 2008 NEC)

Class 2 and Class 3 can have 150V. Fire alarm can be 250V (12A & B). Not to require grounding or mechanical protection is not a safe application. These systems are not intrinsically safe. Patients frequently are in wet beds and such a state likely would be reason to use the nurse call device.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided evidence to support the need for mechanical protection and grounding for Class 2 and Class 3 circuits.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
LIPSTER, S.: The panel should accept this comment. See negative statement on comment 15-133.

15-135 Log #1143 NEC-P15 **Final Action: Reject**
(517.160)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-122
Recommendation: Accept the proposal with the following revisions:
(A) Installation.
(1) Isolated Power Circuits. Each isolated power circuit shall be controlled by a switch or circuit breaker that simultaneously disconnects all conductors it controls. Conductors of isolated power circuits shall not be installed in cables, raceways, or enclosures with conductors of other systems.
Substantiation: It is prudent to prohibit installation with other system conductors. The present last sentence is superfluous; covered by the definition of isolated Power System, in 517.2.
Panel Meeting Action: Reject
Panel Statement: The panel contends that requiring to "simultaneously disconnect all conductors it controls" is not the same as having an isolated pole in each conductor.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-136 Log #1152 NEC-P15 **Final Action: Accept in Part**
(517.160(A)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-124
Recommendation: Accept the proposal with the following revisions:
Each isolated power circuit shall be controlled by a switch or circuit breaker that simultaneously disconnects all conductors of the circuit it controls. Conductors of isolated power circuits shall not be installed in cables, raceways, or other enclosures containing conductors of another system. Isolated power circuits shall be supplied by one or more of the following:
(1) isolation transformers
(2) generators
(3) electrically isolated batteries
(4) a combination of such sources
Substantiation: Isolated power system conductors should be separate from other systems.
Panel Meeting Action: Accept in Part
Add the following as last new sentence to 517.160(A)(1) to read as follows:
Conductors of isolated power circuits shall not be installed in cables, raceways, or other enclosures containing conductors of another system.
Panel Statement: The panel agrees with the submitter's substantiation and accepts the following part of the submitter's recommendation: "Conductors of isolated power circuits shall not be installed in cables, raceways, or other enclosures containing conductors of another system."
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 518 — PLACES OF ASSEMBLY

15-137 Log #1151 NEC-P15 **Final Action: Reject**
(518.4(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-128
Recommendation: Accept the proposal with the following revisions:
The wiring method shall qualify as an equipment grounding conductor, or shall contain an insulated equipment grounding conductor, or be provided with an equipment bonding conductor in accordance with 250.102(E).
Substantiation: Bonding conductors may be enclosed with circuit conductors and do not meet the definition of equipment grounding conductor when installed as defined in Article 100 Bonding Jumper, Equipment Bonding jumpers are permitted in many occupancies and classified locations, why not for assembly occupancies?
Panel Meeting Action: Reject
Panel Statement: Section 518.4(A) covers wiring methods and allowable types of equipment grounding conductors, not equipment bonding conductors. However, the section as currently written does not prohibit the use of equipment bonding conductors.
The intent of this section is to require an equipment grounding conductor (EGC) as defined in Article 100. FPN #1 of this definition addresses bonding.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-138 Log #2086 NEC-P15 **Final Action: Reject**
(518.4(B))

Submitter: Jim Davis, Electrical Education Services, LLC
Comment on Proposal No: 15-131
Recommendation: Revise 518.4(B) as follows: **Nonrated Construction**.
~~Nonrated Construction. In addition to the wiring methods of 518.4(A), nonmetallic sheathed cable, Type AC cable, electrical nonmetallic tubing, and rigid nonmetallic conduit~~. Any wiring method approved by this code shall be permitted to be installed in those buildings or portions thereof that are not required to be of fire-rated construction by the applicable building code.
Substantiation: The code panel is respectfully requested to reconsider this proposal which is intended to simplify the code text for all users by NOT naming all of the wiring methods (in a list) that are otherwise approved for non-rated construction as pointed out by Mr. Sampson in his Explanation of Negative Vote to the panel statement in the ROP. Simplification here will help reduce potential confusion—not to mention—save ink.
Panel Meeting Action: Reject
Panel Statement: Article 518 occupancies are special and the panel contends that not all wiring methods approved elsewhere in the Code are applicable. Furthermore, the panel believes that wiring methods acceptable for Article 518 occupancies should be specifically itemized for usability and clarity.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

ARTICLE 520 — THEATERS, AUDIENCE AREAS OF MOTION PICTURE AND TELEVISION STUDIOS, AND SIMILAR LOCATIONS

15-139 Log #1149 NEC-P15 **Final Action: Reject**
(520.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-135
Recommendation: Accept the proposal with the following revisions:
Electrical designed or intended to be moved from one location to another and supplied by flexible cords or cables.
Substantiation: Present wording indicates the portable cords are the equipment moved from one place to another and does not specify “flexible.”
Panel Meeting Action: Reject
Panel Statement: The submitter did not identify which definition he wanted changed, thereby failing to meet the requirements of clause 4.4.5(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-140 Log #1150 NEC-P15 **Final Action: Reject**
(520.2 Stand Lamp (Work Light))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-136
Recommendation: Accept the proposal with the following revisions:
A portable luminaire or lampholder with guard and self-supporting means for the purpose of providing illumination on the stage or in the auditorium.
Substantiation: A luminaire or lampholder that is specifically intended for other than “general” (not defined) illumination should be included.
Panel Meeting Action: Reject
Panel Statement: “General Purpose” is easily understood and used throughout the Code. Use of “General Purpose” specifically differentiates luminaires used in stand lamps from stage/studio luminaries.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-141 Log #2087 NEC-P15 **Final Action: Reject**
(520.5(C))

Submitter: Jim Davis, Electrical Education Services, LLC
Comment on Proposal No: 15-139
Recommendation: Revise 520.5 (C) as follows:
Nonrated Construction. ~~Nonmetallic sheathed cable, Type AC cable, electrical nonmetallic tubing, and rigid nonmetallic~~ conduit Any wiring method approved by this code shall be permitted to be installed in those buildings or portions thereof that are not required to be of fire-rated construction by the applicable building code.
Substantiation: The code panel is respectfully requested to reconsider this proposal which is intended to simplify the code text for all users by NOT naming all of the wiring methods (in a list) that are otherwise approved for non-rated construction as pointed out by Mr. Sampson in his Explanation of Negative Vote to the panel statement in the ROP. Simplification here will help reduce potential confusion not to mention—save ink.
Panel Meeting Action: Reject
Panel Statement: Article 520 occupancies are special and the panel contends that not all wiring methods approved elsewhere in the Code are applicable. Furthermore, the panel believes that wiring methods acceptable for Article 520 occupancies should be specifically itemized for usability and clarity.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-142 Log #965 NEC-P15 **Final Action: Reject**
(520.21)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-183
Recommendation: Accept the proposal with the following revisions:
All metal raceways and metal-covered cables, the metal frames and enclosures of all electrical equipment including border lights and portable luminaries shall be connected to an equipment grounding conductor.
Substantiation: The permitted wiring methods in 525.5 include Types MI, MC, and AC cables. Type MI is sheathed; Type MC may be an interlocking tape type; Type AG has a flexible metallic enclosure. These are distinct types of covering.
Panel Meeting Action: Reject
Panel Statement: The submitter referred to the wrong section; 520.21 addresses dead front switchboards. The substantiation is based on another article. In addition, the comment does not meet the requirements of clauses 4.4.5(b), (c), and (d) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-143 Log #973 NEC-P15 **Final Action: Reject**
(520.21)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-143
Recommendation: Accept the proposal.
Substantiation: Since Article 400 does not require listing, how is a “user” of the NEC to determine if flexible cords and cables are suitable per 400.3 and conform to the descriptions in the Use columns of Table 400.4 without the benefit of listing protocols? Many sections re: flexible cords and cables do not specify listing which can result in some cords on the same premises being specifically required to be listed while others are not.
Panel Meeting Action: Reject
Panel Statement: The submitter suggests the acceptance of Proposal 15-143, which refers to section 520.21. Section 520.21 addresses dead front switchboards and does not contain wording on the listing of flexible cords and cables, as the comment substantiation suggests. The comment does not meet the requirements of clause 4.4.5(c) of the Regulations Governing Committee Projects.
The Task Group spent a considerable amount of time and energy to attempt to identify the actual section the submitter was requesting action on. The Task Group was unable to accomplish that.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-144 Log #1157 NEC-P15 **Final Action: Reject**
(520.27(A)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-144
Recommendation: Accept the proposal with the following revisions:
A single feeder that supplies no other load, provided with a disconnecting means that simultaneously disconnects all ungrounded conductors of the feeder.
Substantiation: It is not clear if a single feeder is intended to supply more than one switchboard. The standard requirements for simultaneous disconnection should be specified. This section may be deemed to modify such requirements since there is no specific section requiring other articles to apply, as is common in many articles.
Panel Meeting Action: Reject
Panel Statement: The submitter is requesting acceptance of two proposals that are in conflict with each other. Chapters 1 through 4 apply to Article 520 installations unless modified by Article 520. There is no question that Chapters 1 through 4 require simultaneous disconnection of all ungrounded conductors in the feeder. It is a common practice to feed multiple switchboards bused together from one feeder. It is not and should not be prohibited by 520.27.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-145 Log #206 NEC-P15 **Final Action: Accept**
(520.44)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-151
Recommendation: The Technical Correlating Committee directs that the panel clarify 520.44(B)(2) as it applies to "listed for the purpose".
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify 520.44(B)(2) as it applies to "listed for the purpose".
See Comment 15-147A.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-146 Log #1156 NEC-P15 **Final Action: Reject**
(Table 520.44)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-150
Recommendation: Change "Ampacity" in the heading of "Rating of Overcurrent Devices."
Substantiation: The heading covers ampacity while the table covers overcurrent device ratings; two different things. Ampacity is related to current carrying rating of conductors.
Panel Meeting Action: Reject
Panel Statement: The headings of the columns are correct. The purpose of the right-hand column is to limit the maximum amount of current for the wire size given in the table. The purpose of Table 520.44 is to describe ampacity of cables of 75 and 90 degree temperature ratings, to limit the maximum rating of the overcurrent device for a given wire size, and to provide ampacity adjustment factors for these conductors when used at a minimum diversity of 50%.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-147 Log #772 NEC-P15 **Final Action: Reject**
(520.44(B)(1) and (B)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-149
Recommendation: Accept the proposal with the following revisions:
"(B)(1) Flexible cords and cables to supply border lights shall be an extra-hard usage type that complies with 400.3."
"(B)(2) Extra-hard usage type flexible cords and cables not in contact with...". (Remainder unchanged).
Substantiation: Flexible cords and cables should be noted to comply with 400.3 as not all of these types are suitable.
Listing is not required in Article 400.
There is no table comparable to Table 400.4 for listed cords and cables; how is the Code user to determine the characteristics and uses of listed cords and cables?
Panel Meeting Action: Reject
Panel Statement: The submitter asks that section 400.3 be applied to the selection of flexible cords and cables covered by Section 520.44(B). This is already required, since Article 520 does not modify this requirement and Chapters 1 through 4 apply to Article 520 occupancies unless specifically modified by Article 520.
The submitter points out that there is no separate table in Article 400 for listed flexible cords and cables, and suggests that this is a reason not to require listing of these cords and cables. The panel reiterates that the special occupancies covered by Article 520 require listed cords and cables and that Article 520 modifies Article 400 on this issue.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-147a Log #CC1500 NEC-P15 **Final Action: Accept**
(520.44(B)(2))

Submitter: Code-Making Panel 15,
Comment on Proposal No: 15-151
Recommendation: In 520.44(B)(2), delete "for the purpose" and substitute "as stage and studio wiring devices".
Substantiation: The change adds clarity to 520.44(B)(2) as it applies to listed products.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-148 Log #207 NEC-P15 **Final Action: Accept**
(520.45)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-153
Recommendation: The Technical Correlating Committee directs that this action be reconsidered and correlated with the existing text in 520.46 and 520.62(B).
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC reconsider and correlate with the existing text in 520.46 and 520.62(B).
By accepting Comment 15-149, the references to 520.45 in 520.46 and 520.62(B) are correct.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-149 Log #2626 NEC-P15 **Final Action: Accept**
(520.45)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 15-153
Recommendation: The proposal should be rejected.
Substantiation: The receptacles covered in 520.45 are of a special construction, and contrary to the proposal substantiation, are not intended to be covered by 406.2(B). They are also exempt from the usual current limitations in Table 210.21(B)(2) by virtue of an express modification in 520.9. At one time, 520.45 had additional limitations with respect to continuous loads on these devices, but those limitations were removed in the 1993 NEC after substantiation that they could function properly even if continuously loaded above 80% of their current rating. It is advisable to leave well enough alone.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-150 Log #208 NEC-P15 **Final Action: Accept**
(520.50(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-156
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action because the modified language that was accepted contains changes from the existing text that have not been identified.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise text of 520.50(C) to read as follows:
Overcurrent Protection. The supply devices of these supplementary circuits shall be protected by branch-circuit overcurrent protective devices. ~~The individual~~ Each ~~supplemental~~ supplementary circuit, within the road show connection panel and theater, shall be protected by branch—circuit overcurrent protective devices ~~of suitable ampacity~~ installed within the road show connection panel.
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.
The panel edits 520.50(C) accordingly. These changes to the actual 2008 text meet the original submitter's intent and now properly identify the changes.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-151 Log #972 NEC-P15 **Final Action: Reject**
(520.53(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-161
Recommendation: Accept the proposal with the following revisions:
Internal surfaces of enclosures of combustible material shall be covered with sheet metal not less than 0.51mm (0.020 in.) in thickness that is galvanized, enameled, or otherwise coated with noncombustible material that is corrosion-resistant.
Substantiation: Thickness of coating should be specified, likewise, noncombustible and corrosion resistant.
Panel Meeting Action: Reject

Panel Statement: The proposed change does not offer any additional clarity. The substantiation calls for specifying the thickness of the coating, but proposed new wording does not specify such thickness. This construction is many decades old and there is no record of loss to suggest that a change to the description of the construction is needed. In addition, the submitter did not provide a technical substantiation of the change.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-152 Log #963 NEC-P15 **Final Action: Reject**
(520.53(H)(1) and (2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-164
Recommendation: Accept the proposal with the following revisions:
(H) Supply Conductors.
(1) General. A portable switchboard shall be supplied from a power outlet by means of extra-hard usage flexible cords or cables that comply With 400.3 and 400.4. Multiconductor flexible cords and cables shall contain an equipment grounding conductor. The supply conductors shall terminate at an externally manually operable fused main (master) switch or circuit breaker at the switchboard or in a connector assembly identified tor the purpose. The supply conductors and connector assembly shall have current ratings not less than the master switch fuses or master circuit breaker and shall be provided with oveercurrent protection.
(2) Single-Conductor Supply. Single conductor portable flexiblepower cable circuit conductors shall not be smaller than 2 AWG and where used as an equipment grounding conductor shall not be smaller than 6 AWG. Single-conductor grounded neutrals shall comply with 520.53(O). Single conductor portable power cables shall be grouped together, but not bundled.
Substantiation: Supply conductors should be specified to comply Wwith 400.3 and 400.4 as all extra-hard usage types may not be suitable, e.g., electric vehicle cables, and those without a W in the type letter, for wet locations and sunlight resistance. Multiconductor cables should contain an EGC. The current rating of supply conductors and connector assembly should be not less than the overcurrent protection in the master switch or circuit breaker since they commonly accompany the switchboard and the total load connected can vary. Single-conductor equipment grounding conductors should be the same type as circuit conductors for flexibility; a solid or normally stranded 6 AWG conductor is not very flexible. Paralleled conductors, identification of conductors and systems are already covered elsewhere in the NEC. “Permitted to be” identified does not impose a requirement and, therefore, not enforceable per 90.5 (B) and may be deemed to amend requirements of 200.6 and 250.119. Conductors may be paralleled for reasons other than increased ampacity, e.g., availability or ease in handling.
Panel Meeting Action: Reject
Panel Statement: The submitter identified two proposals with different content, but only references one proposal in the proposed revision. However, he doesn’t identify which one. Since the comment is not in legislative format, it is not possible to determine what existing language changes and whether it is a wholesale or just a partial revision. No improvement in clarity is offered.
This comment has failed to meet the requirements of clauses 4.4.5(b) and (c) of the Regulations Governing Committee Projects.
The Task Group spent a considerable amount of time and energy to attempt to identify the actual section the submitter was requesting action on. The Task Group was unable to accomplish that.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-153 Log #1155 NEC-P15 **Final Action: Reject**
(520.53(H)(1) and (2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-164
Recommendation: Accept the proposal with the following revisions:
(1) The non-fixed feeder conductors supplying a portable switchboard shall be extra hard usage types of flexible cords or cables that comply with 400.3. The supply cords and cables shall terminate wtihin the switchboard enclosure in a manually externally operable fused or circuit breaker or a connector assembly identified for the purpose. The supply cords and cables (and connector assembly) shall have ratings not less than the fusible switch or circuit breaker at the switchboard.
(2) Single Conductor Cables. Single conductor flexible cables shall not be smaller than 2 AWG. The equipment grounding conductor shall not be smaller than 6 AWG. Single conductor grounded neutral conductors shall be sized in accordance with 520.53(O)(2). Single conductor cables shall be grouped together but not bundled. The equipment grounding conductor shall be permitted to be a different type if it meets the requirements of this section, and shall be permitted to be reduced in size as permitted by 250.122.
Substantiation: While it is understood which supply conductors are intended to be covered “supply conductors” literally includes fixed feeder and service conductors. Extra-hard usage flexible cords and cables should be suitable for the use; (400.3). This section may be deemed to amend that. Some are designed as electric vehicle cables, some are not designated W for wet locations and sunlight resistance. The grounded neutral and EGC identification and system identification are covered in other NEC sections which apply as are paralleled conductors for size and length, whether paralleled for ampacity or other reasons such as availability or ease in handling.
Panel Meeting Action: Reject
Panel Statement: It was not possible to determine what existing language changes and whether it was a wholesale or just a partial revision. No improvement in clarity is offered.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-154 Log #209 NEC-P15 **Final Action: Accept**
(520.53(H)(3)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-168
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action relating to the use of the phrase “overcurrent protection device” vs. “overcurrent protective device”.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Change the word “protection” to “protective” in the original proposal on 520.53(H)(3)(1) and also in 520.53(H)(3)(2).
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.
The panel edits the text to change the word “protection” to “protective” in the original proposal.
The panel also recognizes identical text in 520.53(H)(3)(2) and makes a parallel change in 520.53(H)(3)(2).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-155 Log #210 NEC-P15 **Final Action: Accept**
(520.53(H)(4)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-169
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action relating to the use of the phrase “overcurrent protection device” vs. “overcurrent protective device”.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Change the word “protection” to “protective” in the original proposal on 520.53(H)(4)(1) and also in 520.53(H)(4)(2).
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.
The panel edits the text to change the word “protection” to “protective” in the original proposal.
The panel also recognizes identical text in 520.53(H)(4)(2) and makes a parallel change in 520.53(H)(4)(2).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-156 Log #872 NEC-P15 **Final Action: Reject**
(520.61(D) and (E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-175
Recommendation: Accept the proposal and revise as follows:
(D) Flanged Surface Devices. Flanged surface devices shall be rated in amperes and voltage.
(C) Cable Management. Cable and flexible cords and cables shall be protected by approved means where they enter equipment enclosures and be arranged so that there is no tension on terminal connections, or provided with devices to prevent such tension.
Substantiation: Since Part V covers portable equipment other than switchboards, the cables of (E) are presumed to be flexible cords and cables since portable switchboards may be supplied by single conductor cables (520.53(H)(2)). If cables and flexible cords cannot be arranged to prevent tension strain relief, devices should be permitted. Flanged surface devices should be included in (D).
Panel Meeting Action: Reject
Panel Statement: The submitter’s text does not pertain to 520.61.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-157 Log #1154 NEC-P15 **Final Action: Reject**
(520.62(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-177
Recommendation: Accept the proposal with the following revisions:
Flexible cords and cables supplying pendent receptacles or cord connector bodies shall comply with 400.3.
Substantiation: All extra-hard usage types may not be suitable for such use, e.g., electric vehicle types and those without a W designation for wet locations and sunlight resistance.
Panel Meeting Action: Reject
Panel Statement: Flexible cords are already required to comply with 400.3 since there is no modification of that requirement in Article 520. There is nothing to prevent use of an extra hard usage cable that does not include a W in its designation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-158 Log #1153 NEC-P15 **Final Action: Reject**
(520.68(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-181
Recommendation: Accept the proposal with the following revisions:
(1) General. Flexible conductors, including cable extensions used to supply portable stage equipment shall be approved extra-hard usage types flexible cords or cables.
Exception: No change.
Delete (2)
Substantiation: Cords for stand lamps are covered in (1). Physical damage is covered in 400.8(7); overcurrent protection is covered in 400.5 and 210.23 which specify branch circuit ratings which encompass overcurrent protection.
Panel Meeting Action: Reject
Panel Statement: The panel contends that Article 520 venues require extra-hard usage cords and cables to be listed, not simply approved.
The intent of this section is to allow a specific exemption of extra-hard usage cord for stand lamps that are fed by branch circuits of 20A or smaller. The submitter provided no substantiation for the change except that these requirements are covered elsewhere. They are not covered elsewhere for this specific special occupancy application.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

ARTICLE 522 — CONTROL SYSTEMS FOR PERMANENT AMUSEMENT ATTRACTIONS

15-159 Log #964 NEC-P15 **Final Action: Reject**
(522.7)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-186
Recommendation: Accept the proposal with the following revisions:
Only qualified persons shall install, maintain, and service electrical installations for installed amusement attractions and associated structure whether permanent or temporary.
Substantiation: Qualified persons should be required for installation, maintenance, and service. The present wording covers permanent installation without specifying “electrical”. Some attractions may not have electrical wiring.
Panel Meeting Action: Reject
Panel Statement: This section is titled “Maintenance”.
The current wording best reflects what this Code section should read. The submitter does not clarify any portion or part of this text. The submitter also includes wording that addresses temporary structure(s) that is beyond the scope of this Code article.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-160 Log #961 NEC-P15 **Final Action: Reject**
(522.23)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-189
Recommendation: Accept the proposal with the following revisions:
Overcurrent protection for Conductors. Conductors 30 AWG through 16 AWG shall have overcurrent protection in accordance with the appropriate conductor ampacity in Table 522.22 or in acordance with Table 402.5 for fixture wires or as permitted in 725.45(C) for Class 1 circuits.
Exception: Overcurrent protection shall not be required for Class 2 control systems.
Substantiation: Correlation due to different conductor insulation temperature ratings, fixture wires, conductors for general wiring, and Class 1 remote control circuits. Conductors larger than 16 AWG covered in Table 310.16 have overcurrent protection requirements already covered elsewhere in the NEC.
Panel Meeting Action: Reject
Panel Statement: The reference to 402.5 is unnecessary as these are control circuit conductors, not fixture wires.
This section applies to a very narrowly defined application with no intention of accommodating all possible wiring. The industry has not requested this additional flexibility.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-161 Log #962 NEC-P15 **Final Action: Reject**
(522.23)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-189
Recommendation: Accept the proposal with the following revisions:
Conductor Ampacity. Conductors sized 16 AWG and smaller shall have an ampacity as specified in Table 522.22. Fixture wires specified in 725.49.
(B) used for Class 1 remote control circuits shall have an ampacity as specified in Table 402.5.
Substantiation: 725.49(B) requires 18 AWG and 16 AWG conductor used for Class 1 circuits to be a fixture wire (Table 402.3). Table 402.5 ampacity for 18AWG is 6 amperes, for 16 AWG it is 8 amperes. Most fixture wires are rated higher than 75 C. Ampere ratings should not be different due to type of circuit.
Panel Meeting Action: Reject
Panel Statement: This section applies to a very narrowly defined application with no intention of accommodating all possible wiring. The industry has not requested this additional flexibility.
It should be noted that Article 522 was created because other articles did not adequately address the special needs of the equipment in permanent amusement attractions. The action by this submitter is attempting to bring in requirements that are not applicable.
The comment does not meet the requirements of Section 4.4.5(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-162 Log #991 NEC-P15 **Final Action: Accept**
(522.23)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 15-188
Recommendation: The Proposal should be Accepted in Principle and “Table 310.16” should be revised to read “Table 310.15(B)(16)”.
Substantiation: Panel 6 Accepted in Principal in Part Proposal 6-52 and renumbered Table 310.16 as Table 310.15(B)(16). Acceptance of this Comment will provide correlation.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-163 Log #825 NEC-P15 **Final Action: Reject**
(522.24(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-190
Recommendation: Accept the proposal and revise text to read as follows:
(B) Control Circuits With Power and Lighting Circuits. Control circuits shall be permitted to be installed in the same raceway, cable, or enclosure with power and lighting circuits where in accordance with the following:
(1) Where the circuits are functionally associated.
(2) In factory or field-assembled control centers.
(3) In a manhole or handhole enclosure where”
(a) The control circuits or power and lighting circuits are in separate raceways, metal-covered cables, or multiconductor Type UF cables durably marked as control or power and lighting circuits.
(b) The control circuits are permanently separated from the power and lighting circuits by a firmly fixed nonconductor such as flexible tubing.
(c) The control circuits and power and lighting circuits are permanently and effectively separated and securely fastened to racks, insulators, or other approved supports.
(4) In cable trays where the control circuits and power and lighting circuits not functionally associated, are separated by an approved fixed solid barrier or by raceway or metal-covered cable.
Substantiation: “Power” circuits may be deemed not to include lighting circuits. Handhole enclosures should be included; they may be installed to provide access to a junction box or conduit body installed in an underground run. Single conductor Type UF cables installed for both power and lighting and control circuits would be difficult to distinguish.
Panel Meeting Action: Reject

Panel Statement: The submitter has totally rewritten the text of his original proposal such that the panel is unable to understand what he wants done. As a result, the panel is of the opinion that the comment does not meet the requirements of Section 4.4.5(c) of the Regulations Governing Committee Projects.

The panel contends that the existing text adequately addresses control circuits with power conductors. The submitter's substantiation does not justify the change.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-164 Log #1162 NEC-P15 **Final Action: Reject**
(522.24(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-190
Recommendation: Accept the proposal with the following revisions:

Control Circuits with Power and Lighting Circuits. Control circuits and power and lighting circuits shall be permitted to occupy the same cable, enclosure, raceway, or cable tray only as permitted in 552.24(B)(1) through (B)(3).

(1) In a cable, enclosure, raceway, or cable tray where the control circuit conductors and power and lighting circuit conductors are functionally associated.

(2) In control centers.

(3) In a manhole or handhole enclosure for underground conductors in accordance with the following:

(a) The control circuit conductors or power and lighting circuit conductors are in separate raceways, metal covered cables, or multiconductor Type UF cables.

(b) The control circuit conductors or power and lighting circuit conductors are permanently and effectively separated by a continuous firmly fixed nonconductor, such as flexible tubing or permanently and effectively separated and securely fastened to racks, insulators, or other approved means.

(4) In cable trays where the control circuit conductors and the power and lighting circuit conductors are separated by a firmly fixed solid barrier compatible with the cable tray, or the control circuit conductors and power and lighting circuit conductors are in a raceway or metal covered cable.

Substantiation: "Power" may be deemed not to include lighting. Hand hold enclosures for underground conductors should be included. Conductors in manhole and handhole enclosures may also be in raceways. "Control centers" covers factory and field assembled types. Cable trays should be included as in (A). Separation in cable trays can also be accomplished by raceways. Single conductor Type UF cable used for both types of systems are difficult to distinguish.

Panel Meeting Action: Reject
Panel Statement: The submitter has totally rewritten the text of his original proposal such that the panel is unable to understand what he wants done. As a result, the panel is of the opinion that the comment does not meet the requirements of Section 4.4.5(c) of the Regulations Governing Committee Projects.

The panel contends that the existing text adequately addresses control circuits with power conductors. The submitter's substantiation does not justify the change.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-165 Log #960 NEC-P15 **Final Action: Reject**
(522.24(B)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-190
Recommendation: Accept the proposal with the following revisions:

(3) In a Manhole or Handhole Enclosure. Control circuits and power and lighting circuits shall be permitted in the same manhole or handhole enclosure if the installation complies with at least one of the following:

(1) The power and lighting circuit conductors are in a separate raceway(s), metal covered cable(s), or multiconductor Type UF cable(s)

(2) The control circuit conductors are in a separate raceway(s), metal covered cable(s) or multiconductor Type UF cable(s).

(3) The control circuit conductors are permanently separated from the power and lighting circuit conductors by a continuous firmly fixed nonconductor such as flexible tubing.

(4) The conductors of the different systems are effectively separated and securely fastened to racks, insulators, or other approved supports.

(5) In cable trays where the control circuit conductors are not functionally associated with the power and lighting circuit, conductors, are separated by a solid fixed barrier of an approved material or the control circuit conductors or power and lighting circuit conduclors are in a raceway(s) or metal-covered cable(s).

Substantiation: Handhole enclosures should be included. Lighting circuit conductors should be included. If single conductor Type UF cables are used for control conductors and power and lighting circuit conductors it can be difficult to discern which is which. Control circuit conductors and power and lighting circuit conductors should be included in proposed (4). Securing of only control circuit conductors doesn't prevent contact by other conductors. Raceways should be permilted as separation in cable trays.

Panel Meeting Action: Reject
Panel Statement: The submitter has totally rewritten the text of his original proposal such that the panel is unable to understand what he wants done. As a result, the panel is of the opinion that the comment does not meet the requirements of Section 4.4.5(c) of the Regulations Governing Committee Projects.

The panel contends that the existing text adequately addresses control circuits with power conductors. The submitter's substantiation does not justify the change.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-166 Log #1161 NEC-P15 **Final Action: Reject**
(522.25)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-191
Recommendation: Accept the proposal with the following revisions:

(1) Continuity of power is required for orderly shutdown and where a ground fault(s) can result in a hazardous condition

(2) Ground detectors are installed in the control system at an approved location occupied while the amusement attraction is in operation.

Substantiation: A ground fault(s) that disables a control system designed to prevent operation of attractions unless doors, gates, or person restraints are in place can be a hazard to persons if failure allows operation with open doors, gates, or unused restraints. Ground detection is not useful if a signal device indicating the condition is not located where personnel are present.

Panel Meeting Action: Reject
Panel Statement: The current language addresses the submitter's concern. The present text adequately addresses the concern that a single ground fault may disable the control system.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 525 — CARNIVALS, CIRCUSES, FAIRS, AND SIMILAR EVENTS

15-167 Log #211 NEC-P15 **Final Action: Accept**
(525.5(B)(2))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-193
Recommendation: The Technical Correlating Committee directs that the panel clarify the action taken on this proposal relating to the phrase "and extending vertically to grade" by placing it after the word "horizontally" in the text.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept
Revise 525.5(B)(2) as follows:

(B) Clearance to Portable Structures.

(2) Over 600 Volts. Portable structures shall not be located under or within a space that is 4.5 m (15 ft) horizontally and extending vertically to grade of conductors operating in excess of 600 volts.

Panel Statement: The panel accepts the direction of the TCC to clarify the action.

The panel makes an editorial change to 525.(B)(2) to clarify usage of the section.

Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-168 Log #1159 NEC-P15 **Final Action: Reject**
(525.6)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-194
Recommendation: Accept the proposal.
Substantiation: "Mechanical" is defined as "of or relating to machinery or tools." "Likely" is used in approximately 80 places in the NEC.
Panel Meeting Action: Reject
Panel Statement: "Likely" is not prescriptive enough and is to be avoided per the NEC Style Manual. "Mechanical" is imperative as part of the application.
The existing language is clear and the submitter has not provided compelling new substantiation to change it.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-169 Log #773 NEC-P15 **Final Action: Reject**
(525.10(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-197
Recommendation: Accept with the following revisions:
"Service equipment shall not be installed where accessible to unauthorized persons, unless the equipment is locked to prevent access or manual operation, or the equipment is under continuous observation of a qualified person."
Substantiation: Equipment should be accessible to authorized persons; the average homeowner or business owner is not a "qualified" person, but has access to their service equipment. Many other requirements in the NEC are not enforceable when the AHJ is not present.
Panel Meeting Action: Reject
Panel Statement: Authorized Persons and Qualified Persons are not the same. An authorized person (e.g., an owner) may be unqualified. The requirement is that only qualified persons can access the equipment.
"Under continuous observation of a qualified person" is not enforceable.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-170 Log #1160 NEC-P15 **Final Action: Reject**
(525.10(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-196
Recommendation: Accept the proposal with the following revisions:
Service equipment shall not be installed in a location where it is accessible to unqualified persons unless it is locked to prevent manual operation of control parts and access to contained parts.
Exception: Where under constant supervision of an authorized person.
Substantiation: Having provisions for locking is not the same as being locked. Provisions alone do not deter access. Where under continuous supervision, equipment does not need to be locked, and perhaps should not be in case access is imperative and the authorized person does not have a key.
Panel Meeting Action: Reject
Panel Statement: The panel contends that locked is not enforceable and lockable is.
"Under continuous observation of a qualified person" is not enforceable.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-171 Log #707 NEC-P15 **Final Action: Reject**
(525.10(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-198
Recommendation: Accept the proposal and revise as follows:
(A) Guarding Service equipment shall not be accessible to unauthorized persons unless locked to prevent access to energized parts, control and switching devices, or under continuous observation and control of an authorized person.
Delete (B).
Substantiation: Service equipment may be lockable but not actually locked which doesn't deter access and defeats the purpose of the provision. The purpose of locking should be noted; the cover of an enclosed switch can be locked but doesn't prevent operation of the lever or handle. Mounting and securing of equipment is covered by 110.13; 110.13 covers wet and damp locations.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comments 15-169 and 15-170.
525.10(B) is necessary as the equipment is reinstalled at various sites – it is not permanent. The requirement for solid backing and protection from weather is necessary.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-172 Log #824 NEC-P15 **Final Action: Reject**
(525.20(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-201
Recommendation: Accept the proposal and the revise text to read as follows:
(A) Wiring Methods. Where wiring is installed it shall be an approved wiring method covered in Chapter 3 except that flexible cords and cables shall be permitted for use as permanent wiring if they comply with 400.3 and the following:
(1) Be an extra-hard usage type or hard usage type where protected by location or approved means.
(2) Contain an equipment grounding conductor.
(3) Be securely fastened in place.
(4) Be a continuous length between terminations.
(5) Installed in a manner or with fittings to prevent strain on terminations.
Substantiation: This section implies that Chapter 3 wiring methods are not to be used. Many portable components can be wired with permanent methods that are a fixed part of the component. The wording doesn't specifically permit the use of flexible cords. Compliance with 400.3 should be noted as all extra-hard usage type cords may not be suitable; e.g., EV series, those without a W designation for wet locations and sunlight resistance.
Panel Meeting Action: Reject
Panel Statement: The proposed language does not provide clarity, and in fact, cannot be applied. Chapter 3 addresses permanent installations and does not cover the portable nature of the equipment in Article 525 venues. Flexible cords are already required to comply with 400.3 since there is no modification of that requirement in Article 525. There is nothing to prevent use of an extra-hard usage cable that does not include a W in its designation if not used outdoors. Additionally, the "securely fastened in place" language is not applicable.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-173 Log #1169 NEC-P15 **Final Action: Reject**
(525.20(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-201
Recommendation: Accept the proposal with the following revisions:
(A) Type. Where methods shall be approved type covered in Chapter 3 except that flexible cords and cables that comply with 400.3 shall be permitted for use as permanent wiring where they comply with 400.3 and other applicable provisions of Article 400, and if they comply with the following:
(1) Be an extra-hard or hard usage type and protected by location or other approved means.
(2) Be securely fastened in place.
(3) Contain an equipment grounding conductor.
Substantiation: Reference to 400.3 will require that flexible cords and cables be suitable for the use and location, i.e., wet locations and sunlight resistance, where required. All extra-hard and hard usage types do not have a W designation and electric vehicle types may not be appropriate. The proposed reference to Article 400 will cover physical damage; 400.8(7) pull at joints and terminals, 400.10 overcurrent protection, 400.13 and other provisions not specified in this section, which in the absence of a section requiring compliance with applicable provisions of other articles may be deemed to modify such provisions.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 15-172.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-174 Log #212 NEC-P15 **Final Action: Accept**
(525.21(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 15-205
Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal and correlate with the action taken on Proposal 1-63.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider the proposal and correlate with the action taken on Proposal 1-63.

The panel reaffirms its position to continue to Accept Proposal 15-205 as written.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-175 Log #1168 NEC-P15 **Final Action: Reject**
(525.21(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-205
Recommendation: Accept the proposal with the following revisions:
(A) Disconnecting Means. Approved means shall be provided to disconnect each portable structure. Each disconnecting means shall:
(1) Simultaneously open all ungrounded conductors of the circuit it controls.
(2) Be located within sight of and within 1.8 m (6 ft) of the operator's station.
(3) Be readily accessible to the operator, including when the ride or attraction is in operation.
(4) Have approved permanent means for locking in the open (off) position (remainder unchanged).
Substantiation: Disconnecting means should be approved for the use and conditions, (ratings wet locations, etc.). Since covers and doors may be lockable, locking should clearly relate to position of the disconnecting mechanism.
Panel Meeting Action: Reject
Panel Statement: While the formatting may provide some clarity, the proposed text change is incomplete and therefore there is no assurance that the submitter's intent can be met.
The list provided by the submitter does not enhance the safety, understanding or enforcement of this provision.
This comment also does not meet the requirements of clause 4.4.5(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-176 Log #2627 NEC-P15 **Final Action: Accept in Part**
(525.21(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 15-205
Recommendation: Continue to accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110: "**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
Panel Meeting Action: Accept in Part
The panel continues to Accept Proposal 15-205.
The panel does not accept the contingency of CMP 1 accepting the companion comment.
Panel Statement: See panel action on Comment 15-174.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-177 Log #1165 NEC-P15 **Final Action: Reject**
(525.21(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-207
Recommendation: Accept the proposal with the following revisions:
General Illumination. All lamps for general illumination for tents and concessions shall be protected from accidental breakage and located, protected by a guard, or enclosed to minimize the likelihood of igniting combustible material.
Substantiation: The present first sentence is already covered by 525.20(A) which is not limited to lighting. This provision should include requirements similar to 408.17 and 410.12.
Panel Meeting Action: Reject
Panel Statement: The submitter's revised text removes the added requirements for wiring inside of tents which are not covered by 525.20(A). The requirements for lamps for general illumination are clearly covered by the existing text. In addition, the requirements of 408.17 and 410.12 already apply and no additional text is necessary.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-178 Log #2464 NEC-P15 **Final Action: Accept**
(525.21(C))

Submitter: Alan Manche, Schneider Electric
Comment on Proposal No: 15-203
Recommendation: Reject this proposal.
Substantiation: The language, although lifted from Article 530, provides permission to the essentially eliminate working space without any substantiation that safety will not be impacted. Even NFPA 79, the safety standards for industrial machinery that can have close spaces, establishes parameters that are enforceable. The language introduced in this section is not enforceable and provides the opportunity for every installation to be a point of conflict. Conflict is not an effective means for the AHJ to ensure an industry accepted level of safety or for the amusement industry to manage electrical installations across the country.
Quick example of how this language may get used. The AHJ must permit reduction of the working space, but doesn't tell him how much, so the AHJ may decide that 2ft- 11 inches instead of 3 ft is appropriate. I can't see how this benefits the amusement industry.
The proposal is not good for either the electrical safety of the operator, maintenance person or the amusement industry.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-179 Log #2710 NEC-P15 **Final Action: Reject**
(525.23(A))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 15-215
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The fact finding report addressed overheating terminals and not shock protection as this section requires. The panel is also aware there is no product yet available.
The wholesale change of "Where GFCI Protection is required." to "Where Power safe protector protection is required." is not supported by the substantiation. The UL Investigation states in the Executive Summary the following:
"Preliminary Testing – A limited testing was performed to demonstrate the conceptual ability of the PSP enhanced safety receptacle design to serve as a principle safeguard to prevent overheating at the receptacle that could result in the ignition of nearby combustibles.
"Recommendations for UL Certification Process – A process was developed for evaluating these receptacles towards a Underwriters Laboratories Inc. Listing of this product." and
"Due to the limited number and prototype nature of the PSP receptacle specimens provided, a comprehensive safety evaluation was not possible."
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-180 Log #1164 NEC-P15 **Final Action: Reject**
(525.31)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-217
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual 4.1 states: "Do not use a reference if the requirement is covered by 90.3 which is modified by "special nature." All articles are special nature. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: The references to Article 250 are not simply restatement of those clauses, but a direction to specific requirements. The submitter has not provided any compelling new substantiation for the panel to change its action.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

ARTICLE 530 — MOTION PICTURE AND TELEVISION STUDIOS AND SIMILAR LOCATIONS

15-181 Log #1163 NEC-P15 **Final Action: Reject**
(530.12(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-221
Recommendation: Accept the proposal with the following revisions:
The wiring for portable stage set lighting shall be done with extra-hard usage or hard usage type flexible cords or cables covered in Table 400.4 that comply with 400.3. Splices and taps in such cords shall be permitted where made by approved means and protected in accordance with applicable provisions of 240.5.
Exception: Flexible cords and cables shall be permitted in accordance with 240.5(B).
Substantiation: Reference to 400.3 will clarify that section is not amended by lack of reference to other applicable provisions. Some extra-hard and hard usage type cord and cables may not be suitable, such as EV types and those without a W in their designation for wet locations and sunlight resistance. This section may be deemed to amend 400.3 and 240.5 since there is no provision in this article as in other articles requiring compliance with other NEC provisions. Flexible cords and cables are already required not to be subject to physical damage. Splices and taps in accordance with 110.14(B) soldered do not require listing. Listed equipment with integral cords such as lamps, radios, and appliances should be exempted from extra-hard and hard usage type cords.
Panel Meeting Action: Reject
Panel Statement: The submitter's proposed text reduces as well as weakens the requirements without technical substantiation. The panel intends these cables to be listed. Current wording clearly describes proven, industry-specific safe practice.
The submitter's substantiation indicates a lack of understanding of the operation of Article 530 venues.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-182 Log #1167 NEC-P15 **Final Action: Reject**
(530.13)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-222
Recommendation: Accept the proposal with the following revisions:
Switches used for lighting and effects on stages, lots, and on location, shall be of the externally manually operable type. Where contactors are used as the disconnecting means for fuses or panelboards, an externally manually operable switch(es) for control of the contactor(s) shall be readily accessible and at least one such switch shall be located at a distance not more than 1.8 m (6 ft) from the contactor(s) it controls. A single such switch shall be permitted to simultaneously disconnect all the contactors on any one location board.
Substantiation: The intent appears intended to require manual operation whether or not externally operable by remote control. Contactors to disconnect panelboards should be included. Where more than one switch controls a contactor, it may be impractical to locate all switches within 6 ft and negate the means or necessity for more distant switches. Readily accessible should be a requirement for such switches, as in effect they are disconnecting means, not just control switches.
Panel Meeting Action: Reject
Panel Statement: The submitter's proposed text does not provide any additional clarity and does not provide any technical substantiation. The current wording describes safe industry practice with a long established record of performance.
The submitter's substantiation indicates a lack of understanding of the operation of Article 530 venues.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-183 Log #1166 NEC-P15 **Final Action: Reject**
(530.19(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-223
Recommendation: Accept the proposal with the following revisions:
Portable portions of feeders and permanently installed feeders that supply only portable loads shall be permitted to have an ampacity not less than 50 percent of the maximum load that will be supplied.
Substantiation: Permanently installed portions of feeders that supply only portable loads should be included. A permanently installed portion of a feeder that supplies only a portable portion of the same feeder sees the same load and should be permitted the same demand factor. Connected load and calculated load are not defined; are they the same? Different terms pertaining to the same thing can be confusing.
Panel Meeting Action: Reject
Panel Statement: 530.19(B) does not apply to permanently installed feeders. Table 530.19(A) already applies to demand factors for permanently installed feeders.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-184 Log #976 NEC-P15 **Final Action: Accept in Principle**
(530.20)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-225
Recommendation: Accept the proposal with the following revisions:
Grounding. All non current-carrying conductive parts of electrical equipment shall be connected to an equipment grounding conductor. This shall not apply to pendant and portable lamps, portable stage lighting equipment and sound equipment, or to other portable and special stage equipment operating at not over 150 volts dc.
Substantiation: The proposal covers wiring methods, including Type AC cable permitted in 530.11. Stage lighting and sound equipment should be designated "portable".
Panel Meeting Action: Accept in Principle
Revise text of 530.20 to read as follows:
530.20 Grounding. Type MC cable, Type MI cable, Type AC cable containing an insulated equipment grounding conductor, metal raceways, and all non—current—carrying metal parts of appliances, devices, and equipment shall be connected to an equipment grounding conductor. This shall not apply to pendant and portable lamps, to portable stage lighting and stage sound equipment, or to other portable and special stage equipment operating at not over 150 volts dc to ground.
Panel Statement: The revised wording aligns the wiring methods of 530.11 with the grounding requirements of 530.20.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-185 Log #977 NEC-P15 **Final Action: Accept in Principle in Part**
(530.21(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-226
Recommendation: Accept the proposal with the following revisions:
(A) Rating Plugs. Receptacles, cord connector bodies and flanged surface devices shall be rated in amperes. The voltage rating of such devices shall be not less than the nominal circuit voltage. The ampere rating of such devices shall not be less than the rating of the circuit to which they are connected. Table 210.21(B)(2) shall not apply.
Substantiation: Cord connector bodies and flanged surface devices are not covered by this provision which can be a hazard.
Panel Meeting Action: Accept in Principle in Part
Revise text to read as follows:
(A) Rating. Plugs and receptacles, including cord connectors and flanged surface devices, shall be rated in amperes. The voltage rating of the plugs and receptacles shall be not less than the nominal circuit voltage. [Remainder unchanged].
Panel Statement: The panel accepts the changes to the first two sentences with revised text for clarity.
The panel does not accept the remainder of the proposed text. The panel chooses to retain the reference to AC. No substantiation for the elimination of AC was provided.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

ARTICLE 540 — MOTION PICTURE PROJECTION ROOMS

15-186 Log #388 NEC-P15 **Final Action: Accept**
(540.2)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 15-228
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.

The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

Panel Meeting Action: Accept

Panel Statement: The NEC Style Manual does not address this specifically. The NFPA 2004 Manual of Style states in Annex B:

"B.10.2.2 Quotient. Use the word *per* for unit names — for example, meters per second.

"Use a slash (/) or the appropriate power for unit symbols — for example, m/s …"

"Frames per inch" is recognized film industry nomenclature.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

ARTICLE 547 — AGRICULTURAL BUILDINGS

19-3 Log #465 NEC-P19 **Final Action: Reject**
(547.1(B)(1) and (2))

Submitter: Thomas L. Adams, Macomb, IL

Comment on Proposal No: 19-11

Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:

(1) Poultry and animal excrement ~~may~~ that cause corrosive vapors.

(2) Corrosive particles ~~may~~ that combine with water.

This text is in the Article Scope and will require approval of the TCC who has the Scope text under its purview.

Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.

However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms *may* or *can* shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term *may* shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."

Since the use of the term *may* in this Section does not meet these criteria, it should be changed.

Panel Meeting Action: Reject

Panel Statement: The panel recognizes discretionary judgment may be necessary on the part of the authority having jurisdiction to determine whether or not the environment is corrosive and whether corrosive particles may be combined with water.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-4 Log #2785 NEC-P19 **Final Action: Accept**
(547.2.Distribution Point)

Submitter: James J. Rogers, Bay State Inspectional Agency

Comment on Proposal No: 19-12

Recommendation: Continue to reject.

Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.

Panel Meeting Action: Accept

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-5 Log #1172 NEC-P19 **Final Action: Reject**
(547.5(A))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 19-17

Recommendation: Accept the proposal with the following revisions:

(A) Wiring Methods. Permanent type wiring methods employed shall be limited to the following: Galvanized steel, stainless steel, and red brass rigid metal conduit, electrical metallic tubing in accordance with 358.10(B), Type PVC conduit, Type UF cable, Type NMC cable, copper Type SE cable, Jacketed Type MC cable, Type MI cable, with additional protection, liquidtight flexible metal conduit, liquidtight flexible nonmetallic conduit, Type RTRC conduit, electrical metallic tubing, nonmetallic wireways, nonmetallic auxiliary gutters, cablebus, cable tray, open wiring on insulators. The wiring methods of 502.2 shall be permitted for areas described in 547.1(A). All wiring methods shall comply with their respective articles.

Substantiation: The proposal specifies additional wiring methods that are suitable for corrosive conditions and specifically indicates "other cables or raceways suitable for location." It applies to permanent wiring methods, flexible cords and cables are not affected.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action to Reject Proposal 19-17.

The proposed changes are already covered in the existing text which states "or other cables or raceways suitable for the location." An all encompassing list of suitable wiring methods is intentionally not provided which allows for judgment by the authority having jurisdiction. Additionally, the panel notes that "permanent wiring methods" are not defined in the code.

The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-6 Log #1170 NEC-P19 **Final Action: Reject**
(547.5(C)(2))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 19-19

Recommendation: Accept the proposal with the following revisions:

Damp or Wet Locations. In damp or wet locations, including normally dry locations where surfaces or equipment are periodically washed or sprayed with liquids, boxes and other enclosures, conduit bodies and other fittings, and other electrical equipment shall be listed or approved for the conditions.

Substantiation: Building surfaces and equipment may be washed or sprayed with other than plain water. Unlisted equipment such as straps should be "approved" for the conditions. "May" is a discretionary term to be used by the Authority Having Jurisdiciton.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided additional substantiation for the panel to reconsider its action on Proposal 19-19.

Chapters 1-4 apply where not amended or replaced by requirements in Chapter 5. Support requirements for wiring methods in Chapter 3 included the use of "approved" products to perform the required support function.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-7 Log #1196 NEC-P19 **Final Action: Reject**
(547.5(D) and (E))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 19-21

Recommendation: Accept the proposal with the following revisions:

(D) Flexible Connections. Where necessary to employ flexible connections to equipment listed dusttight flexible connectors, extra-hard usage or hard usage type flexible cords and cables that comply with 400.3 and contain an equipment grounding conductor shall be permitted in lengths no longer than necessary.

(E) Separate Equipment Grounding Conductor. Where a separate equipment grounding or bonding conductor is installed it shall be an insulated copper conductor.

Substantiation: Dusttight flexible connectors have no article wheerin they are required to be listed. Article 400 does not require listing. Raceways are required to be listed in their respective articles. LFMC, LFNC, and Type MC cables are already permitted in 547.5(A) whether or not flexibility is required and they and associated fittings are required to be listed in their respective articles. Wiring and equipment are required to be protected by 110.27(B), 300.4 and 352.12(C) and other sections which apply, unless amended. Bonding conductors should be included in proposed (F) since they may be installed in raceways or direct buried between electrodes or equipotential grids or under earth areas where corrosive particles can percolate.

Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-21.

The existing code text already covers the proposed revised language. The recommended change does not provide additional clarity.

The submitter's reference to (E) is incomplete and ambiguous. It is unclear if the submitter intends to delete or revise the current (E) and (F).

The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-8 Log #1171 NEC-P19 **Final Action: Reject**
(547.5(D), (E), and (F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-22
Recommendation: Accept the proposal with the following revisions:

(D) Flexible Connections. Where necessary to employ flexible connections, dustight flexible connectors, liquidtight flexible metal conduit, liquidtight flexible nonmetallic conduit, or extra-hard usage or hard usage type flexible cords and cables that comply with 400.3 shall be used. All connectors and other fittings shall be identified for the purpose.

(E) Physical Protection. All wiring and equipment shall comply with 110.27(B).

(F) Grounding and Bonding Conductors. Where a grounding or bonding conductor is installed within a location covered by 547.1, it shall be a copper conductor, and where installed underground it shall be insulated or covered and comply with cover requirements of Table 300.5
Substantiation: Flexible cables should be included. Cords and cables should comply with 400.3 since all extra-hard and hard usage types do not have the designation W for wet locations and sunlight resistance, which may be required. Reference to 110.27(B) covers physical damage and applies where damage is likely, but not evident, at time of installation or inspection. (F) should include bonding conductors and minimum cover depths required for direct buried conductors operating at zero volts.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-22.

Chapters 1-4 apply where not amended or replaced by requirements in Chapter 5.

The existing language in 90.3 covers the proposed additional code references.

The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-9 Log #1195 NEC-P19 **Final Action: Reject**
(547.5(G)(4))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-26
Recommendation: Accept the proposal.
Substantiation: "Outdoors" includes concrete slab areas, but does not include a concrete slab in an indoor confinement area. Why not indoor slabs?
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-26.

Additional substantiation for the proposed change has not been provided.

The submitter's substantiation referencing indoor and outdoor slabs does not appear to be connected to the original Proposal 19-26. The submitter implies that indoor concrete slabs in confinement areas are not included for GFCI protection; however, indoor areas are included in 547.5(G)(1). Per 547.10, all concrete slabs in confinement areas indoor or outdoors are required to have equipotential planes.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-10 Log #871 NEC-P19 **Final Action: Reject**
(547.8(B) and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-28
Recommendation: Accept the proposal.
Substantiation: The panel statement supports the proposal, since exposure to physical damage may not be evident at time of installation or inspection, but circumstances indicate such exposure is likely.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-28.

The panel does not agree with the submitter that the panel's statement accompanying its action to Reject Proposal 19-28 supports the proposed changes.

As explained in the panel statement on Proposal 19-212, the decision whether or not the installation will be "subject to physical damage" is evident at the point of inspection. "Likely to…" is irrelevant to the decision. "Likely to…" is good Code language to guide product standards where the final installation circumstances may not be evident. In the case of Proposal 19-89, "likely to" is acceptable since the circumstance is not expected under normal circumstances but could occur.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-11 Log #213 NEC-P19 **Final Action: Accept**
(547.8(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-29
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal as it relates to the existing "building cleansing water" vs. "building cleaning water" as accepted in the proposal.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise text to read as follows:

Luminaires exposed to water from condensation, building ~~cleaning~~ cleansing water, or solution shall be listed as suitable for use in wet locations.
Panel Statement: The panel accepts the direction of the Technical Correlating Committee to clarify the panel action.

The panel inadvertently accepted the change in terminology that was part of the original proposal but which was not substantiated. The panel has corrected the language as shown in the Panel meeting action.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-12 Log #1175 NEC-P19 **Final Action: Reject**
(547.9)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-30
Recommendation: Accept the proposal with the following revisions:

(A)(3) Operation. The site-isolating device shall simultaneously disconnect all ungrounded supply conductors from the premises wiring it controls.

(A)(8) Accessibility. Where the site-isolating device is not readily accessible, it shall be provided with an approved operating mechanism to open and close the disconnecting means from a readily accessible location. The handle of the operating mechanism shall be not more than 2 m (6 ft 7 in.) above grade or a working platform and not more than 4.57 m (15 ft) horizontally from the operating mechanism.

(B) Supply Conductors to Buildings or Other Structures. Supply conductors to buildings or other structures shall comply with 547.9(B)(1) through (B)(3). 250.32 and applicable provisions of Part F of Article 225.

Delete present (C).

(C) Direct Buried Conductors. Where direct buried conductors are run to or installed in a building or other structure covered in 547.1, they shall be insulated copper.
Substantiation: The conductors supplying pole mounted site isolating devices are not necessarily service conductors. The supply conductors to a building or other structure are feeders or branch circuits. "Other" is before "structure" since a building is a structure, but all structures are not buildings. Proposed (C) should apply to all conductors in buildings covered by 547.1
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to reject Proposal 19-30.

New material has been introduced which was not included in the original proposal. The new material is either not technically substantiated or it is unclear to the panel what text is intended to be modified or where the new text is to be located.

The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-13 Log #2251 NEC-P19 **Final Action: Reject**
(547.9(A)(1))

Submitter: John Williamson, Maple Grove, MN
Comment on Proposal No: 19-31
Recommendation: Revise Proposal 19-31 as follows: A site-isolating device shall be installed at the distribution point where two or more agricultural buildings or structures are supplied from the distribution point. If there is more than one distribution point, the requirements of 547.9(E) shall apply.
Substantiation: The NEC does not limit the number of distribution points on an agricultural premises. NEC 547.9(E) contains rules for permanent identification plaques or directories when more than one distribution point is on the same agricultural premises. The proposed revision in the wording will be better correlated with 547.9(E).
Panel Meeting Action: Reject
Panel Statement: The proposed language is redundant as the requirements of 547.9(A) and (E) already apply. The submitter's comment does not address the panel's concern stated in its action on Proposal 19-31.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-14 Log #969 NEC-P19 **Final Action: Accept in Principle**
(547.9(A)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-16
Recommendation: Reject the proposal.
Substantiation: The submitter's substantiation is incorrect. 547.9(A)(2) does not clearly require pole-top mounting, only to meet 230.24. A pole "top" mounting could be among the open individual supply conductors supported at the top area of the pole.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 19-15.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-15 Log #2628 NEC-P19 **Final Action: Accept in Principle in Part**
(547.9(A)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-16
Recommendation: Accept the proposal in principle and in part.
Reject the change to "pole-top." Accept the specification for conductor clearances, but locate the requirement in 547.9(B)(2) by rewording this paragraph as follows:
(2) Conductor Installation and Clearances. The supply conductors on the line side of a service disconnect shall, where run as overhead conductors, meet the clearance requirements of 230.24. The supply conductors on the load side of a service disconnect shall be installed in accordance with the requirements of Part II of Article 225.
In addition, reword 547.9(A)(2) to read as follows:
(2) Location. The site-isolating device shall be pole-mounted and, ~~shall meet the clearance requirements of 230.24~~ for an overhead distribution system, be not less than the height above grade required by 230.24 for the conductors it supplies.
Substantiation: The extension of the requirements of 547.9(A) to overhead conductor clearances is beyond the scope of this part of Section 9, which only deals with site-isolating devices. This comment places the desired requirement where it belongs. In addition, 230.24 only provides clearances for conductors, not equipment. The rewording provides the appropriate context to allow 230.24 clearances to carry over to this equipment. This height may or may not be the height of the top of the pole.
Panel Meeting Action: Accept in Principle in Part
The panel rejects the revisions to (B)(2) Conductor Installation.
The panel accepts the revisions to (A)(2) Location in part as follows:
(2) Location. The site-isolating device shall be pole-mounted and~~, shall meet the clearance requirements of 230.24 for an overhead distribution system.~~ be not less than the height above grade required by 230.24 for the conductors it supplies.
Panel Statement: The panel does not agree with the proposed revisions to (B)(2) as there is not a height requirement for a service rated disconnect in this section.
In (A)(2) the panel rejects the addition of "for an overhead distribution system" as 230.24 deals only with overhead distribution systems (service drop conductors). The panel accepts all other revisions to (A)(2). The panel recognizes that the action on this comment continues to require that the device be mounted near the top of the pole without using the term "pole-top mounted."
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-16 Log #2786 NEC-P19 **Final Action: Accept**
(547.9(A)(3))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 19-33
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-17 Log #968 NEC-P19 **Final Action: Accept in Part**
(547.9(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-40
Recommendation: Accept the proposal with the following revisions:
Bonding Conductors. Where livestock is housed, a bonding conductor installed within a location covered by Article 547 it shall be a solid copper conductor. Where run underground it shall be insulated or covered and suitable for wet locations. Burial depth shall comply with Table 300.5.
Substantiation: Equipment grounding conductors are covered in 547.5(F). Bonding conductors should be similarly covered, whether direct-buried or in raceway. Table 300.5 should be noted since it applies to conductors operating at O volts (grounding and bonding conductors). Solid copper is less prone to corrosive conditions than stranded conductors, and is required in some provisions due to possible corrosion.
Panel Meeting Action: Accept in Part
The panel continues to accept the original proposal which deleted 547.9(D). The panel rejects the proposed revisions in this comment.
Panel Statement: New material has been introduced which was not included in the original proposal. In accepting Proposal 19-40, section 547.9(D) has been deleted. It is unclear to the panel where the submitter intends to locate the proposed text.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-17a Log #CC1900 NEC-P19 **Final Action: Accept**
(547.9(E))

Submitter: Code-Making Panel 19,
Comment on Proposal No: 19-41
Recommendation: Revise text to read as follows:
Where a site is supplied by more than one ~~service~~ distribution point ~~with any two services located a distance of 150 m (500 ft) or less apart, measured in a straight line~~, a
permanent plaque or directory shall be installed at each of these distribution points denoting the location of each of the other distribution points and the building or
structures served by each.
Substantiation: As directed by the Technical Correlating Committee in Comments 19-18 and 19-19, the panel has clarified its action taken on Proposals 19-41 and 19-42.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-18 Log #214 NEC-P19 **Final Action: Accept**
(547.9(E))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-41
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 19-42.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-19 Log #215 NEC-P19 **Final Action: Accept**
(547.9(E))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-42
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 19-41.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-20 Log #1174 NEC-P19 **Final Action: Reject**
(547.9(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-41
Recommendation: Revise the panel action as follows:
Where a site is supplied by more than one service or source of power, a durable plaque or directory shall be installed at each of the distribution points denoting the location of other distribution points, and the buildings or other premises served.
Substantiation: Distribution points are not necessarily supplied by service conductors. They may be a feeder or supplied by generators or solar power.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 19-17a.
The new material that has been introduced, which was not included in the original proposal, does not add clarity or usability to the code.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

ARTICLE 550 — MOBILE HOMES, MANUFACTURED HOMES, AND MOBILE HOME PARKS

19-21 Log #870 NEC-P19 **Final Action: Reject**
(550.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-54
Recommendation: Accept the proposal.
Substantiation: 550.11 requires a single disconnecting means which can be an individual enclosed fused switch or circuit breaker. This article does not specifically require a "panelboard."
Panel Meeting Action: Reject
Panel Statement: The definition in 550.2 simply equates the term "Distribution Panelboard" with "Panelboard" as defined in Article 100 and as the term is used in Article 550.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-22 Log #1173 NEC-P19 **Final Action: Reject**
(550.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-52
Recommendation: Accept the proposal with the following revisions:
Feeder Assembly. The conductors from the mobile home service to the mobile home distribution equipment, including the equipment grounding conductor together with necessary fittings and equipment approved for the purpose of supplying current to the main disconnecting means in the mobile home.
Substantiation: The proposal includes all supply conductors whether cord or permanent wiring. "Source" is too inclusive and includes utility, park transformers, and distribution equipment. Feeder conductors do not necessarily terminate in a panelboard (not specifically required) but may terminate in a single enclosed circuit breaker or fused switch.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-52.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-23 Log #216 NEC-P19 **Final Action: Accept**
(550.2.Distribution Panelboard)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-54
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-54 and determined that it is not in conflict with the action taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a and the definition of "Distribution Panelboard" in 550.2 equates with the definition of "Panelboard" in Article 100.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-24 Log #2725 NEC-P19 **Final Action: Reject**
(550.2.Power Safe Protector (PSP))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 19-56
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: A definition is not necessary based on the action taken on Comment 19-32.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-25 Log #1194 NEC-P19 **Final Action: Reject**
(550.10(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-62
Recommendation: Accept the proposal with the following revisions:
(A) Feeder. The power supply to the mobile home shall be a feeder assembly consisting of not more than one listed 50-ampere mobile home power supply cord with an integrally molded or securely attached plug cap or a permanently installed feeder rated not less than 50 amperes.
Substantiation: Edit. Emphasizes the minimum rating of a permanently installed feeder.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-62.
The submitter has not provided substantiation to support the proposed revisions.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-26 Log #217 NEC-P19 **Final Action: Accept**
(550.11)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-63
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase “distribution board” in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-63 and determined that it is not in conflict with the decisions by Panel 9 on Proposal 9-130a. The term “panelboard” was retained in Proposal 9-130a and the definition of “Distribution Panelboard” in 550.2 equates with the definition of “Panelboard” in Article 100.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-27 Log #1180 NEC-P19 **Final Action: Reject**
(550.11)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-63
Recommendation: Accept the proposal with the following revisions:
Circuit Protective Equipment. If a fusible main disconnecting means is provided, the main fuse ampere rating shall be durably marked with lettering at least 6 mm (1/4 in.) high and visible when fuses are changed. Plug fuses and fuseholders shall be Type S and in dead-front enclosures. Enclosures for circuit breakers shall be dead-front.
FPN: No change.
Substantiation: Present first sentence is superfluous; there is no prohibition of branch circuit equipment (presumably disconnecting means and overcurrent protection) from being installed in a panelboard. The requirement for maximum fuse size marking should not be limited to panelboards. Plug fuses may also be installed in fusible switches. Panelboards are not specifically required in this article.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to reject Proposal 19-63.
New material has been introduced which was not included in the original proposal. It is unclear to the panel what text is intended to be modified or where the new text is to be located.
The submitter’s failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-28 Log #218 NEC-P19 **Final Action: Accept**
(550.11(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-65
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase “distribution board” in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-65 and determined that it is not in conflict with the decisions by Panel 9 on Proposal 9-130a. The term “panelboard” was retained in Proposal 9-130a and the definition of “Distribution Panelboard” in 550.2 equates with the definition of “Panelboard” in Article 100.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-29 Log #1177 NEC-P19 **Final Action: Reject**
(550.11(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-64
Recommendation: Accept the proposal with the following revisions:
(A) Distribution Equipment. A single main disconnecting means consisting of a readily accessible circuit breaker of fusible switch shall be provided near the entrance of feeder conductors into the mobile home, but not in a bathroom or toilet compartment. The main disconnecting means enclosure shall be plainly and durably marked “Main Disconnect” in letters at least 6 mm (1/4 in.) high. A fusible main disconnecting means enclosure shall be plainly and durably marked with the appropriate fuse rating in letters at least 6 mm (1/4 in.) high. The mobile home distribution equipment shall contain solderless type grounding terminals or bars for all grounding and bonding conductors terminated therein. The terminations of grounded circuit conductors shall comply with 550.16(A). The main disconnecting means and overcurrent protection and other distribution equipment shall have ratings not less than the feeder conductors. The bottom of the distribution equipment shall be not less than 600 mm (24 in.) above the floor or standing space. A clear working space not less than 750 mm (30 in.) wide and deep and not less than the width and height of the distribution equipment shall be provided.
FPN: No change.
Substantiation: Panelboards are not specifically required. It is impractical to mark the body of a fuse or circuit breaker, and if so marked, would not be visible with a dead-front installed. The marking would be discarded if the fuse or circuit breaker is replaced. “Durable” and “durably” are terms commonly used in the NEC. Distribution equipment should have ratings not less than the feeder conductors. Since there is no prohibition of distribution equipment on the exterior standing space, (grade) is added to the penultimate sentence.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-30.
The requirements in 550.11 pertain specifically to distribution panelboards when used but do not specifically state or imply that a distribution panelboard is required.
The submitter’s failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-30 Log #1178 NEC-P19 **Final Action: Reject**
(550.11(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-64
Recommendation: Accept the proposal.
Substantiation: It is impractical to mark the body of a fuse or circuit breaker, and if so marked, would not be visible with a dead-front installed. The marking would be discarded if the fuse or circuit breaker is replaced. “Durable” and “durably” are terms commonly used in the NEC.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-64. No additional technical substantiation has been provided to support the proposed change. The panel has had no reports of inability to conform with the existing marking requirement.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-31 Log #1179 NEC-P19 **Final Action: Reject**
(550.11(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-64
Recommendation: Accept the proposal.
Substantiation: It is impractical to mark the body of a fuse or circuit breaker, and if so marked, would not be visible with a dead-front installed. The marking would be discarded if the fuse or circuit breaker is replaced.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-30.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-32 Log #2723 NEC-P19 **Final Action: Reject**
(550.13(B))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 19-69
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The submitter's referenced report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent injuries and loss. However, the report did not include an investigation of the ability of this technology to mitigate the hazards associated with wiring device failure mechanisms. Additionally, there are currently no product requirements that exist for PSP protection. As such, we will continue to support the rejection of any proposal to include requirements for PSP and similar devices in the NEC. The panel maintains that installation of these devices is not currently prohibited by the NEC.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-33 Log #2181 NEC-P19 **Final Action: Reject**
(550.13(B) Exception)

Submitter: Wayne E. Morris, Association of Home Appliance Manufacturers
Comment on Proposal No: 19-71
Recommendation: The Code-Making Panel should accept the original proposal in full.
Substantiation: The revised proposal accepted by the CMP eliminates the exception for refrigerators, freezers, and laundries. Nuisance failures of GFCIs for freezers or refrigerators located in a basement or garage may be rare, but cause a great deal of damage when they occur.
Panel Meeting Action: Reject
Panel Statement: The submitter's comments are anecdotal and not technically substantiated. Technological advancement, improvement in the product standards and the involvement by the Consumer Product Safety Commission have combined to significantly enhance the reliability of GFCI's.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-34 Log #219 NEC-P19 **Final Action: Accept**
(550.13(D))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-73
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 2-274.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 550.13(D) as follows:
(D) Receptacle Outlets Required. Except in the bath, closet, and ~~hall~~ hallway areas, receptacle outlets shall be installed at wall spaces 600 mm (2 ft) wide or more so that no point along the floor line is more than 1.8 m (6 ft) measured horizontally from an outlet in that space. In addition, a receptacle outlet shall be installed in the following locations:...".
Panel Statement: As directed by the Technical Correlating Committee, the panel has correlated the action taken on Proposal 19-73 with the action of Panel 2 taken on Proposal 2-274.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-35 Log #2724 NEC-P19 **Final Action: Reject**
(550.13(E)(3))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 19-74
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-32.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-36 Log #1176 NEC-P19 **Final Action: Reject**
(550.15)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-79
Recommendation: Delete the first paragraph and revise the following:
Wiring Methods and Equipment. Except as otherwise specified in this article, wiring methods and equipment covered in Chapters 3 and 4 of this Code, and in compliance with the respective wiring method articles, shall be the wiring methods employed for mobile homes and mobile home sites.
Substantiation: All wiring methods are not suitable or not approved for mobile home installations; e.g., Articles 326, 353, 354, and possibly, 394.10, 396.10, 398.10, and 400.8. This provision may be deemed to amend "uses not permitted."
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-79.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-37 Log #2217 NEC-P19 **Final Action: Accept**
(550.15(~~H~~))

Submitter: Ron B. Chilton, Raleigh, NC
Comment on Proposal No: 19-81a
Recommendation: This change should be accepted.
Substantiation: This change should be accepted as the mobile home industry has provided a nonmetallic conduit method as the feeder method from the mobile home panelboard and has for almost 40 years now. Schedule 80 PVC and other nonmetallic conduits are listed for use where subject to physical damage and would meet concerns. This type installation has also been the primary method of supplying the feeder between the service disconnect and the mobile home panelboard located inside the home for the same number of years.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-38 Log #1187 NEC-P19 **Final Action: Reject**
(550.16)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-84
Recommendation: Accept the proposal with the following revisions:
Grounding. Grounding in or on a mobile home by connection to a grounding bus(es) or terminal(s) in the mobile home main disconnecting means specified in 550.11(A). The grounding bus(es) or terminal(s) shall be connected by the feeder assembly equipment grounding conductor to a grounding electrode conductor in the mobile home service equipment. The metal frame of the mobile home and non current-carrying metal parts of equipment and equipment grounding conductors shall not be connected to the grounded circuit conductor(s) in or on the mobile home. Bonding screws, straps, or buses for this purpose shall be removed.
(A) Ranges and Clothes Dryers. Connections of ranges and clothes dryers with 120/240 volt ratings shall be made with a 4 conductor flexible cord and 3-pole 4-wire grounding plugs and receptacles or by Type AC cable, Type MC cable, or conductors in flexible metal conduit or liquidtight flexible metal conduit enclosing an equipment grounding or bonding conductor.
(B) Equipment Grounding Means.

(1) Feeder Assembly. The equipment grounding conductor in the feeder assembly shall be connected to the grounding bus(es) or terminal(s) in the main disconnecting means specified in 550.11(A)

(2) Electrical System. All exposed noncurrent-carrying metal parts of electrical equipment fastened in place or connected by permanent wiring methods shall comply with 250.110.

(3) Cord-Connected Equipment. Cord-connected equipment shall comply with 250.114.

Exception: Listed luminaries, lampholders and equipment with factory attached flexible cords and nongrounding-type attachment plugs.

Substantiation: A distribution panelboard (if used) may not contain the main disconnecting means specified in 550.11(A). "Feeder assembly" covers the supply cord and a permanent type feeder. References to 250.110 and 250.14 covers fixed and portable equipment and have exceptions which should apply. This section does not allow for such exceptions. Clothes dryers with a 120/240 volt rating may be connected for only 120 volts which do not require a 4-wire cord and plug. Liquidtight flexible metal conduit is suitable for connection to ranges and dryers; the conduits should contain an EGC or EBC since wording may be deemed to amend 348.60 and 350.60. An exception is warranted for listed equipment with integral nongrounding cords and plugs. This section should also clearly apply to equipment on, but not in, the mobile home.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action to Reject Proposal 19-84.

The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-39 Log #220 NEC-P19 **Final Action: Accept**
(550.16(B)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-86

Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel reviewed its action on Proposal 19-86 and determined that it is not in conflict with the action taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a and the definition of "Distribution Panelboard" in 550.2 equates with the definition of "Panelboard" in Article 100.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-40 Log #221 NEC-P19 **Final Action: Accept**
(550.16(B)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-87

Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel reviewed its action on Proposal 19-87 and determined that it is not in conflict with the action taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a and the definition of "Distribution Panelboard" in 550.2 equates with the definition of "Panelboard" in Article 100.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-41 Log #1188 NEC-P19 **Final Action: Reject**
(550.16(B)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-86

Recommendation: Accept the proposal with the following revisions:

"...shall be effectively bonded to the grounding bus(es) or terminal(s) specified in 550.11(A)."

Substantiation: A panelboard (if provided) may not contain the main disconnecting means specified in 550.11(A). The main disconnecting means may be a single enclosed circuit breaker or fused switch.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 19-29.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-42 Log #222 NEC-P19 **Final Action: Accept**
(550.16(C)(1) and (2))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-89

Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel reviewed its action on Proposal 19-89 and determined that it is not in conflict with the action taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a and the definition of "Distribution Panelboard" in 550.2 equates with the definition of "Panelboard" in Article 100.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-43 Log #1186 NEC-P19 **Final Action: Reject**
(550.16(C)(1) and (2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-89

Recommendation: Accept the proposal with the following revisions:

(1) All exposed noncurrent-carrying metal parts of the mobile home that are likely to become energized shall be bonded to the grounding terminal(s) or bus(es) specified in 550.11(A). A solid copper bonding conductor sized in accordance with 250.122, but not smaller than 8 AWG shall be connected between the grounding terminal(s) or bus(es) specified in 550.11(A) and the chassis. The bonding conductor shall be routed so as not likely to be subject to physical damage or protected by approved means.

(2) Grounding and bonding terminals shall be listed and solderless type approved for the wire size and material.

Substantiation: A panelboard is not specifically required and may not contain the main disconnecting means specified in 550.11(A). The bonding conductor should be solid copper since it may be subject to corrosion by de-icing road salts. Bounding conductor size should be specified. Terminals should be approved for conductor size and material.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action taken on Proposal 19-89. The proposed reference to 250.122 is not applicable.

New material has been introduced which was not included in the original proposal. The new material is either not technically substantiated, is already included elsewhere in the code, or does not add clarity or usability to the code. The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-44 Log #389 NEC-P19 **Final Action: Accept**
(550.16(C)(4)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-90
Recommendation: Continue to reject the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported, including Proposal 19-102 (see companion comment). In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-45 Log #1023 NEC-P19 **Final Action: Reject**
(550.16(C)(4)(2))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-90
Recommendation: The Proposal should be Accepted and "per" changed to "for each".
Substantiation: The phrase "for each" is more appropriate for a standard.

The NEC Style Manual for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted this change and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: The proposed revision does not add clarity or improve usability. The panel agrees with the substantiation provided by the submitter of Comment 19-44.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-46 Log #971 NEC-P19 **Final Action: Reject**
(550.17(B)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-91
Recommendation: Accept the proposal with the following revisions:

(1) An electric continuity test, and where practical, a visual inspection, to ensure that all electrically conductive parts are effectively bonded.
Substantiation: Continuity tests such as an ohmmeter cannot ensure effective bonding nor tight connections necessary for fault current nor whether connectors are listed for wire size and material.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no additional substantiation from that provided in the original proposal.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-47 Log #390 NEC-P19 **Final Action: Accept**
(550.18(A)(5))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-93
Recommendation: Continue to reject the proposal.
Substantiation: In addition to the panel objection to the abbreviation "V", which is correct, the word "per" should be retained as well, and the panel action is correct. The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.

The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-48 Log #1024 NEC-P19 **Final Action: Reject**
(550.18(A)(5))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-93
Recommendation: The Proposal should be Accepted in Part and "per" changed to "for each". The remainder of the Proposal should continue to be Rejected.
Substantiation: The phrase "for each" is more appropriate for a standard.

The NEC Style Manual for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted this change and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 19-47. The panel agrees with the substantiation provided by the submitter of Comment 19-47.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-49 Log #1185 NEC-P19 **Final Action: Reject**
(550.18(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-94
Recommendation: Accept the proposal to change "leg" to "each conductor."
Substantiation: The proposal is innocuous; "conductor" is the term usually used in the NEC; 550.18 uses the term "conductor."
Panel Meeting Action: Reject
Panel Statement: The panel continues to contend that the word "leg" is clearly understood. No additional substantiation has been provided by the submitter.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-50 Log #970 NEC-P19 **Final Action: Reject**
(550.18(B)(2) and (3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-94
Recommendation: Revise to read as follows:
(2) Nameplate ratings for permanently installed motors and heater loads. Omit smaller of the heating and cooling loads except blower motor, if used for evaporative cooler or air-conditioner. Where an air conditioner is not installed and a 40-ampere supply cord is provided, add 15-amperes per conductor for air conditioning.
(3) 125 percent for the largest motor or continuous load, whichever is greater. (remainder unchanged).
Substantiation: The provision should apply to permanently installed motors and heaters; portable equipment may be unknown or transient. Twenty-five percent of the largest motor or continuous load is sufficient to prevent overheating at terminals of overcurrent devices. Applying the factor to both, results in a 250 percent calculated load increase.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to reject Proposal 19-94. New material has been introduced which was not included in the original proposal. The new material is either not technically substantiated, is already included elsewhere in the code, or does not add clarity or usability to the code.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-51 Log #391 NEC-P19 **Final Action: Accept**
(550.18(B)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-95
Recommendation: Continue to reject the proposal.
Substantiation: In addition to the panel objection to the abbreviation "V", which is correct, the word "per" should be retained as well, and the panel action is correct. The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.
The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-52 Log #1025 NEC-P19 **Final Action: Reject**
(550.18(B)(2))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-95
Recommendation: The Proposal should be Accepted.
Substantiation: The phrase "for each" is more appropriate for a standard.
The NEC Style Manual for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).
Most of the Panels have accepted this change and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: See the panel action on Comment 19-51. The panel agrees with the substantiation provided by the submitter of Comment 19-51.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-53 Log #822 NEC-P19 **Final Action: Reject**
(550.24(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-103
Recommendation: Accept the proposal and revise text to read as follows:
The mobile home service equipment shall be:
(1) readily accessible
(2) Located within sight of and not more than 9 m (30 ft) from the exterior of the mobile home.
Exception: The service equipment shall be permitted to be located elsewhere on the premises if a disconnecting means listed for use as service equipment and rated not less than required in 550.32(C) and located as required by this section is provided. Such disconnecting means shall not be grounded in accordance with 250.32.
Substantiation: "Adjacent" is effectively defined by the 30 ft requirement and is a term not to be used per the NEC Style Manual. This "other" disconnecting means should be listed for use as service equipment.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to reject Proposal 19-103. New material has been introduced which was not included in the original proposal. The new material is either not technically substantiated, is already included elsewhere in the code, or does not add clarity or usability to the code.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-54 Log #392 NEC-P19 **Final Action: Accept**
(550.32(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-102
Recommendation: The proposal should be accepted.
Substantiation: Unlike many of the proposal submitter's proposals that objected to the legitimate use of the preposition "per" where it carries the precise meaning of "for each" in the context in which it is used, this proposal is one of a group that collectively challenge a slang usage of the word meaning "in accordance with." This usage is not as clear and should be replaced.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-55 Log #1026 NEC-P19 **Final Action: Accept**
(550.32(A))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-102
Recommendation: The Proposal should be Accepted.
Substantiation: The phrase "in accordance with" is more appropriate since the service equipment must be rated "in accordance with" the requirements of 550.32(C). This revision also correlates with the last sentence in 550.32(A) and 551.31(A) where the phrase "in accordance with" is used in a similar manner.
The NEC Style Manual for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).
Most of the Panels have accepted this change and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-56 Log #821 NEC-P19 **Final Action: Reject**
(550.32(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-104
Recommendation: Accept the proposal.
Substantiation: While "capacity" may be clear to Code users, the NEC Style Manual 3.2.5.1 states ampacity shall be used to apply to current-carrying capacity of conductors.
Panel Meeting Action: Reject
Panel Statement: The substantiation provided does not apply to the recommendation of Proposal 19-104 and the submitter has not provided a location for the recommended text. The panel reaffirms the action taken on Proposal 19-104.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-57 Log #1027 NEC-P19 **Final Action: Accept**
(550.32(E))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-106
Recommendation: The Proposal should continue to be Rejected.
Substantiation: According to the NEC Style Manual, the words "circuit" and "interrupter" are not hyphenated when used as a noun but are hyphenated when used as an adjective.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-58 Log #2726 NEC-P19 **Final Action: Reject**
(550.32(E))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 19-107
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-32.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 551 — RECREATIONAL VEHICLES AND RECREATIONAL VEHICLE PARKS

19-59 Log #820 NEC-P19 **Final Action: Reject**
(551.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-112
Recommendation: Accept the proposal and revise text to read as follows:
Distribution Equipment. A circuit breaker, fused switch, single equipment or group of equipment units designed for assembly in the form of a single equipment...(remainder unchanged).
Substantiation: Single enclosed circuit breakers and fused switches are not prohibited. "Panel" is not code-defined; panelboard is. A panelboard is not specified, or required where there is only one 15- or 20 ampere branch circuit (551.42(A) and (B)).
Panel Meeting Action: Reject
Panel Statement: The definition in 551.2 simply equates the term "Distribution Panelboard" with "Panelboard" as defined in Article 100 and as the term is used in Article 551.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-60 Log #223 NEC-P19 **Final Action: Accept**
(551.2.Distribution Panelboard)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-112
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-112 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a and the definition of "Distribution Panelboard" in 551.2 is identical to that of "Panelboard" in Article 100.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-61 Log #2727 NEC-P19 **Final Action: Reject**
(551.2.Power Safe Protector (PSP))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 19-114
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-24.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-62 Log #823 NEC-P19 **Final Action: Reject**
(551.20)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-119
Recommendation: Accept the proposal and revise text to read as follows:
Equipment that is suitable for use on ac and dc circuits shall be clearly marked for such use.
Substantiation: The present wording prohibits transformer ac circuits from supplying equipment marked for ac and dc. The source, whether transformer, generator, battery, or solar power, is irrelevant. The panel reference to 551.20(B) relates to dual voltage, not the type of current.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-119. The recommended change does not add clarity or improve usability of the Code.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-63 Log #819 NEC-P19 **Final Action: Reject**
(551.20(F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-121
Recommendation: Accept the proposal and revise text to read as follows:
(F) Receptacles, Plug Caps, Cord Connector Bodies, and Flanged Surface Devices. Where a recreational vehicle is equipped with a 120 volt or 120/240 volt ac system, a low-voltage ac or dc system, or a combination of such systems, receptacles, cord connector bodies, plug caps, and flanged surface devices of each system shall have a configuration that is not compatible with such devices of another system.

Where a vehicle equipped with a device or leads for connection to an external source of low-voltage ac or dc power,sources the connection device shall have a configuration that is not compatible with 120 volt or 120/240 volt systems devices. A durable warning shall be provided at the connection point stating the voltage and type of current, ac or dc, or both for which the connection is provided.
Substantiation: A configuration such as a parallel slot 15 ampere grounding type receptacle is different from the same nongrounding type receptacle, but the grounding type will accept a nongrounding type plug. The provision should also apply to cord connector bodies and flanged surface devices that may be installed.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-121.
New material has been introduced which was not included in the original proposal. No technical substantiation has been provided for adding the suggested components.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-64 Log #986 NEC-P19 **Final Action: Reject**
(551.30(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-122
Recommendation: Accept the proposal.
Substantiation: If a grounded conductor from an engine generator is connected to the grounded conductor of another system, it is not a separately derived system and system grounding requirements don't apply. "At the same time" describes 3 pm on Monday and 3 pm on Tuesday.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-121.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-65 Log #224 NEC-P19 **Final Action: Accept**
(551.30(E)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-123
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-123 and determined that it is not in conflict with the decisions by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-66 Log #985 NEC-P19 **Final Action: Reject**
(551.30(E)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-123
Recommendation: Accept the proposal.
Substantiation: 551.42(A) and (B) indicate a single fused switch or a single circuit breaker may constitute the disconnecting means defined in Article 551 definitions. The reference coveres equipment that is not a "panelboard".
Panel Meeting Action: Reject
Panel Statement: A panelboard is one of the options available in 551.30(E)(1). The panel reiterates from its statement on the original proposal that the reference to 551.42 (A) and (B) is not germane to the subject of the proposal, or the comment.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-67 Log #967 NEC-P19 **Final Action: Reject**
(551.31(B) and (D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-126
Recommendation: Accept the proposal with the following revisions:
(B) Multiple Supply Sources Ratings. The multiple supply source shall not be required to have the same kW or kVA ratings.
(D) Power Supply Assemble Rated 30 Amperes or More. The power supply assembly shall be permitted to be rated less than the calculated load but not less than 30 amperes, and shall have overcurrent protection not greater than the power supply assembly.
Substantiation: Proposed kW or Kva is more clear than "capacity". Proposed (D) correlates with (C) which relates to amperes, not capacity. "External" is superfluous; power supply assemblies are basically external.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-126. The existing requirement is clear as written and the proposed revisions would not add clarity or enhance usability.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-68 Log #1028 NEC-P19 **Final Action: Accept**
(551.40(C))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-127
Recommendation: The Proposal should continue to be Rejected.
Substantiation: According to the NEC Style Manual, the words "circuit" and "interrupter" are not hyphenated when used as a noun but are hyphenated when used as an adjective.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-69 Log #225 NEC-P19 **Final Action: Accept**
(551.41(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-117
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 2-274.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise the exception to 551.41(A) as follows:
(A) Spacing. Receptacle outlets shall be installed at wall spaces 600 mm (2 ft) wide or more so that no point along the floor line is more than 1.8 m (6 ft), measured horizontally, from an outlet in that space.
Exception: Bath and ~~hall~~ hallway areas.
Panel Statement: As directed by the Technical Correlating Committee, the panel has correlated the action taken on Proposal 19-117 with the action taken by Panel 2 on Proposal 2-274.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-70 Log #966 NEC-P19 **Final Action: Reject**
(551.41(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-132
Recommendation: Accept the proposal with the following revisions:
(C) Ground-Fault Circuit Interruptor Protection
Each 125-volt single-phase 15-and 20-ampere receptacle outlet in the following locations shall have ground-fault circuit interruptor protection for personnel:
(1) Within 1.8 m (6 ft) of a sink, lavatory, tub, or shower.
(2) Where installed to serve kitchen countertops.(3) On the exterior of the vehicle, including within a compartment accessible from the exterior of the vehicle
. Exception: Receptacle outlets installed for appliances in dedicated spaces, other than laundry equipment, and located more than 1.8m (6ft) from a sink or lavatory.

Substantiation: 90.1 states the NEC is for safeguarding persons and property. If the requirements of 210.8 and 210.8(7) are minimum requirements for safety in other type dwelling units why should they not apply? The rim of food waste disposers in a sink can be energized by leakage current too small to operate the overcurrent device. Appliances in dedicated spaces within 6 ft of a sink such as food waste disposers, trash compactors, and dishwashers can become energized by leakage current. A receptacle for expandable sections within 6 ft of a sink can be used for other purposes. Receptacles in compartments on the exterior can be used for other purposes than a contained appliance.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-132.

The recommended changes are considered editorial and do not add clarity or improve usability of the code. GFCI protection is required in each of the cases described.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-71 Log #2728 NEC-P19 **Final Action: Reject**
(551.41(C))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 19-134
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-32.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-72 Log #983 NEC-P19 **Final Action: Reject**
(551.43(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-135
Recommendation: Accept the proposal.
Substantiation: References are common in the NEC; 210.21 is applicable and more comprehensive as it covers other ratings.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-135. No new technical substantiation has been provided.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-73 Log #226 NEC-P19 **Final Action: Accept**
(551.45)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-136
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-136 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-74 Log #505 NEC-P19 **Final Action: Reject**
(551.45(C) Exception (New))

Submitter: Jerome A. Hoover, Monaco RV, LLC
Comment on Proposal No: 19-137
Recommendation: I am requesting the panel reconsider the vote to reject this proposal and to change the vote to accept.
Substantiation: Not only does the proposal correctly state that an RV is temporarily connected to the utility connection by an easily detachable cord, which differs from a permanently connected residential utility connection, but the temporarily connected, easily detachable RV power supply cord serves as the main RV service disconnect. The back-fed circuit breaker can only be released from its mounting after a service technician or assembler has removed the panelboard cover with a screwdriver, wrench 01' other appropriate tool.

The RV cord connection to the campground service outlet is comparable to an appliance cord connection to a convenience outlet rather than to a residential, permanent utility connection that cannot be disconnected. The need to remove the panelboard cover with tools reminds a technician to detach the power supply cord, serving as the main RV disconnect, from the campsite electrical service outlet before performing service work, just as a repair technician would disconnect an appliance before servicing it. A residential utility connection differs from an RV connection because it depends upon the main panelboard breaker to disconnect power before performing service work.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action taken on Proposal 19-137. The substantiation does not recognize foreseen safety hazards and present UL Standard 67 requires the use of hold-downs.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-75 Log #227 NEC-P19 **Final Action: Accept**
(551.46(A)(2))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-139
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-139 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The panel found no text in the proposal or in 551.46(A)(2) that is germane to the actions taken by Panel 9.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-76 Log #834 NEC-P19 **Final Action: Reject**
(551.46(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-140
Recommendation: Accept the proposal with the following revisions:

"(C) Separable Power Assembly.

(1) Units with one 15- or 20 ampere branch circuit. The flexible cord or cable shall be an extra-hard usage type that complies with 400.3, contains an equipment grounding conductor, has an ampacity not less than the branch circuit, and is equipped with an attachment plug and cord connector body in accordance with Figure 551.46(C), as applicable.

FPN: No change.

(2) Units with two to five 15- or 20-ampere branch circuits. The flexible cord or cable shall be an extra-hard usage type that complies with 400.3, contains an equipment grounding conductor, has an ampacity not less than 30 amperes, and an attachment plug and cord connector body in accordance with Figure 551.46, as applicable.

FPN: No change."
Substantiation: These provisions should specify cord type compliance with 400.3 (for example, use in wet locations and sunlight resistance (W designation). There is no specific description of the power supply assembly.

The present (C)(1) and (2) do not cover the cord connector body that connects to the flanged surface inlet of 551.46(A)(1). Figure 551.46(C) does not include 15 ampere ratings or cord connector bodies.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-140.

The intent of the submitter is unclear as he appears to be proposing to replace requirements for attachment plugs with ones for separable power supply assemblies. No technical substantiation has been provided for adding the additional components.

The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-77 Log #887 NEC-P19 **Final Action: Reject**
(551.46(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-142
Recommendation: Accept the proposal.
Substantiation: Cord connector bodies are the "female connector" in 551.46(A)(1) and flanged surface inlets are the devices in 551.46 (A) and (B) connected to a cord connector body.
Panel Meeting Action: Reject
Panel Statement: Figure 551.46(C) exhibits the connection interface configurations. No value would be added here by including such additional figures, or precise terminology for the components of the assembly that have been suggested.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-78 Log #889 NEC-P19 **Final Action: Reject**
(551.46(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-140
Recommendation: Accept the proposal with the following revisions:
Separate Power Supply Assemblies.
(1) Units with only one 15-ampere branch circuit. These units shall be provided with a separable power supply assembly consisting of the following:
(a) An extra-hard usage type flexible cord or cable with an ampacity not less than 15-amperes, that contains an equipment grounding conductor and complies with 400.3.
(b) A firmly attached 2-pole 3-wire grounding type plug and cord connector body rated 15-amperes, 125-volts as shown in Figure 551.46(C).
FPN: No change.
(2) Units with only one 20-ampere branch circuit. These units shall be provided with a separable power supply assembly consisting of the following:
(a) An extra-hard usage type flexible cord or cable with an ampacity not less than 20-amperes that contains an equipment grounding conductor and complies with 400.3
(b) A firmly attached 3-wire 2-pole grounding-type plug and cord connector body rated 20-amperes, 125-volts as shown in Figure 551.46(C).
FPN: No change.
(3) Units with two to five 15- or 20-ampere branch circuits. Such units shall be provided with a separable power supply assembly consisting of the following:
(a) An extra-hard usage type flexible cord or cable with an ampacity not less than 30-amperes, that contains an equipment grounding conductor, and complies with 400.3.
(b) A firmly attached 2-pole 3-wire grounding type plug and cord connector body rated 30-amperes, 125-volts, as shown in Figure 551.46(C).
FPN no change.
(4) Units with 50-ampere power supply assembly. Such units shall be provided with a separable power supply assembly consisting of the following:
(a) An extra-hard usage type flexible cord or cable with an ampacity not less than 50-amperes, that contains an equipment grounding conductor and complies with 400.3.
(b) A firmly attached 3-pole 4-wire grounding-type attachment plug and cord connector body rated 50-amperes, 125/250 volts as shown in Figure 551.46(C).
FPN no change.
Permanently connected power supply assemblies in accordance with 551.46(A)(2) shall comply with this section except they shall not be provided with a cord connector body.
Substantiation: This section should specify the type of flexible cord and cable, an equipment grounding conductor, and cord connector body necessary for connection to the flanged surface inlet specified in (A)(1). Reference to 400.3 clarifies not all extra-hard usage type flexible cords are suitable; e.g., wet locations and sunlight resistant. "Female connector" in (A)(1) is not defined and not specifically required. Figure 551.46(C) needs revision to indicate cord connector bodies and 15-ampere rated devices.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 19-76.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-79 Log #228 NEC-P19 **Final Action: Accept**
(551.47)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-142b
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-142b and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-80 Log #1068 NEC-P19 **Final Action: Accept**
(551.47)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 19-142b
Recommendation: Revise the accepted text as follows: "...supports shall be provided at ~~least~~ intervals not exceeding 1.4 m (4-1/2 ft) at other places."
Substantiation: The meaning of the term "at least" is not clear. While the term is used often in casual conversation, and generally understood, the text of the code should not be so vague and should be consistent with similar requirements elsewhere. In response to ROP 19-146, the panel refers to Article 334 and states that type NMS is the most commonly used wiring method in RVs. Section 334.30 uses "intervals not exceeding" in two places and "support does not exceed" in one place. Each or either of these is clear. But literally, "at least" could mean and generally does mean "not less than." So if an installation is made with spacing at 6 ft between supports, the supports are "at least" 4-1/2 ft apart. I do not believe that was the panel intent.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-81 Log #886 NEC-P19 **Final Action: Reject**
(551.47(F) and (G))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-144
Recommendation: Accept the proposal.
Substantiation: All cables do not have sheaths, e.g., TypeAC. The provisions in (G) may be deemed to amend the provisions of 300.4 since it doesn't include cables or raceways such as Type MI, RMC, IMC, PVC, and doesn't permit notches. "Cable" in 300.4 includes optical fiber cables and coaxial cables which this provision doesnot include. References in any article may be overlooked; is that a reason not to use them? See 90.1(C). The NEC Style Manual, 4.1.2 states: "Use references to other NEC rules to avoid repeating a requirement."
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on Proposal 19-144. The requirements in (G) are specific to the RV industry. Usability of the NEC by the industry by having the RV requirements maintained within Article 551 is far more important than using references where information could be overlooked.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-82 Log #982 NEC-P19 **Final Action: Reject**
(551.47(G))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-145
Recommendation: Accept the proposal.
Substantiation: Already fully covered by 300.4
Section 90.3 states Chapters 1 through 4 apply unless amended. Redundant provisions unnecessarily increase the bulk of the NEC. Other articles specific to an industry do not repeat provisions that already apply. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-81.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-83 Log #885 NEC-P19 **Final Action: Reject**
(551.47(K))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-149
Recommendation: Accept the proposal.
Substantiation: See Explanation of Negative on Proposal 7-9,320.12 (1), in the 2010 ROP. "Likely" was accepted in Proposal 19-189, 550.16(C)(1) and (2),of the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: As explained in the panel statement on Proposal 19-212, the decision whether or not the installation will be "subject to physical damage" is evident at the point of inspection. "Likely to…" is irrelevant to the decision. "Likely to…" is good Code language to guide product standards where the final installation circumstances may not be evident. In the case of Proposal 19-89, "likely to" is acceptable since the circumstance is not expected under normal circumstances but could occur.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-84 Log #4 NEC-P19 **Final Action: Accept in Principle**
(551.47(R)(1))

Submitter: Bruce A. Hopkins, Recreation Vehicle Industry Association
Comment on Proposal No: 19-154
Recommendation: Accept original proposal.
Substantiation: The overcurrent protection mandated by this language is unnecessary and redundant because appropriate overcurrent protection is required by the two current listing standards for RV listed generator sets. (See the two listing standard excerpts below).

● ANSI/EGS-1 states in section 5.12.1 that generators shall have an integral overcurrent protection device, collapsible field or other integral overcurrent protection feature for protection of generator feeder conductors.

● UL 1248 states in section 14.1 that the generator and field conductors to the junction box for connection to the load shall be protected by an appropriately rated overcurrent protective device, except that this overcurrent protection need not be provided for generations having a collapsible field or other built-in overcurrent protection if field conductors are adequately sized for the maximum sustained current available.

I have provided three drawings that show typical installations of RV generators.

Drawing A shows a complete installation with the RV listed generator with integral overcurrent protection, and the wires to the panelboard. The integral breaker on the body of the genset protects the wires from the genset to the panelboard. Circuits downstream of the panelboard have individual branch circuit protection provided.

Drawing B shows the same in installation without a transfer switch; but the use of a receptacle. The coach owner/user can choose to plug the RVs' power cord into a shore power receptacle or can plug into the generator output receptacle. In drawing A and B, the integral overcurrent protection on the genset body is used only to protect the generator output from the genset to the panelboard.

In drawing C, the generator is not supplied by the RV manufacturer. If the consumer wants a genset, the dealer would make the installation. The NEC now requires the use of a RV listed genset that will have a collapsing field, integral OCP, or a mandate in the installation instructions to provide OCP for the genset's output wires. In our drawing C, we are showing the breaker that is currently being installed by the RV manufacturer when the genset is not installed.

When the RV manufacturer provides a prewire for a genset and a dealer subsequently installs the genset, this breaker in the j-box is discarded since the RV listed generator has the needed protection installed or is otherwise provided. This breaker in the J-box is considered by us to be redundant. Further, since the genset is not installed in a prewire application, this breaker is not really needed since this conductor between the J-box and the transfer switch is not energized or used.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment on 19-85.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:

ZIEMAN, M.: Circuit over-current protection is a basic principal of electrical safety. To the best of my knowledge, the code always requires the installer of the circuit to also install overcurrent protection for that circuit. The code never permits the end user to be responsible for the overcurrent protection, especially when the end user is a consumer with no electrical expertise.

This action of the panel allows the RV manufacturer to install a 110-125 or 120/240 Volt AC circuit WITH NO OVERCURRENT PROTECTION. The circuit is intended for the future installation of a generator. In lieu of requiring overcurrent protection, the panel has approved that a label be provided to instruct the installer to install a generator with the appropriate overcurrent protection (the installer could be the RV owner, a repair shop, a RV retailer, or the RV owner's friend - Bubba). This is akin to allowing the electrical circuits in a single family residence to be run to a distribution panel with no branch circuit breakers as long as a label is provided telling the home owner to install appropriate overcurrent protection. A LABEL IS NO SUBSTITUTE FOR PROPER OVERCURRENT PROTECTION WHICH COULD BE INSTALLED BY THE RV MANUFACTURER AT MINIMUM COST.

To make the situation even worse, the ultimate overcurrent protection installed, if any, is never subject to inspection by a building official or any other knowledgeable and qualified person.

It is believed, though not known for sure, that most (NOT ALL) generators incorporate some form of overcurrent protection. In the first place, the panel's action assumes that all RV generators will incorporate overcurrent protection. Next, the panel's logic can probably best be illustrated with this example:

EXAMPLE: The RV manufacturer installs a 30-ampere circuit with no overcurrent protection and indicates on the label to provide 30 over-current protection. The RV owner later decides to install a generator. First, they will in each and every case, READ AND UNDERSTAND the label. (If you believe this, I have a bridge to sell you). Next, they will in each and every case FOLLOW the instruction on the label (if you believe that, I have a second bridge to sell you), and will purchase only a 30-ampere maximum generator (not a 50 ampere or larger one) and make the installation. We all know that many times this will not happen. Often, they will never read the label and if they do they may not understand it or may choose to ignore it anyway. If they have access to a used generator rated more than 30 amperes (their neighbor, one they pulled out of their other RV or one they found on Craig's List) they will often install it with no second thoughts.

Bottom-line this proposal WILL result in hazardous installations where the circuit has oversized overcurrent protection or in some case no circuit protection at all.

"According to the latest national statistics, there were, on average, 3,100 RV fires each year from 2002 through 2005. These fires caused seven deaths, 62 injuries and approximately $41 million in damages in each of those years."[1]

One can logically assume that a large percentage of these fires are electrical in origin. Let's not add to it by approving this ill-conceived comment.

The purpose for our code is stated in Article 90 and 90.1(A) as follows: "Practical Safeguarding. The purpose of this Code is the practical safeguarding of persons and property from hazards arising from the use of electricity." Let's live up to what it says. I, for one, will not be a part of such an ill-conceived scheme.

[1]http://www.roadtripamerica.com/rv/RV-Fire-Safety.htm

19-85 Log #504 NEC-P19 **Final Action: Accept in Principle**
(551.47(R)(1))

Submitter: Jerome A. Hoover, Monaco RV, LLC
Comment on Proposal No: 19-154
Recommendation: I am requesting the panel reconsider the vote to accept this proposal in part and to change the vote to accept.
Substantiation: The proposal correctly state that overcurrent protection is not needed, no current can run through the conductors, and no connection to the electrical system is provided when the OEM does not install the generator at the factory. The standard installation of RV listed generators to ensure that proper overcurrent protection is then provided.
The panel's concern about unprotected circuit conductors because of future generator installations can be alleviated without requiring that the manufacturer install redundant protection, and additional safety can be assured, by revising the label language of 551.47(R)(4) as follows;

GENERATOR CIRCUIT
ONLY INSTALL A GENERATOR LISTED
SPECIFICALLY FOR RV USE
~~GENERATOR CIRCUIT.~~ ,WITH APPROPRIATE
OVER-CURRENT PROTECTION. THIS CONNECTION
IS FOR GENERATORS RATED 1l0/125-VOLT AC,
60 HZ, _____AMPERES MAXIMUM.
OR
GENERATOR CIRCUIT
ONLY INSTALL A GENERATOR LISTED
SPECIFICALLY FOR RV USE
~~GENERATOR CIRCUIT.~~ ,WITH APPROPRIATE
OVER·CURRENT PROTECTION. THIS CONNECTION
IS FOR GENERATORS RATED 120/240·VOLT AC,
60 HZ, _____AMPERES MAXIMUM.

Revising the label language would satisfy the intent of the petitioner to provide necessary overcurrent protection at the time of generator installation, rather than installing unnecessary, redundant protection for an uninstalled generator-or may never be installed.

Panel Meeting Action: Accept in Principle

Revise existing 551.47(R)(1) to read as follows:

(1) Circuit conductors shall be appropriately sized in relation to the anticipated load as stated on the label required in (4) below. ~~and shall be protected by an overcurrent device in accordance with their ampacities. Where the generator provides overcurrent protection for the conductors, additional overcurrent protection is not required.~~

Revise existing 551.47(R)(4) as follows:

A label conforming to 551.46(D) shall be placed on the cover of each junction box containing incomplete circuitry and shall read, as appropriate, either

GENERATOR
ONLY INSTALL A GENERATOR LISTED
SPECIFICALLY FOR RV USE
~~GENERATOR CIRCUIT.~~ ,HAVING
OVER-CURRENT PROTECTION ~~THIS CONNECTION IS FOR GENERATORS~~ RATED 1l0/125-VOLT AC,
60 HZ, _____AMPERES MAXIMUM.

OR

GENERATOR
ONLY INSTALL A GENERATOR LISTED
SPECIFICALLY FOR RV USE
~~GENERATOR CIRCUIT.~~ ,HAVING
OVER·CURRENT PROTECTION. ~~THIS CONNECTION IS FOR GENERATORS~~ RATED 120/240·VOLT AC,
60 HZ, _____AMPERES MAXIMUM.

The correct ampere rating shall be legibly marked in the blank space.

Panel Statement: The panel accepts the text of Proposal 19-154 and has also revised 551.47(R)(4) to meet the intent of Proposal 19-154 and Comment 19-85.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

ZIEMAN, M.: See my Explanation of Negative Vote on Comment 19-84.

19-86 Log #884 NEC-P19 **Final Action: Reject**
(551.53(A) and (B))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 19-156

Recommendation: Delete (A) and (B) and delete (C) or revise as follows:

(C) Outdoor Equipment. Equipment installed in damp or wet locations shall comply with 110.11.

Substantiation: Present (A) is covered by 410.23; (B) is covered by 410.10(D) which requires marking for wet and damp locations. Section 110.11 covers equipment other than outlets, luminaires, and air cooling equipment, and equipment that doesn't require listing such as straps, bolts, hardware.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its long standing position that usability of the NEC by the industry by having the RV requirements maintained within Article 551 is far more important than using references where information could be overlooked. Section 110.11 would also apply where applicable for "other equipment".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-87 Log #229 NEC-P19 **Final Action: Accept**
(551.54(B))

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 19-158

Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel reviewed its action on Proposal 19-158 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-88 Log #883 NEC-P19 **Final Action: Reject**
(551.54(B))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 19-158

Recommendation: Accept the proposal with the following revisions:

(B) Distribution Equipment. The recreational vehicle distribution equipment shall have a grounding terminal(s) or bus(es) to accommodate all wire-type equipment grounding conductors and all bonding conductors.

Substantiation: A one branch circuit installation with a single fused switch or circuit breaker does not require a panelboard. Grounding terminals and buses should also accommodate all bonding conductors, such as in 551.56(B), (E), (F).

Panel Meeting Action: Reject

Panel Statement: A distribution panelboard must comply with the requirement in 551.54(B). 551.45(A) already includes "other equipment" as was stated in the panel statement on Proposal 19-158.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-89 Log #5 NEC-P19 **Final Action: Accept in Principle**
(551.54(C))

Submitter: Bruce A. Hopkins, Recreation Vehicle Industry Association

Comment on Proposal No: 19-159

Recommendation: Accept original proposal.

Substantiation: In a recreational Vehicle (RV) application, the term "Grounded Circuit Conductor" is misleading. This conductor, known as a neutral, in an RV electrical circuit is intentionally isolated from the ground conductor within the vehicle to prevent a possible hazardous condition. The problem occurs when the polarity of the incoming electrical current is reversed and a simultaneous fault of neutral to ground exists, which would result in the RV skin and chassis being energized. The use of an altered extension cord in conjunction with the listed shore cord or incorrectly wired adaptor cord/plug makes reversed polarity in the RV a critical safety concern. Retaining the term "neutral" will help avoid confusion, and be more consistent with RV industry terminology.

I have supplied supporting material for details and illustrations for a complete description on why the isolated neutral is not a grounded conductor within RVs.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Revise the title and first two sentence of 551.54(C) as follows:

"(C) Insulated Grounded Conductor (Neutral Conductor). The grounded circuit conductor (neutral conductor) shall be insulated from the equipment grounding conductors and from equipment enclosures and other grounded parts. The grounded circuit conductor (neutral conductor) terminals in the distribution..."

Panel Statement: The panel recognizes the previous actions of the code-making panels to remove the word "neutral" and replace it with the term "grounded conductor." For education purposes in the RV industry and RV parks, the panel has added "(neutral conductor)."

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

CHILTON, R.: The attempts to correlate language for usage in the National Electrical Code have been an ongoing process for many cycles. Understanding the yearn to leave wording in this Section regarding the use of the term, "neutral" instead of "grounded" speaks of more than just this Article and Industry, it relates to misunderstanding of the term itself as a "grounded conductor". For all buildings, including modular buildings, mobile homes/manufactured homes, and dwellings, this conductor referred to as the "grounded conductor" is a universal term for identification in electrical systems, even systems that are not yet energized. As the NEC is a Code for use by Qualified Persons, the emphasis on education must be applied to understanding use and function of the terms also. To leave the term "neutral" in this Section would be to regress.

19-90 Log #445 NEC-P19 **Final Action: Accept in Principle**
(551.54(C))

Submitter: Dale Jordal, Winnebago Industries, Inc.

Comment on Proposal No: 19-159

Recommendation: Keep proposal as originally submitted.

Substantiation: The panel's statement/substantiation to reject the proposal was incorrect. This is a safety issue, and the panel's statement that the white (neutral) conductor is bonded to ground as in residential applications is incorrect. Please refer to the original substantiation and Mr. Hopkins' Explanation of Negative Vote.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 19-89.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
CHILTON, R.: See my Explanation of Negative response to Comment 19-89.

19-91 Log #503 NEC-P19 **Final Action: Accept in Principle**
(551.54(C))

Submitter: Jerome A. Hoover, Monaco RV, LLC
Comment on Proposal No: 19-159
Recommendation: I am requesting the panel reconsider the vote to reject this proposal and to change the vote to accept.
Substantiation: In deference to the panel statement that they disagree with substantiation statement that, “”.the conductor is not ‘grounded’ as in residential applications.”.” I would submit the statement is correct because the RV is only temporarily grounded through the detachable RV power supply cord and the campground system ground; whereas residential installations are permanently connected to the electrical utility.
The return buss inside panelboard is intended for the connection of insulated ground conductors-commonly known in the RV industry as the neutral bar and the return buss for equipment ground conductors-commonly known as the ground bar, are not interconnected within the RV panelboard, unlike permanent building panelboard installations. This provides separation of the equipment grounding system from the ‘neutral’ grounding system until the conductors are connected to the campground system ground. The practice of connecting easily accessible non-current carrying components to the equipment ground without interconnecting to the neutral ground until the RV is connected to an external power supply, is more like an appliance than a residence, and using the term neutral conductor in conjunction with the term insulated grounding conductor recognizes that the RV is to the campground as an appliance is to a residence; thus, the need for the additional clarity requested by the submitter.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 19-89.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
CHILTON, R.: See my Explanation of Negative response to Comment 19-89.

19-92 Log #882 NEC-P19 **Final Action: Reject**
(551.55)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-160
Recommendation: Accept the proposal.
Substantiation: (A) is covered by 250.110; (B) is covered by 250.119; (C) is covered by 250.118; (D) is covered by 250.148(D); (E) is covered by 250.148(B); (F) is covered by 422.16(B)(1)(1), (B)(2)(1), (B)(4)(1) and 250.114. The last sentence of (c)(3) permits luminaire attachment screws as a grounding conductor attachment; 250.148(C) requires a screw for grounding not be used for other purposes. (C)(3) indicates other than a mounting (or cover) screw be used; 314.40(D) requires a taped hole for screws, not a (self-tapping) screw threaded into the canopy. Maximizing usability of the NEC by any one industry is not purpose per 90.1. If having superfluous requirements that already apply, as noted in 90.3, is more important than references why are some provisions referenced throughout the NEC? The panel reference to dwellings is irrelevant; Articles 250 and 314 are not limited to dwellings. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its long standing position that usability of the NEC by the industry by having the RV requirements maintained within Article 551 is far more important than using references where information could be overlooked.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-93 Log #980 NEC-P19 **Final Action: Reject**
(551.55(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-163
Recommendation: Accept the proposal.
Substantiation: This provision is limited to NMSC; there is no safety reason it shouldn’t apply to an EGC in PVC, or any other raceway. Sheet metal screws in a sheet metal housing are not reliable grounding means. Other NEC provisions require a grounding screw be used for no other purpose; if this is for safety and reliability, the mounting screws for a luminaire should not be permitted as a grounding means. If this is suitable for one industry it should be permitted for all. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its long standing position that usability of the NEC by the industry by having the RV requirements maintained within Article 551 is far more important than using references where information could be overlooked.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-94 Log #981 NEC-P19 **Final Action: Reject**
(551.55(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-162
Recommendation: Accept the proposal.
Substantiation: This is already covered by Article 250. 90.3 states: “Do not repeat provisions that already apply”. See 90.1(C). Redundant provisions unnecessarily increase the bulk of the NEC.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 19-92.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-95 Log #947 NEC-P19 **Final Action: Reject**
(551.55(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-166
Recommendation: Accept the proposal
Substantiation: This is covered by 250.48(B) and (D) which apply to all occupancies and industries unless amended. References were not proposed as implied by the panel statement. 90.3 states: Chapters 1 through 4 apply unless amended. Since 250.148(B) and (D) apply, why repeat them and unnecessarily increase the bulk of the NEC? See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 19-92.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-96 Log #949 NEC-P19 **Final Action: Reject**
(551.55(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-164
Recommendation: Reject the proposal and delete this subsection.
Substantiation: Superfluous. It is obvious that equipment grounding conductors for devices, fittings, or other equipment have to be arranged so that a connection can be made; this applies whether or not the box is nonmetallic or is not an “outlet” box, and whether or not grounding is required or done by choice.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 19-92.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-97 Log #230 NEC-P19 **Final Action: Accept**
(551.56)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-167
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase “distribution board” in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-167 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term “panelboard” was retained in Proposal 9-130a.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-98 Log #833 NEC-P19 **Final Action: Reject**
(551.56(F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-168
Recommendation: Accept the proposal with the following revisions:
"Metal Air Ducts. Metal circulating air ducts directly connected to electrical equipment shall be bonded and grounded. Such ducts shall be considered grounded where bonded to the grounded air moving equipment."
Substantiation: Metal air ducts connected to an air mover by a nonconductive flexible fitting to reduce vibration should not require grounding, since they are not likely to be energized.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-168. The substantiation provided appears to be an exception to the recommendation and does not support the recommended change.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-99 Log #979 NEC-P19 **Final Action: Reject**
(551.56(F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-168
Recommendation: Delete this provision.
Substantiation: This is already covered by 551.56(A) which also requires the bonded parts to be connected to a grounding terminal (grounded). Bonding in and of itself does not necessarily mean grounded. A metal duct directly connected to a (grounded) furnace will be grounded, and if the metal duct is connected to the appliance by a nonconductive flexible boot or fitting, there is no need for it to be bonded or grounded since it is not likely to become energized.
Panel Meeting Action: Reject
Panel Statement: The requirement of this section for bonding metal air ducts is industry specific to RV installations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-100 Log #869 NEC-P19 **Final Action: Reject**
(551.60)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-170
Recommendation: Accept the proposal.
Substantiation: A visual inspection is just as practical during construction and installation as other requirements to determine if terminals are suitable for wire size and type, etc. Bonded parts should also be grounded; bonding alone doesn't prevent something from being energized. See definition of bonded in Article 100.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject 19-170. The submitter has provided no additional substantiation from that provided in the original proposal.
Electrical continuity tests are conducted at the factory as a matter of standard. Visual examination is not reliable according to the Recreation Vehicle Industry Association.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-101 Log #2629 NEC-P19 **Final Action: Accept**
(551.60)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-169
Recommendation: Accept the proposal in principle.
Change "must" to "shall be".
Substantiation: This brings the new sentence into agreement with standard NEC style for expressing a mandatory requirement.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-102 Log #2729 NEC-P19 **Final Action: Reject**
(551.71)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 19-171
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-32.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-103 Log #946 NEC-P19 **Final Action: Reject**
(Table 551.73)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-172
Recommendation: Accept the proposal.
Substantiation: The panel action did not specifically refute the substantiation.
Panel Meeting Action: Reject
Panel Statement: The submitter of the original proposal claimed the proposal to be only editorial so the panel's statement was appropriate.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-104 Log #393 NEC-P19 **Final Action: Accept**
(551.73(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-174
Recommendation: Continue to reject the proposal.
Substantiation: The panel action is correct. The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.
The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-105 Log #1029 NEC-P19 **Final Action: Reject**
(551.73(A))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-174
Recommendation: The Proposal should be Accepted and "per" changed to "for each" in four places.
Substantiation: The phrase "for each" is more appropriate for a standard.
The NEC Style Manual for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).
Most of the Panels have accepted this change and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 19-104. The panel agrees with the substantiation provided in Comment 19-104.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-106 Log #231 NEC-P19 **Final Action: Accept**
(551.73(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-175
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-175 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-107 Log #945 NEC-P19 **Final Action: Reject**
(551.73(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-175
Recommendation: Accept the proposal.
Substantiation: Althought the term "distribution panelboard" is used in Article 551, it is not appropriate where there is one or more individually enclosed switches or circuit breakers, e.g., as covered in 551.42.
Panel Meeting Action: Reject
Panel Statement: The panel acknowledges the submitter's substantiation. However, distribution panelboards and "other equipment" are already covered in section 551.45(A).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-108 Log #978 NEC-P19 **Final Action: Reject**
(551.73(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-175
Recommendation: Accept the proposal.
Substantiation: Panelboards are not specifically required; distribution equipment may be individual fused switches or circuit breakers.
Panel Meeting Action: Reject
Panel Statement: The panel acknowledges the submitter's substantiation. However, distribution panelboards and "other equipment" are already covered in section 551.45(A).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-109 Log #394 NEC-P19 **Final Action: Accept**
(551.73(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-176
Recommendation: Continue to reject the proposal.
Substantiation: The panel action is correct. The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.

The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-110 Log #1030 NEC-P19 **Final Action: Reject**
(551.73(C))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-176
Recommendation: The Proposal should be Accepted and "per" changed to "for each".
Substantiation: The phrase "for each" is more appropriate for a standard.

The NEC Style Manual for NFPA Technical Committee Documents 3.2.1.2 states that "Spelling and definitions of general words and terms shall follow *Webster's Collegiate Dictionary*, 11th Edition." The dictionary defines "per" as through, by means of, for each, and according to. Its most common and natural nonbusiness uses always involve figures ($150 per performance, 32 miles per gallon, 55 miles per hour), or sports (averages 15 points per game).

Most of the Panels have accepted this change and it will provide more consistent terminology throughout the NEC.
Panel Meeting Action: Reject
Panel Statement: The proposed revision does not add clarity or improve usability. The panel agrees with the substantiation provided in Comment 19-109.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-111 Log #843 NEC-P19 **Final Action: Reject**
(551.74)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-178
Recommendation: Accept the proposal.
Substantiation: Article 240 already applies per 90.3. The NEC Style Manual states: "Do not use references if covered by 90.3 and the NEC shall comply with the NFPA Style Manual."
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its longstanding position that usability of the NEC by the industry by having the RV requirements maintained within Article 551 is far more important than using references where information could be overlooked.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-112 Log #948 NEC-P19 **Final Action: Reject**
(551.74)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-178
Recommendation: Accept the proposal.
Substantiation: Article 240 already applies. Articles for other "specialized" industries do not have applicable provisions repeated. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-111.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-113 Log #837 NEC-P19 **Final Action: Reject**
(551.77(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-180
Recommendation: Accept the proposal and revise as follows:

A switch or circuit breaker shall be provided in the on-site equipment that simultaneously disconnects the ungrounded conductors of each circuit it conrtols.
Substantiation: "Power supply to the recreational vehicle" includes the service or other source of power for the vehicle.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the action taken on Proposal 19-180. The switch or circuit breaker used is already required to be listed and used within the terms of its listing. No substantiation is given for adding the requirement for simultaneous disconnection of the ungrounded conductors.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-114 Log #944 NEC-P19 **Final Action: Reject**
(551.77(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-180
Recommendation: Accept the proposal with the following revisions:
A switch(es) or circuit breaker(s) shall be provided in the site equipment that simultaneously disconnects all ungrounded conductors of the circuit(s) it controls.
Substantiation: Simultaneous disconnection of ungrounded conductors is a standard requirement throughout the NEC as a safety measure. A switch that disconnects only one ungrounded conductor of a 125/250 receptacle leaves one conductor energized.
Panel Meeting Action: Reject
Panel Statement: The current code language accomplishes simultaneous disconnection.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-115 Log #836 NEC-P19 **Final Action: Reject**
(551.79)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-183
Recommendation: Accept the proposal.
Substantiation: This provision and the FPN are covered by 225.18, 225.19, 225.60 and 225.61. The NEC Style Manual states: "do not use a reference if covered by 90.3", and the NEC shall comply with the NFPA Manual of Style." There are no exceptions for a specialized industry. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-111.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-116 Log #838 NEC-P19 **Final Action: Reject**
(551.79)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-182
Recommendation: Accept the proposal.
Substantiation: Redundant provisions already covered elsewhere in the NEC increase the bulk of the Code. Provisions that apply are not repeated for other industries or installations. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-111.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-117 Log #835 NEC-P19 **Final Action: Reject**
(551.80(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-184
Recommendation: Accept the proposal and revise as follows:
Where direct-buried or encased in a cement or asphalt concrete slab emerging exposed conductors and cables shall be protected by approved means. Where raceways provide the protection, they shall extend to the minimum required depth of the conductors and cables.
Substantiation: The provision should cover embedment in a slab. "Approved means" covers raceways and enclosures such as open bottom pad or floor-mounted equipment, lighting poles, or emergence into stud or block wall cavities. The depth of raceway protection should comply with the minimum depth of the conductors, since that depth is required for safety.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the action taken on Proposal 19-184. No technical substantiation has been provided to support the recommended change.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 552 — PARK TRAILERS

19-118 Log #842 NEC-P19 **Final Action: Reject**
(552.10(C)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-189
Recommendation: Accept the proposal.
Substantiation: 110.4 is not limited to "general" wiring methods and covers splices and other connections not addressed in this section which begs the question: is this provision intended to modify 110.4 provisions for splices and other connections?
Panel Meeting Action: Reject
Panel Statement: To answer the submitter's question, yes, the requirements in 552.10(C) modify or confirm the requirements for low voltage electrical connections in Section 110.14.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-119 Log #841 NEC-P19 **Final Action: Reject**
(552.20(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-191
Recommendation: Accept the proposal.
Substantiation: 552.40(D) referred to in the panel statement only covers 120 volt and low voltage ratings, not ac and dc ratings of the same voltage, and does not cover equipment other than luminaries or appliances, such as motors. The provision does not allow for a circuit supplied by a transformer-supplied rectifier.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the action to reject Proposal 19-191. The proposal does not add clarity or improve usability of the code. Dual voltage fixtures, including luminaires or appliances, are already referenced in 552.20(D).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-120 Log #888 NEC-P19 **Final Action: Reject**
(552.27(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-231
Recommendation: Accept the proposal with the following revisions:
Bonding conductor terminals shall be of the solderless type listed as pressure terminal connectors, and approved for the wire size and material. The bonding conductors shall be minimum 8 AWG and where exposed to corrosion shall be solid and insulated or covered.
Substantiation: The conductor should be solid and insulated or covered where exposed to corrosion such as rock salt used for snow and ice clearance on roads.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to reject Proposal 19-231. The concept that park trailers would be exposed to the conditions such as rock salt used for snow and ice clearance on roads is not typical. Park trailers are typically set-up for seasonal use and as such are not moved frequently. The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-121 Log #1198 NEC-P19 **Final Action: Reject**
(552.27(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-231
Recommendation: Accept the proposal with the following revisions:
Bonding conductor terminals shall be of the solderless type listed as pressure terminal connectors and approved for the wire size and material. The bonding conductors shall be minimum 8 AWG and where exposed to corrosion shall be solid and insulated or covered.
Substantiation: The conductor should be solid and insulated or covered where for snow or ice or exposed to corrosion such as rock salt used for snow and ice clearance on roads.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-120.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-122 Log #840 NEC-P19 **Final Action: Reject**
(552.40(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-193
Recommendation: Accept the proposal and revise as follows:
Materials and equipment associated with a park trailer(s) or park trailer sites shall comply with applicable provisions of this Code except as provided in 552.3.
Substantiation: All materials and equipment covered by the NEC are not required to be listed.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no technical substantiation for changing the present requirement in this section for listed equipment.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-123 Log #839 NEC-P19 **Final Action: Reject**
(552.41)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-194
Recommendation: Accept the proposal and revise as follows:
Exception No. 2: Wall space occupied by kitchen cabinets or wardrobe cabinets.
(B)(4) Within 900 mm (3 ft) of a bathroom lavatory. Receptacles installed higher than 1.7 m (5 1/2 ft) above the floor shall not be counted as a required receptacle.
Substantiation: Receptacles behind doors may be the most conveniently accessed receptacle. If 210.52(4)(A)(2)(1) and (D) are requirements in accordance with 90.1(A) for safety, they should apply to this article.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to reject Proposal 19-194.
The requirements of 210.52 do not apply because park trailers are not intended to be used as a permanent dwelling unit by definition. Receptacles are not prohibited to be located behind a door in a park trailer.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-124 Log #232 NEC-P19 **Final Action: Accept**
(552.41(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-190
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 2-274.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 552.41 as follows:
552.41 Receptacle outlets shall be installed at wall spaces 600 mm (2 ft) wide or more so that no point along the floor line is more than 1.8 m (6 ft), measured horizontally, from an outlet in that space.
Exception: Bath and ~~hall~~ hallway areas.
Panel Statement: As directed by the Technical Correlating Committee, the panel has correlated the action taken on Proposal 19-190 with the action taken by Panel 2 on Proposal 2-274.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-125 Log #2730 NEC-P19 **Final Action: Reject**
(552.41(C))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 19-196
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-32.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-126 Log #952 NEC-P19 **Final Action: Reject**
(552.41(D)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-197
Recommendation: Delete existing text with the following revisions:
Provided with GFCI protection if the outlet is a 125-volt 15- or 20-ampere receptacle outlet.
Substantiation: All interior branch circuits are not required to have GFCI protection; for example a 240 volt circuit. 552.4(C) makes the requirement superfluous.
Panel Meeting Action: Reject
Panel Statement: Heating cables on park trailers are not served by 240 volt circuits. GFCI protection on the exterior receptacle used for pipe heating cable is intentionally included with interior receptacles to help indicate if the circuit trips.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-127 Log #951 NEC-P19 **Final Action: Reject**
(552.41(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-198
Recommendation: Accept the proposal with the following revisions:
At least one readily accessible 125 volt single-phase 15- or 20-ampere grounding-type receptacle supplied from an interior 120-volt circuit shall be installed on the exterior of the park trailer. A receptacle installed for a pipe heating cable shall not be considered as this required receptacle outlet.
Substantiation: The circuit should be an interior circuit and receptacle type and rating specified. “Outdoors” can be complied with by a site power supply receptacle. A receptacle for general use on top of a park trailer is impractical.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-198.
This section applies to the manufacture of the park trailer itself. There is no safety reason for the receptacle to be fed from an interior circuit; it is permitted to be supplied by an individual branch circuit.
Additionally, the submitter has introduced new language that was not included in the original proposal.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-128 Log #828 NEC-P19 **Final Action: Reject**
(552.43)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-199
Recommendation: Accept the proposal and revise text to read as follows:
(A) Feeder. The feeder to the park trailer shall be a power-supply assembly described in 551.2 that complies with 552.44 or a permanently installed feeder.
Delete (B).
Substantiation: 551.2 is applicable per 552.1; 552.44 requires a factory-installed or provided power-supply assembly which makes (B) superfluous.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 19-129.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-129 Log #2216 NEC-P19 **Final Action: Accept**
(552.43)

Submitter: Ron B. Chilton, Raleigh, NC
Comment on Proposal No: 19-199
Recommendation: This proposal should be rejected to correlate with similar remaining text found in Article 550 and Article 551.
Substantiation: Although meant to clarify this section, the Code Panel left similar text in Article 550 and 551. It would have been advisable to revise this similar text in those other Articles or leave 552.43 as it is in the 2008 National Electrical Code to correlate with those other Articles.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-130 Log #827 NEC-P19 **Final Action: Reject**
(552.45(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-201
Recommendation: Accept the proposal and revise text to read as follows:
Distribution Equipment.
(A) Listed distribution equipment shall be provided for the park trailer circuits and provided with grounded conductor termination terminal(s) in accordance with 552.55(C). An equipment grounding conductor terminal(s) shall be provided in the distribution equipment.
(B) Location. The distribution equipment shall be readily accessible. A clear working space at least 750 mm (30 in.) wide and high but not less than the width or height of the distribution equipment, shall be provided.
Substantiation: Same as proposal. Working space height should be specific.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its statement on the Proposal 19-201 that 552.54(A) specifies that only distribution panelboards are to be used in park trailers. The submitter has provided no technical substantiation to add additional options.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-131 Log #233 NEC-P19 **Final Action: Accept**
(552.45(A), (B) and (C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-201
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase “distribution board” in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-201 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term “panelboard” was retained in Proposal 9-130a, only “distribution board” was deleted.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-132 Log #868 NEC-P19 **Final Action: Accept in Principle**
(552.46(B)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-202
Recommendation: Accept the proposal and revise as follows:
The lighting circuits shall be permitted to serve listed kitchen waste disposers, gas-fired cooking appliances for lights, clocks, timers, and ignition.
Substantiation: Counter-mounted cook tops should be included, also free standing ranges, all of which may have electric ignition. Whether or not a disposer is cord-connected is irrelevant.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
The lighting circuits shall be permitted to serve ~~built-in gas ovens with electric service only for lights, clocks or timers, or~~ listed cord-connected kitchen waste disposers and to provide power for supplemental equipment and lighting on gas-fired ranges, ovens, or counter-mounted cooking units.
Panel Statement: The panel action meets the submitter’s intent and correlates with the language in 210.52(B)(2) Exception 2.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-133 Log #831 NEC-P19 **Final Action: Reject**
(552.46(B)(3)(b))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-203
Recommendation: Accept the proposal.
Substantiation: Continuous currents contribute to excess heating of terminals of overcurrent devices for branch circuits, feeders, and service conductors. Examples D3 and D3(a) in Annex D, page 765, indicate 125 percent factor is applied to branch circuits, feeders, and by virtue of the examples and 215.2(A)(1) applies to service conductors. The heating effects don’t disappear at terminals of overcurrent devices for feeders and service conductors.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-203.
The submitter has not provided a revised recommendation but rather requested that the original proposal be accepted with no change. The desired effect of the submitter’s recommendation continues to be unclear to the panel. The existing text by reference to 210.19(A) appears to satisfy the submitter’s intent.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-134 Log #395 NEC-P19 **Final Action: Accept**
(552.47(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-204
Recommendation: Continue to reject the proposal.
Substantiation: The panel action is correct. The use of the word “per” in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as “VA/ft^2”. This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.
The preposition “per” in the English language carries the precise meaning of “for each” in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in “Table 3.2.1, Possibly Unenforceable and Vague Terms.” Section 3.3.4 of the same document requires that “NEC language shall be brief, clear, and emphatic.” Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: “Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel.”
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-135 Log #396 NEC-P19 **Final Action: Accept**
(552.47(B)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-205
Recommendation: Continue to reject the proposal.
Substantiation: The panel action is correct. The use of the word “per” in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as “VA/ft^2”. This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.
The preposition “per” in the English language carries the precise meaning of “for each” in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in “Table 3.2.1, Possibly Unenforceable and Vague Terms.” Section 3.3.4 of the same document requires that “NEC language shall be brief, clear, and emphatic.” Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: “Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel.”
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-136 Log #826 NEC-P19 **Final Action: Reject**
(552.48)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-206
Recommendation: Accept the proposal.
Substantiation: The panel statement that 552.48(B) addresses threaded conduit is incorrect. Threaded conduit connectors are also terminated with locknuts, bushings, as are connectors for EMT, PVC, and many cable types. An inside and outside locknut should be provided to prevent loosening due to vibration which impairs grounding continuity or exposes conductors to damage by knockout edges if a connector detaches due to vibration. (C), (D), (F), (G), (H), (I), (K), and (L) are covered elsewhere in the NEC or implied since covering of cable that is not continuous would expose conductors to damage, or cause loss of grounding/bonding. The provision for (F) doesn't include Type MI cable and should be in the respective cable articles so it will apply generally.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the action and panel statement on Proposal 19-206. The requirement in 552.48(B) applies only to conduit terminated by a locknut and bushing. Nowhere in the Code is it required to otherwise apply a locknut both inside and outside.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-137 Log #830 NEC-P19 **Final Action: Reject**
(552.48)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-208
Recommendation: Accept the proposal.
Substantiation: The industry may be specialized, but so are others for which the components are used and covered by other articles. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its longstanding position that usability of the NEC by the industry by having the requirements for park trailers maintained within Article 552 is far more important than using references where information could be overlooked.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-138 Log #832 NEC-P19 **Final Action: Reject**
(552.48)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-207
Recommendation: Accept the proposed text for (A).
Substantiation: "Shall be permitted" is not a requirement per 90.5(B) and not enforceable. The present (H) is covered by 552.48(A) which then permits Type MI cable to support a 6 ft, Type AC cable at 2 ft for flexibility. This section contains no similar support requirements for raceway wiring methods, since they are covered in the respective raceway articles, cable articles should also govern.
Panel Meeting Action: Reject
Panel Statement: "Shall be permitted" is intentionally permissive and means neither prohibited or required. This term is selectively used in the Code to address some gray areas that have been particularly problematic for inspection authorities or others.

The requirements in 552.48(H) intentionally contravene the requirements in the Chapter 3 Articles as indicated "except as otherwise specified", in 552.48(A).

The submitter's substantiation is incorrect as Type MI cable is not permitted to support other cables per 300.11(C).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-139 Log #829 NEC-P19 **Final Action: Reject**
(552.48(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-209
Recommendation: Accept the proposal.
Substantiation: Sections 312.2 and 314.20 are applicable to and 90.3 states: Chapter 3 applies unless amended. References are used in many places in the NEC to avoid redundancy and helps to avoid unnecessary bulk of the code even though they may be "overlooked." The panel revised 19-212a, 552.48(K) in the ROP by inserting references to replace repetition of requirements.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 19-137. The panel considers the preference for particular references to Chapter 1-4 requirements during each code cycle and is acutely sensitive to the needs of the industries served by the Articles within its scope.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-140 Log #867 NEC-P19 **Final Action: Reject**
(552.48(F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-210
Recommendation: Accept the proposal and revise as follows:

The overall outer covering of cables and flexible cords and cables shall be continuous between boxes, other enclosures and terminations.
Substantiation: The provision should include all cables, all boxes and terminations such as plugs and cord connector bodies. Type NM cable may terminate without an outlet box per 334.30(C).
Panel Meeting Action: Reject
Panel Statement: The current code text is clear and the recommendation does not add clarity.

The panel concludes that the word "enclosures" addresses the point regarding NM cable and the reference to 334.30(C).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-141 Log #975 NEC-P19 **Final Action: Reject**
(552.48(G))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-211
Recommendation: Accept the proposal.
Substantiation: Covered by 300.4 which applies unless amended. Redundant provisions which already apply unnecessarily increase the bulk of the NEC. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-137.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-142 Log #234 NEC-P19 **Final Action: Accept**
(552.48(H))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-211a
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-211a and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a, only "distribution board" was deleted.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-143 Log #876 NEC-P19 **Final Action: Reject**
(552.48(H))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-211a
Recommendation: Accept the proposal and revise as follows:

Cables shall be supported in accordance with the applicable provisions of the respective cable article.
Substantiation: The support requirements in Chapter 3 apply to all installations, and dependent upon the type of cable may vary from this provision; e.g., 320.20(D)(2), 330.30(C), 332.30, 362.30 (A). If those sections provide for safety, why not for park trailers?
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-144 Log #974 NEC-P19 **Final Action: Reject**
(552.48(H))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-211a
Recommendation: Delete, or accept with the following revisions:
(H) Cable Supports. Cables shall be securely fastened to supports in accordance with the respective cable articles.
Substantiation: This provision is covered by the cable articles, which for Type AC allows a 2 ft length for flexibility, and a 6 ft length for Type MC cable, a 3 ft length for ENT, and a 6 ft length for Type MI cable. If those provisions constitute a safe installation, they should be applicable.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 19-138. No substantiation has been provided for changing the specific support requirements for park trailers in 552.48(H).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-145 Log #1069 NEC-P19 **Final Action: Accept**
(552.48(H))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 19-211a
Recommendation: Revise the accepted text as follows "...Supports shall be provided at ~~least every~~ intervals not exceeding 1.4 m (4-1/2 ft) at other places."
Substantiation: The meaning of the term "at least" is not clear. While the term is used often in casual conversation, and generally understood, the text of the code should not be so vague and should be consistent with similar requirements elsewhere. For example, Section 334.30 uses "intervals not exceeding" in two places and "support does not exceed" in one place. Each or either of these is clear. But literally, "at least" could mean and generally does mean "not less than." So if an installation is made with spacing at 6 ft between supports, the supports are "at least" 4-1/2 ft apart. I do not believe that was the panel intent.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-146 Log #1693 NEC-P19 **Final Action: Reject**
(552.48(H))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-211a
Recommendation: Delete or revise as follows: Cables shall be supported in accordance with the respective cable articles.
Substantiation: The present wording does not require fastening to supports. Support and fastening are covered in the cable articles. This provision does not allow for different support dimensions specified in 320.20(D)(2), 330.30(B), and 332.30 which are applicable for all installations.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-144.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-147 Log #854 NEC-P19 **Final Action: Reject**
(552.49)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-215
Recommendation: Accept the proposal.
Substantiation: 314.16 already applies, as do the raceway conductor fill provisions (which are not specifically indicated). The NEC Style Manual 4.1 states: " Do not use a reference if the requirement is covered by 90.3." Articles relating to other "specialized" industries do not repeat provisions that already apply. Repeating text and references is unnecessary and increases the bulk of the Code. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-148 Log #853 NEC-P19 **Final Action: Reject**
(552.50)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-217
Recommendation: Accept the proposal.
Substantiation: Already covered by Article 200. The NEC Style Manual states: "Do not use a reference if the requirement is covered by 90.3."
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-149 Log #855 NEC-P19 **Final Action: Reject**
(552.51)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-219
Recommendation: Accept the proposal.
Substantiation: 110.14 already applies whether or not the installation is a specialized industry. The NEC Style Manual 4.1 states: "Do not use a reference if the requirement is covered by 90.3." See 90.1(C)
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-150 Log #850 NEC-P19 **Final Action: Reject**
(552.53)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-221
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual states: "Do not use a reference if the requirement is covered by 90.3." Articles relating to other "specialized" industries do not repeat provisions that already apply. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-151 Log #1690 NEC-P19 **Final Action: Reject**
(552.54(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-222
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual 4.1 states: "do not use a reference if the requirement is already covered by 90.3." This should apply to redundant text which unnecessarily increases the bulk of the NEC.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-152 Log #851 NEC-P19 **Final Action: Reject**
(552.54(B) and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-223
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual states: "Do not use a reference if the requirement is covered by 90.3." Articles relating to other "specialized" industries do not repeat provisions that already apply. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-153 Log #849 NEC-P19 **Final Action: Reject**
(552.56(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-224
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual states: "Do not use a reference if the requirement is covered by 90.3." See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-154 Log #866 NEC-P19 **Final Action: Reject**
(552.56(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-225
Recommendation: Delete, or revise as follows:
(c) Grounding of Electrical Equipment. Grounding of electrical equipment shall be by means specified in 250.118. Bonding shall be in accordance with applicable provisions of Part V of Article 250.
Substantiation: Grounding/bonding is well covered in Article 250 and applies generally; there is no need for specific different methods in this article which don't comply with 250.126 and 250 148(C). Present (C)(2) specifies a grounding screw used for no other purpose while (C)(3) permits a luminaire attachment (mounting) screw for grounding that doesn't attach to a grounding plate.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 19-138.
The submitter's statement that there is "no need for specific different methods in this article which don't comply with 250.126 and 250 148(C)" is not technical substantiation to change the existing requirements in the Code.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-155 Log #760 NEC-P19 **Final Action: Reject**
(552.56(C) and (D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-226
Recommendation: Accept the proposal.
Substantiation: Redundant provisions unnecessarily increase the bulk of the NEC. Repeating them for one industry is no more warranted than repeating already applicable provisions for all industries.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-156 Log #848 NEC-P19 **Final Action: Reject**
(552.56(C) and (D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-226
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual states: "Do not use a reference if the requirement is covered by 90.3." See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-157 Log #755 NEC-P19 **Final Action: Reject**
(552.56(D) and (E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No:
Recommendation: Accept the proposal.
Substantiation: The proposal is applicable for metal boxes and other enclosures and should specifically apply to wire-type conductors, including bonding conductors. Metal raceway and cable equipment grounding conductors will be in electrical with each other by virtue of connection to the metal enclosure.
(E) should also apply where only one grounding or bonding conductor is involved.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on Proposal 19-227. Section 552.56(A) addresses metal components including metal boxes. The principal objective in 553.56(E) is to assure connection between multiple equipment grounding conductors entering a box.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-158 Log #754 NEC-P19 **Final Action: Reject**
(552.56(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-228
Recommendation: Accept the proposal.
Substantiation: Redundant provisions that are already covered by other sections unnecessarily increase the bulk of the NEC. Repeating them for one industry is no more warrented than repeating them for all industries. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-159 Log #847 NEC-P19 **Final Action: Reject**
(552.56(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-228
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual states: "Do not use a reference if the requirement is covered by 90.3." See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-160 Log #753 NEC-P19 **Final Action: Reject**
(552.56(F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-229
Recommendation: Accept the proposal.
Substantiation: Redundant provisions that are already covered by other sections unnecessarily increase the bulk of the NEC. Repeating them for one industry is no more warrented than repeating them for all industries. See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-161 Log #846 NEC-P19 **Final Action: Reject**
(552.56(F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-229
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual states: "Do not use a reference if the requirement is covered by 90.3." See 90.1(C).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-162 Log #235 NEC-P19 **Final Action: Accept**
(552.57)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-230
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-230 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a, only "distribution board" was deleted.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-163 Log #466 NEC-P19 **Final Action: Accept in Principle**
(552.57)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 19-230
Recommendation: The Proposal action should have been to Accept in Principle in Part and changed to read as follows:

(A) Required Bonding. All exposed non-current-carrying metal parts that ~~may become~~ are capable of becoming energized shall be effectively bonded to the grounding terminal or enclosure of the distribution panelboard.

Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.

However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms *may* or *can* shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term *may* shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."

Since the use of the term *may* in this Section does not meet these criteria, it should be changed.

Panel Meeting Action: Accept in Principle

Change "that may become" to "that is likely to become."

Panel Statement: "Likely to" is good Code language to guide product standards where the final installation circumstances may not be evident. In this instance "likely to" is acceptable since the circumstance is not expected under normal circumstances but could occur. This is consistent with the panel's action on Proposal 19-89.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-164 Log #844 NEC-P19 **Final Action: Accept in Part**
(552.57)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-230
Recommendation: Accept the proposal.
Substantiation: There is no safety reason to bond metal parts of low voltage equipment not likely to become energized by 120 volt systems. "Likely" is a term used many times in the NEC. The equipment specified in 525.57(D) and (E) should be required to be bonded; bonding is only required by (A) where it "may" be energized. "May" is a discretionary term to be used by the AHJ. Metal air ducts need only be bonded where they can become energized; air duct from a roof ventilator doesn't need to be bonded, nor does duct isolated by a flexible nonmetallic connector. Park trailers provided with one branch circuit supplied from a fused switch or single enclosed circuit breaker do not need a panelboard.
Panel Meeting Action: Accept in Part

The panel accepts "are likely to" as a replacement for "may."

The remainder of the recommendation of the proposal is rejected.
Panel Statement: The substantiation suggests that this requirement applies to low voltage systems, which is not the case since this requirement falls under Part IV, Nominal 120-Volt or 120/240-Volt Systems.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-165 Log #845 NEC-P19 **Final Action: Reject**
(552.57(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-231
Recommendation: Accept the proposal and revise as follows:

Bonding terminals shall be listed as solderless (pressure) type and approved for the wire size and material used. The bonding conductor shall be minimum 8 AWG and solid copper where the bonding terminal is exposed on the underside of the park trailer.

Substantiation: Terminals should be approved for the wire size and material. Solid copper should be required where the bonding terminal is exposed on the underside of the trailer and subject to corrosion from road salts.
Panel Meeting Action: Reject
Panel Statement: The terminals are required to be "listed" as pressure type terminals. The listing standard requires markings of the types and sizes of conductors for which they are listed.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-166 Log #893 NEC-P19 **Final Action: Reject**
(552.59(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-232
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual states: "Do not use a reference if the requirement is covered by 90.3." Is that a requirement or optional?
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

19-167 Log #892 NEC-P19 **Final Action: Reject**
(552.60(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-233
Recommendation: Accept the proposal.
Substantiation: A continuity test with an ohmmeter or test lamp can indicate connections but no necessarily if "properly bonded", i.e., adequate for sufficient current to operate overcurrent devices, or whether terminal size and material is suitable. Visual inspection is not impractical when the unit is constructed and wired any more than it is for the other wiring installed.
Panel Meeting Action: Reject
Panel Statement: Park trailers are not built on the site of their use. Electrical continuity tests are conducted at the factory as a matter of standard. Visual examination is not solely reliable for park trailers according to their manufacturers.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 553 — FLOATING BUILDINGS

19-168 Log #875 NEC-P19 **Final Action: Accept in Part**
(553.1)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-234
Recommendation: Accept the proposal.
Substantiation: A Panel board, per se, is not specifically required. Distribution equipment can consist off individual enclosed switches or circuit breakers. Connection means are not specified. The NEC Style Manual 3.1.2 states "may" shall only be used where it is a discretionary judgment by the AHJ. "Likely" is a term used over 80 times in the NEC.
Panel Meeting Action: Accept in Part

The panel accepts the change from "may" to "are likely to."

The remainder of the recommendation is rejected.
Panel Statement: As in the original proposal, the submitter continues to reference section 553.1 which is not germane to the subject of the recommendation.

See panel action on Comment 19-183.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-169 Log #890 NEC-P19 **Final Action: Reject**
(553.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-236
Recommendation: Accept the proposal with the following revisions:

A building unit as defined in Article 100 that floats on water, is moored permanently or indefinitely at one location and has a premises wiring system connected to an electrical supply system not located in or on the floating building.

Substantiation: "Permanent" wiring is used many times to indicate fixed wiring methods. "Premises" is defined as a tract of land which includes the shore area adjacent to floating buildings, and is not the same as premises wiring system definition.
Panel Meeting Action: Reject
Panel Statement: The term "premises wiring system" is defined in Article 100 and the reference in 90.2(A)(1) includes floating buildings as a premise.

The proposed text is not needed to add clarity to the code.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-170 Log #1613 NEC-P19 **Final Action: Accept**
(553.4)

Submitter: Joseph P. Fello, Eaton Corp.
Comment on Proposal No: 19-241
Recommendation: 553.4 Location of Service Equipment. The service equipment for a floating building shall be located adjacent to, but not on or in, the building or any floating structure. The Main over current protective device which feeds the floating structure shall have ground fault protection not exceeding 100mA. Ground fault protection of each individual branch or feeder circuit shall be permitted as a suitable alternative.
Substantiation: Eaton appreciates that panel's recognition of the merit to requiring a level of ground fault protection on these circuits. The newly proposed maximum level is meant to address the Panel's concern around the practical application for floating building environments.
In response to the panel's request for technical substantiation, the information attached with Proposal 19-241 included documentation of incidents in which more than 50 people died and over 30 people have been injured due to leakage currents on or around marinas.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-171 Log #2787 NEC-P19 **Final Action: Accept**
(553.5)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 19-242
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-172 Log #236 NEC-P19 **Final Action: Accept**
(553.6)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-243
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-243 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a, only "distribution board" was deleted.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-173 Log #894 NEC-P19 **Final Action: Reject**
(553.6)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-243
Recommendation: Accept the proposal with the following revisions:
Supply Conductors. Each floating building shall be supplied by one set of supply conductors from its service equipment.
Exception: Where the floating building has multiple occupancy or is supplied by different classes of service, a single set of supply conductors shall be permitted for each occupancy and class of service.
Substantiation: There is no specific requirement for a panelboard; the disconnecting means can be a switch for a single branch circuit, whereby the circuit is not a feeder. Each occupancy should be specified not each occupant (person). Different classes of service should be permitted to supply a set of supply conductors. If supplied by a feeder it will terminate in an overcurrent device(s).
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-243. The submitter's substantiation for the proposed revisions is not germane to recommendation.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-174 Log #958 NEC-P19 **Final Action: Reject**
(553.6)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-243
Recommendation: Accept the proposal with the following revisions:
Supply Conductors. Each floating building shall be supplied by a single set of branch circuit or feeder conductors for each class of service.
Exception: Where the floating building has multiple occupancy each occupancy, shall be permitted to be supplied by a single set of supply conductors from each class of service.
Substantiation: A panelboard is not specifically required. and not needed where the supply is a single branch circuit and there is no overcurrent protection at the floating building. Where there are different classes of service, a set of conductors from each should be permitted.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-173.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-175 Log #957 NEC-P19 **Final Action: Reject**
(553.7(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-244
Recommendation: Accept the proposal with the following revisions:
Flexibility. Flexibility of the branch circuit and feeder conductors to a floating building shall be provided and maintained. Such supply conductors shall be installed so that the motion of the floating building and changes in the water level does not result in strain on the supply conductor terminations.
Substantiation: Wind can also cause movement of the floating building. There will normally be some strain on the wiring method. The provision should address strain on conductor terminations. "Unsafe" and "undue" are not germaine or defined.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the action taken on Proposal 19-244. No additional technical substantiation has been submitted to support the recommended change. The recommended text does not add clarity or improve usability of the code.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-176 Log #237 NEC-P19 **Final Action: Accept**
(553.8(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-245
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-245 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a, only "distribution board" was deleted.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-177 Log #956 NEC-P19 **Final Action: Reject**
(553.8(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-245
Recommendation: Accept the proposal.
Substantiation: A panelboard is not specifically required by this artical. Where a branch circuit is installed, the building disconnecting means may not include overcurrent protection. Single individual switches may be the disconnecting means.
Panel Meeting Action: Reject
Panel Statement: The present text in Article 553 implies that only panelboards are to be used in floating buildings. The submitter has provided no technical substantiation to add additional options.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-178 Log #238 NEC-P19 **Final Action: Accept**
(553.8(A) and (B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-246
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase “distribution board” in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-246 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term “panelboard” was retained in Proposal 9-130a, only “distribution board” was deleted.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-179 Log #959 NEC-P19 **Final Action: Reject**
(553.8(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-246
Recommendation: Accept the proposal with the following revisions:
(A) Grouding. Grounding of noncurrent-carrying metal parts of electrical equipment shall be to a grounding terminal(s) or bus(es) in the building disconnecting means.
(B) A wire type equipment grounding conductor shall be installed with the building supply conductors and connected to a grounding terminal or bus in the building disconnecting means.
Substantiation: There is no specific requirement for a panelboad; the disconnecting means can be an individual switch(es) or circuit breaker(s), and the building may be supplied by a single branch circuit.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-177.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-180 Log #955 NEC-P19 **Final Action: Reject**
(553.8(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-246
Recommendation: Accept the proposal with the following revisions:
A wire-type equipment grounding conductor shall be installed with each set of supply conductors to the floating building and connected to a grounding terminal(s) or bus(es) in the building disconnecting means.
Substantiation: The provision seems intended to require a wire type EGC.
Panel Meeting Action: Reject
Panel Statement: The recommended text does not add clarity or usability to the code. The term “wire type equipment grounding conductor” is not used in the code.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-181 Log #239 NEC-P19 **Final Action: Accept**
(553.9)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-247
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase “distribution board” in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-247 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term “panelboard” was retained in Proposal 9-130a, only “distribution board” was deleted.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-182 Log #954 NEC-P19 **Final Action: Reject**
(553.9)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-247
Recommendation: Accept the proposal.
Substantiation: A panelboard is not specifically required in this article. The disconnecting means can be a single individual switch.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-181.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-183 Log #891 NEC-P19 **Final Action: Accept in Part**
(553.11)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-234
Recommendation: Accept the proposal as intended for 553.11.
Substantiation: The proposal was intended for 553.11.
Panel Meeting Action: Accept in Part
The panel Accepts the term “likely to” to replace “may”. The panel Rejects the remainder of the recommendation.
Panel Statement: The present text in Article 553 implies that only panelboards are to be used in floating buildings. The submitter has provided no technical substantiation to add additional options. The remaining proposed changes do not add clarity to the present text.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-184 Log #950 NEC-P19 **Final Action: Accept in Part**
(553.11)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-248
Recommendation: Accept the proposal with the following revisions:
All metal parts of the building in contact with the water, all metal piping and tubing, and all noncurrent-carrying metal parts that are likely to become energized shall be connected to the equipment grounding terminal(s) or bus(es) in the building disconnecting means.
Substantiation: A required panelboard is not specified in this article. A branch circuit supply to the building is only required to have a disconnecting means.
Panel Meeting Action: Accept in Part
The panel Accepts the proposed change to “likely to” from “may”. The panel Rejects the remainder of the recommendation.
Panel Statement: See the panel statement on comment 19-183. The panel reconsidered its original action on the proposed change from “may” to “likely to” and found the change is appropriate considering the basis described in the panel statement to comment 19-83.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-185 Log #953 NEC-P19 **Final Action: Accept in Part**
(553.11)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-248
Recommendation: Accept the proposal with the following revisions:
All metal parts in contact with the water, all metal piping or tubing, and all noncurrent-carrying metal parts that are likely to become energized shall be connected to a grounding terminal(s) or bus(es) in the building disconnecting means.
Substantiation: A panelboard is not specifically required in this article. The disconnecting means can be an individual switch or circuit breaker.
Panel Meeting Action: Accept in Part
The panel Accepts the proposed change to "likely to" from "may". The panel Rejects the remainder of the recommendation.
Panel Statement: See the panel statement on Comments 19-183 and 19-184.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

ARTICLE 555 — MARINAS AND BOATYARDS

19-186 Log #240 NEC-P19 **Final Action: Accept**
(555.2)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-249
Recommendation: The Technical Correlating Committee directs that this proposal be reconsidered and correlated with the action taken on Proposal 9-130a where Code-Making Panel 9 deleted the phrase "distribution board" in Article 408.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel reviewed its action on Proposal 19-249 and determined that it is not in conflict with the actions taken by Panel 9 on Proposal 9-130a. The term "panelboard" was retained in Proposal 9-130a, only "distribution board" was deleted.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-187 Log #2630 NEC-P19 **Final Action: Accept in Principle**
(555.2.Marine Power Outlet)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-249
Recommendation: Accept the panel action in principle.
Change "distribution panels" to "panelboards."
Substantiation: This comment is offered in response to the many TCC notes relative to the deletion of the terminology "distribution board" in Article 408 by CMP 9, and this comment applies equally to all such actions. The submitter is the senior member of CMP 9, and the term "distribution board" is not related in any way to the term "distribution panelboard." A "distribution board" is an item of equipment so obsolete that no current member of CMP 9 either knew or was able to discover the definitive meaning of, even after discussions spanning numerous code cycles. A "distribution panelboard" is very much in common usage, although not formally defined. However, in general it is advisable to stay with defined terms, and for NEC purposes the best course is to let the adjective "distribution" as a modifier for "panelboard" leave the Code, just as "subpanels" did many years ago. Just as all subpanels are panels, so also are all distribution panelboards. It is noted that in most instances CMP 19 has followed this approach.
Panel Meeting Action: Accept in Principle
Change "distribution panels" to "distribution panelboards."
Panel Statement: This panel action is in response to the Panel 9 action on Proposal 9-130a which eliminated the term "distribution board" but retained the word "panelboard". This panel action is believed to meet the intent of the submitter and is consistent with the term used for this equipment throughout the Article within the scope of Panel 19.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-188 Log #2732 NEC-P19 **Final Action: Reject**
(555.2.Power Safe Protector (PSP))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 19-251
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-24.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-189 Log #1612 NEC-P19 **Final Action: Accept**
(555.3)

Submitter: Joseph P. Fello, Eaton Corp.
Comment on Proposal No: 19-252
Recommendation: **555.3 Ground Fault Protection.** The main over current protective device which feeds the marina shall have ground fault protection not exceeding 100mA. Ground fault protection of each individual branch or feeder circuit shall be permitted as a suitable alternative.
Substantiation: Eaton appreciates that panel's recognition of the merit to requiring a level of ground fault protection on these circuits. The newly proposed maximum level is meant to address the Panel's concern around the practical application for marina environments.
In response to the panel's request for technical substantiation, the information attached with Proposal 19-252 included documentation of incidents in which more than 50 people died and over 30 people have been injured due to leakage currents on or around marinas.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:
CHILTON, R.: As noted in the Panel Statement for initially rejecting the proposal, it's not the idea that a greater level of protection is warranted but the availability of equipment to sufficiently address several issues as a reason for the action. To protect personnel with GFCI devices, the 6 mA level for leakage current is a proven factor and within the standards. The 100 mA Ground Fault Protection supplying a main feeder for a marina will surely provide greater flexibility for main feeders, and some protection, however there is a significant problem with practicality for marinas. Perhaps the alternative at this point would have been to require all branch circuits and individual feeders for each dock or station to have the GFCI protection, thereby lessening the seriousness of the entire power supply for the marina to be shut down which could literally be a hundred vessels or boats. Another issue is the belief that some might have that they are protected by the 100 mA device on the main, which we know is not the case as far as personnel protection is concerned. Even when the alternative for feeder and branch circuit GFCI protection is included, the use of a 100 mA device does not provide the personnel protection expected.

19-190 Log #897 NEC-P19 **Final Action: Reject**
(555.10 Exception (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-256
Recommendation: Accept the proposal with the following revisions:
Permanently installed electrical equipment on piers and docks shall be securely supported in accordance with 110.13, 314.23, and 352.10(H). Internal openings for support fasteners shall be sealed to prevent the entrance of moisture.
Substantiation: The provision should be limited to permanently installed equipment and include docks and below deck levels.. Docks may be parallel to the shore while piers extend at right angles to the shore. References to applicable provision requirements provides comprehensive requirements, which (sentence incomplete)
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to reject Proposal 19-256. No new technical substantiation has been provided.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-191 Log #896 NEC-P19 **Final Action: Reject**
(555.11)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-258
Recommendation: Accept the proposal with the following revisions:
Circuit breakers and switches shall comply with 404.4 and be externally manually operable.
Substantiation: Section 404.4 has provisions that are not amended by this section. The provision for weep holes will be covered by listing protocols and is not needed for flush mounted equipment or watertight equipment.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to reject Proposal 19-258. No new technical substantiation has been provided.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-192 Log #895 NEC-P19 **Final Action: Reject**
(555.13)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-260
Recommendation: Accept the proposal with the following revisions:
(A) Wiring Methods
(1) General. Wiring methods employed shall be approved for the use.
(2) Portable power cable in accordance with 400.3 that contains an equipment grounding conductor shall be permitted as follows:
(1) As fixed wiring on the underside of piers and docks (floating or fixed).
(2) Where flexibility is necessary.
(3) No change.
(B) Installation
(1) Overhead wiring. Overhead wiring shall be installed to avoid possible contact with masts and other parts of watercraft, boat hoists, movable equipment, and other structures, except at points of support. Overhead wiring shall be installed not less than 6.0 m (20 ft) from the outer edge of any portion of the yard that can be used for storage of watercraft or stepping or unstepping masts.
(2) No change.
(3) No change.
(4) Portable Power Cables.
(a) Where portable cables are used as fixed wiring, the installation shall comply with the following:
(1) Cables shall be securely supported
(2) Cables shall be located on the underside of the pier or dock.
(3) Cables shall be fastened to structural members other than deck planking by approved nonmetallic means.
(4) Cables shall not be installed where likely to be subject to physical damage.
(5) Where cables pass through structural members they shall be protected by a permanently installed sleeve of approved material.
(b) Where portable cables are used as permanent wiring an approved corrosion resistant junction box with permanently installed terminal blocks shall be provided where circuit extensions are to be connected.
(5) Protection
Except as permitted in 555.13 (A)(2)
(2) Type RMC, IMC, EMT, PVC raceways shall be the wiring method employed for fixed wiring above or below the decks of piers and docks and landing stages and shall comply with 110.11.
Exception: Where installed in dry locations within structures on the pier or dock other approved wiring methods shall be permitted.
Substantiation: Portable power cables should comply with 400.3, 3.g., be a type W for wet locations and sunlight resistance. Docks should be included as in 555.1 and 555.7(B)(4) should be limited to cables for permanent fixed wiring. Cables should contain an EGC. A reference to 110.11 covers suitability of equipment. An exception is warranted for wiring in dry locations within structures on the pier or dock. Piers and docks are not necessarily the same structure.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the action to Reject Proposal 19-260.
The proposed revisions do not add clarity or usability to the code and technical substantiation has not been provided for all changes.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-193 Log #715 NEC-P19 **Final Action: Reject**
(555.13(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-262
Recommendation: Accept the proposal and revise as follows:
(A) General.
(1) Wiring methods covered in this Code that are identified as suitable for the use shall be employed.
(2) Portable power cables Portable power cables covered in Table 400.4 that comply with 400.3 and contain an equipment grounding conductor shall be permitted as follows:
(a) As permanent wiring on the underside of piers and docks (floating or fixed).
(b) Where flexibility is necessary as on piers and docks composed of floating sections.
Substantiation: The only portable power cables in Table 400.4 are Type G, GEC, and PPE. They are rated 600 volts and oil resistant which should suffice for water resistance. Since they don't have a W designation they are not sunlight or water resistant per the table. An equipment grounding conductor should be specified since for type PPE the EGC is optional. "Shall be permitted" does not impose a requirement per 90.5(B); (A)(1) cites Chapter 3 but (A)(2) allows Chapter 4 wiring methods. Article 400 does not specify listing nor do many other sections in the NEC re; cords. There is no comparable Table 400.4 for listed cords and cables; where does the Code user go for descriptions and uses for listed cords and cables?
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the action to Reject Proposal 19-262.
The proposed revisions do not add clarity or usability to the code and technical substantiation has not been provided for all changes.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-194 Log #1977 NEC-P19 **Final Action: Reject**
(555.13(A)(2)(3) (New))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 19-263
Recommendation: Proposal should be accepted.
Substantiation: The rule in 555.13(A)(2) only permits the use of the portable power cable (1) As permanent wiring on the underside of piers (floating or fixed) or (2) Where flexibility is necessary as on piers composed of floating sections. In both cases the permission to use the portable power cable only applies on the pier itself and does not permit the use of the portable power cable as a feeder from the power source to the pier. 55.13(B)(4) only tells us how to install the cable in the two locations where it is permitted.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the action to Reject Proposal 19-263. The use of portable power cables as a feeder is not prohibited provided it is installed in accordance with the provisions of the code.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-195 Log #241 NEC-P19 **Final Action: Accept**
(555.13(B)(5))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-268a
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal with regard to the deleted word "full" that was left out of the revised text without explanation.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Add the word "full" to the second sentence of 555.13(B)(5) as follows:
The conduit shall be connected to the enclosure by <u>full</u> standard threads or fittings listed for use in damp or wet locations as applicable.
Panel Statement: The panel agrees with the comment and has taken action to add the word "full."
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-196 Log #1689 NEC-P19 **Final Action: Reject**
(555.15(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-269
Recommendation: Accept the proposal and revise second sentence of (B) as follows: The equipment grounding conductor contained within Type MI cable shall be identified at terminations by the insulating material of terminal seals.
Substantiation: Where the EGC is the cable sheath, it is already identified per 250.18(9). Where it is a contained conductor, it is identified by the terminal fitting insulation color since all emerging conductors are bare. "Permitted" does not impose a requirement per 90.5(B), therefore, the present provision is optional.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to reject Proposal 19-269. "Shall be permitted" is intentionally permissive and means neither prohibited or required. This term is selectively used in the Code to address some gray areas that have been particularly problematic for inspection authorities or others. The existing code text is clear as written.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-197 Log #941 NEC-P19 **Final Action: Reject**
(555.15(D) and (E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-271
Recommendation: Accept the proposal with the following revisions:
Delete (D) and (E).
Substantiation: 555.15(A) requires an EGC; (B) specifies the type. The EGC run with a branch circuit or feeder will terminate at a disconnecting means or other approved equipment, not necessarily a panelboard; the definition of EGC indicates its purpose and connections.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-271. No technical substantiation has been provided for the deletion of (D) and (E).
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-198 Log #940 NEC-P19 **Final Action: Reject**
(555.17(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-273
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual 3.3.5 indicates lack of consistency for similar requirements and creates confusion. "Disconnecting means" can be a group of devices that don't simultaneously disconnect all conductors. The first paragraph requires isolation from all supply conductors which includes grounded circuit conductors. "Durable" is a term used in the NEC and is not included in Table 3.2.1 of the NEC Style Manual as a term not to be used.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-273.
555.17 states: "shall be provided to isolate each boat from its supply connection(s)."
Sufficient technical substantiation has not been provided to support the recommended changes.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-199 Log #759 NEC-P19 **Final Action: Reject**
(555.19(B)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-275
Recommendation: Accept revised text as follows:
"(1) 15- and 20-ampere, single-phase, 125-volt receptacles, cord connector bodies, and flanged surface outlets installed on dc circuits operating at higher than 50 volts, where installed outdoors, in boathouses, in buildings, and other structures used for storage, maintenance, or repair, shall be provided with GFCI protection for personnel. Such type devices used in other locations shall be protected in accordance with 210.8(B)."
Substantiation: This provision should include devices used on dc circuits, cord connector bodies, and flanged surface outlets. "Other" structures are proposed, since buildings are structures, but all structures are not buildings.
Panel Meeting Action: Reject
Panel Statement: New material has been introduced which was not included in the original proposal. No technical substantiation has been provided for adding the suggested components.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

19-200 Log #2731 NEC-P19 **Final Action: Reject**
(555.19(B)(1))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 19-276
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 19-32.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

ARTICLE 590 — TEMPORARY INSTALLATIONS

3-45 Log #2700 NEC-P03 **Final Action: Reject**
(590.1(A))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 3-108
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: On page iii of the UL Research Report, preliminary testing was conducted on prototype samples submitted to UL. The testing demonstrated the ability of the PSP receptacle prototypes to detect an overheating condition occurring at the receptacle contacts and terminals at an early stage. Due to the limited number and prototype nature of the PSP receptacle specimens provided, a comprehensive safety evaluation was not possible.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-46 Log #874 NEC-P03 **Final Action: Reject**
(590.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-110
Recommendation: Accept the proposal.
Substantiation: As written, only other requirements of the NEC apply, not permissive exceptions alternatives, or other permissive provisions
Panel Meeting Action: Reject
Panel Statement: Permissive exceptions, alternatives, and other permissive rules are not required to be used but any requirements for permanent wiring located elsewhere in the NEC must be applied.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-47 Log #242 NEC-P03 **Final Action: Accept**
(590.4)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 3-111
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the actions on Proposals 1-234 and 9-130a.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action in Comment 3-50. Deleting the second sentence in 590.4(B) resolves any correlation issue with Panel 1 and 9.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-48 Log #761 NEC-P03 **Final Action: Reject**
(590.4)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-111
Recommendation: Accept text as revised:
"(B) Feeders. Overcurrent protection shall be provided in accordance with the applicable provisions of 240.4, 240.5, 240.100, and 240.101. Feeders shall originate in approved distribution equipment. Feeder conductors that are not to remain as permanent installations shall be within cable assemblies or extra-hard usage or hard usage type flexible cords or cables that comply with 400.3." (Remainder unchanged).
"(C) Branch Circuits. Branch circuits shall originate in approved distribution equipment. Conductors that are not to remain as permanent installations shall be within approved cable assembles or extra-hard usage or hard usage type flexible cords or cables that comply with 400.3." (Remainder unchanged).
Substantiation: Feeders and branch circuits used for temporary purposes, but that are to remain as permanent wiring should be exempt from the cable or cord assembly requirements. Flexible cords and cables should be specified to comply with 400.3 since all hard usage and extra hard usage types are not suitable, such as electric vehicle cable and those without a "W" designation for wet locations and sunlight resistance.
"Permitted" in (B) is optional per 90.5(B) and opens the door for any wiring method that complies with "Uses Permitted" and "Uses Not Permitted".
Panel Meeting Action: Reject
Panel Statement: Adding the phrase "the applicable provisions of" is unnecessary and does not add any clarity. Adding the sentence requiring feeder and branch circuits that are not to remain as permanent installations to be within approved cable assemblies or hard usage or extra hard usage would be overly restrictive since other temporary wiring methods could be used.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-49 Log #938 NEC-P03 **Final Action: Reject**
(590.4)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-115
Recommendation: Accept the proposal with the following revisions:
All branch circuits shall be supplied by an approved power outlet, switchboard, panelboard, motor control center, fused switch, or circuit breaker.
Substantiation: All the items specified are suitable for supplying branch circuits, including a circuit breaker.
Panel Meeting Action: Reject
Panel Statement: The definition of "power outlet" in Article 100 and the text in 590.4(C), first sentence already covers the items requested in the proposal so a list of locations where a branch circuit can originate is unnecessary.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
STENE, S.: Based on the Panel Statement in this comment, it is my understanding that the Panel's intent is to not only reject this comment but to also reject Proposal 3-115 and the Panel Action text at the proposal stage.

3-50 Log #939 NEC-P03 **Final Action: Accept**
(590.4)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-111
Recommendation: Accept the deletion of the second sentence of (B).
Substantiation: Article 240 already applies unless amended by Section 90.3 that states: Chapters 1-4 apply unless amended. The NEC Style Manual states in 4.1 "Do not use a reference if the requirement is already covered by 90.3."
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-51 Log #984 NEC-P03 **Final Action: Reject**
(590.4)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-112
Recommendation: Accept the proposal with the following revisions:
(H) Protection from Accidental Damage. Temporary wiring shall be protected from accidental damage by location or other approved means. Where passing through doorways or other pinch points, conductors shall be protected.
(I) Terminations. Flexible cords and cables shall enter boxes or other enclosures through bushed fittings.
(J) Support. Temporary wiring that is fixed in place shall be securely fastened to supports at approved intervals with staples, cable ties, straps, or other approved means, installed so as not to damage the wiring.
Substantiation: Protection can be provided by elevation, as indicated elsewhere in the NEC.
(H) should indicate wiring methods other than flexible cords and cables such as NM and NMC, and single conductors permitted in 590.4(B) and (C). Support does not secure protection from physical damage, that is covered elsewhere in the NEC.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided technical substantiation in the comment to justify any of the suggested changes provided in either the original proposal or the comment. The submitter did not answer any of the issues detailed in the panel statement in the rejected proposal. In addition, the panel had difficulty in determining what changes were made in the comment so the panel could not readily see what text was new and what was existing. The panel notes that submitter deleted the vegetation prohibition without substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-52 Log #927 NEC-P03 **Final Action: Reject**
(590.4(B) and Exception and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-114
Recommendation: Accept the proposal with the following revisions:
(B) Feeders. Feeder conductors shall be within approved cable assemblies or multiconductor extra-hard or hard usage type flexible cords or cables that comply with 400.3. (remainder unchanged).
Substantiation: All extra-hard usage and hard usage cords and cables may not be suitable, e.g., electric vehicle cable, those without a type letter W for use in wet locations and sunlight resistant. The present first sentence is superfluous; the definition of feeder includes origination at service equipment, separately derived system, or other source. "Permitted" doesn't impose a requirement per 90.5(B); it is allowed but not required.
Panel Meeting Action: Reject
Panel Statement: The comment text does not apply to the proposed changes to 590.4(B), Exception or the text within 590.4(C) in the proposal and introduces new suggested changes that have not had public review. The suggested text in the comment referencing 400.3 is already required by any installation utilizing flexible cords or cables so adding it to 590.4 is unnecessary.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-53 Log #1072 NEC-P03 **Final Action: Reject**
(590.4(C))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 3-115
Recommendation: This proposal should have been Accepted in Principal and the sentence revised to read: "...or fused switch or circuit breaker enclosure" as suggested by Mr. Pace in his comment on Negative.
Substantiation: While the panel statement may be correct that a branch circuit does not originate in a circuit breaker, certainly a branch circuit can originate at a circuit breaker that is in a circuit breaker enclosure. No reason was given to prohibit the use of enclosed circuit breakers for this purpose.
Panel Meeting Action: Reject
Panel Statement: See the panel statement in Comment 3-49.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-54 Log #243 NEC-P03 **Final Action: Accept**
(590.4(D))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 3-122
Recommendation: The Technical Correlating Committee directs this proposal be reconsidered and correlated with the action taken on Proposal 18-54.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee. See the action and statement on Comment 3-56.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-55 Log #943 NEC-P03 **Final Action: Reject**
(590.4(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-121
Recommendation: Accept the proposal with the following revisions:
Branch circuits that supply temporary lighting shall not supply receptacle or other equipment. GFCI protection shall not be installed for branch circuits or feeders that supply temporary lighting.
Substantiation: Temporary lighting circuits on sites other than construction such as demolition, and where permitted for emergencies, tests, experiments, and development work as covered in 590.3(C) and remodeling, maintenance, repair or demolition as covered in 590.3(A) should be included, as outages can also be hazardous.
Panel Meeting Action: Reject
Panel Statement: The second to last sentence in the existing Code text states receptacles on construction sites shall not be installed on branch circuits that supply temporary lighting. This subsection does not cover "other electrical equipment" as alluded to in the proposed new text. The proposed GFCI protection for temporary lighting is inappropriate within this section since it only covers receptacles, not temporary lighting.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-56 Log #1228 NEC-P03 **Final Action: Accept in Principle**
(590.4(D))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 3-122
Recommendation: This Proposal should be accepted to add new text to the requirement in Section 590.4(D).
Substantiation: In its statement for rejecting proposal 3-122, the sole rationale given for the rejection by CMP 3 was that the proposal in 406.8(B)(1) must first be accepted. Proposal 18-54, in 406.8(B)(1), has been accepted by CMP 18. Therefore, CMP 3 now should consider accepting this proposal in 590.4(D) based on the substantiation given.
Panel Meeting Action: Accept in Principle
In the recommendation of Proposal 3-122, accept the proposal revision in (D)(1) as is and change the text in (D)(2) in the proposal to read as follows:
(2) Receptacles in Wet Locations. All 15- and 20-ampere, 125- and 250-volt receptacles installed in a wet location shall comply with Section 406.8(B)(1).
Panel Statement: The word "all" provides an adjective to start the sentence, rather than a number, and the word "Section" has been deleted in compliance with the NEC Style Manual.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-57 Log #1428 NEC-P03 **Final Action: Reject**
(590.4(D))

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 3-123
Recommendation: Accept the proposal as originally submitted:
Receptacles on construction sites shall not be installed on connected to the same individual, general purpose, or multiwire branch circuits that supply temporary lighting.
Substantiation: The panel's rewording of the proposal was, "Receptacles on construction sites shall not be installed on any branch circuit that supplies temporary lighting." This negates the intent of keeping temporary lighting and other loads separate. That is because 210.4(A) states that, "A multiwire circuit shall be permitted to be considered as multiple circuits."
I read that as saying that I may install a multiwire branch circuit, with one phase for lights and another for receptacles, and still comply with the proposed wording because I would consider each half of the circuit separately.
Panel Meeting Action: Reject
Panel Statement: The panel's acceptance of "any branch circuit" applies to individual or multiwire branch circuits so the list of various types of branch circuits is unnecessary.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-58 Log #2631 NEC-P03 **Final Action: Accept in Part**
(590.4(D))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 3-123
Recommendation: Continue to accept the proposal in principle, but insert the words "or on any leg of a multiwire branch circuit" after "installed on any branch circuit" and before "that supplies temporary lighting."
Substantiation: Although the panel action is generally technically valid, it is important to recognize that 210.4 does not require multiwire circuits to be considered as one circuit; in fact it says such circuits "shall be permitted to be considered as multiple circuits." Therefore it may very well not occur to many installers or inspectors that a connection to an opposing leg of a multiwire circuit is intended to be a violation. Now that there is a common disconnecting requirement for all multiwire circuits, it is crucial that this be applied correctly.
Panel Meeting Action: Accept in Part
Accept the recommendation to continue accepting the proposal in principle and reject the remainder of the comment.
Panel Statement: Any branch circuit includes a single branch circuit, an individual branch circuit, and a multiwire branch circuit so adding the suggested text is unnecessary.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-59 Log #873 NEC-P03 **Final Action: Reject**
(590.4(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-125
Recommendation: Accept the proposal and revise as follows:
Approved disconnecting means shall be provided for each temporary circuit, that simultaneously disconnects all ungrounded conductors of the circuit it controls.
Substantiation: Suitable is subjective and not limited to the AHJ; whereas "approved" is. Simultaneous disconnection of ungrounded conductors is a standard requirement throughout the NEC; this section may be deemed to amend that requirement.
Panel Meeting Action: Reject
Panel Statement: Removing "suitable" and replacing it with "approved" is not necessary since 110.2 already requires the installation to be approved. Any two or three phase ungrounded conductors must be able to be disconnected by circuit breaker or fusible switch but simultaneous disconnection is an important safety consideration where the neutral conductor of a multiwire branch circuit may still be carrying current as noted in 210.4(B).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-60 Log #942 NEC-P03 **Final Action: Reject**
(590.4(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-126
Recommendation: Accept the proposal with the following revisions:
An approved disconnecting means that simultaneously disconnects all ungrounded conductors of the circuit it controls shall be provided. Common trip multipole circuit breakers shall be permitted as the disconnecting means.
Substantiation: "Suitable" is a term to be avoided per the Style Manual. Handle ties that are field installed can be removed.
Panel Meeting Action: Reject
Panel Statement: See the panel statement in Comment 3-59. Adding a permissive statement permitting common trip circuit breakers is unnecessary since handle ties are permitted by 240.15. In addition, 210.4(B) requires simultaneous disconnection of multiwire branch circuits.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-61 Log #678 NEC-P03 **Final Action: Reject**
(590.4(G))

Submitter: Bob Fahey, City of Jamesville
Comment on Proposal No: 3-132
Recommendation: Revise text to read as follows:
(G) Splices. On construction sites, a box shall not be required for splices or junction connections where the circuit conductors are multiconductor cord or cable assemblies, provided (1) the splices are a minimum of 2.5m (8 ft) above the floor or finished grade, and (2) that the equipment grounding continuity is maintained with or without the box. See 110.14(B) and 400.9. A box, conduit body, or terminal fitting having a separately bushed hole for each conductor shall be used wherever a change is made to a conduit or tubing system or a metal-sheathed cable system.
Substantiation: I have modified my language from my original Proposal 3-132, the new language specifically requires these splices to be located away from where the trade or the general public would commonly come in contact with such a splice if these open splices were required to be located above 8 feet. I have taken the 8' requirement from NEC 300.5(D)(1) for the protection of conductors emerging from grade outside. The splice I had noted in my substantiation on ROP #3-132 was located outside on the earth, where it was accessible to the general public, this type of installation should not be allowed, if we are to adequately protect the public and others who could easily come in contact with this open splice. With the present language in 590.4(G), this type of open splice can occur anywhere on a construction site, including areas accessible to the general public. I would encourage the Code panel to please take another look at this section and require open splices to be located above 8' on construction sites to better protect the construction workers and in the case I inspected, the general public. I do not have any documentation of injuries or deaths caused by the open splice located where they are readily accessible to all workers and the public, but my instinct is to assume if this practice is allowed to continue, there would be someone who would become injured due to these open splices allowed anywhere on a construction site. As an AHJ, the present language does not allow me to require that these splices be located where the splice is not a danger to others on the site, the proposed language would give the AHJ an enforcement tool to require these splices be located in areas not readily accessible and definitely not allow these open splices to be located on the floor or outside on the earth.
Panel Meeting Action: Reject
Panel Statement: Splices on construction sites can be accomplished where the splice is not a danger to the general public or the construction personnel without requiring the splice to be located above 8 feet or in a not readily accessible location.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-62 Log #930 NEC-P03 **Final Action: Reject**
(590.4(G))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-131
Recommendation: Accept the proposal with the following revisions:
A box or fitting shall not be required for splices where the circuit conductors are single insulated conductors as permitted in the Exception for 590.4(B), or multiconductor flexible cord or cable in accordance with 400.3, nonmetallic covered multiconductor cable assemblies, provided equipment grounding conductor continuity is maintained and there is no strain on the splices. A box, conduit body, or fitting having a separate bushed hole for each single conductor shall be provided where a change is made to a raceway system or metal-covered cable system.
Substantiation: This provision should apply to temporary wiring covered in 590.3(C) and Exception for 590.4(B), and for demolition, remodeling, repair, maintenance, as noted in 590.3(A), there should be no strain on open splices. 110.14(B) and 400.9 already apply. Flexible cord and cable should be specifically included and noted to comply with 400.3.
Panel Meeting Action: Reject
Panel Statement: There was no technical substantiation provided for any of the proposed changes. There also was no technical substantiation provided to expand this permitted use from construction sites to other types of temporary installations. There is no guarantee that other temporary installation sites will have qualified electricians installing and supervising the continuing maintenance of these circuits as will be done on construction sites. The suggested text in the comment referencing 400.3 is already required by any installation utilizing flexible cords or cables, therefore, adding it to 590.4 is unnecessary.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-63 Log #1184 NEC-P03 **Final Action: Reject**
(590.4(J))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-133
Recommendation: Accept the proposal with the following revisions:
Cable assemblies and flexible cords and cables that are used for branch circuits or feeders shall be securely supported and fastened in place by approved means and protected by location or other approved means.
Substantiation: The provision literally applies to flexible cords and cables supplying portable equipment. Support intervals have no direct relation to protection from damage. "Secured", "Securely", "Securing" are used in 110.13(A), 314.23(A), 320.30(A), 324.30, 330.30, 322.30, 334.30, 342.30, 344.30, 348.30, 350.30, 352.30, 355.30, 356.30, etc., without a Code definition of the terms.
Panel Meeting Action: Reject
Panel Statement: The submitter did not address any of the issues for the rejection as covered in the panel statement for Proposal 3-133. The purpose of the proposal and comment stage of the NEC is to provide technical substantiation justifying a proposed change in the NEC. This submitter has not provided any technical substantiation for these proposed changes.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-64 Log #762 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-135
Recommendation: Accept the proposal.
Substantiation: This article applies to more than construction, remodeling, repair, or demolition per 590.3(C), and should apply where emergencies, tests, experiments, etc. can involve wiring of a type not suitable for permanent installations.
Panel Meeting Action: Reject
Panel Statement: This submitter has not provided any technical substantiation for applying GFCI protection for all temporary installations.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-65 Log #1313 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: Andrew S. McConnell, Boyle Fredrickson SC
Comment on Proposal No: 3-140
Recommendation: Proposal 3-139 should be rejected.
Substantiation: 90.2 specifically defines the National Electrical Code as an installation code, and Article 90.1(c) specifically indicates the National Electrical Code is not intended as a design specification. However, the proposed change to 590.6 concerns the design of portable generators, not their installation. This is a substantial departure from the historical intent and purpose of the National Electrical Code.
Under conventional and accepted use of the Code for safe installation practices, the NFPA would not have product liability exposures in the event a manufacturer produce a product that possesses some hidden safety flaw,. However, under the proposed product design specification of 590.6, it is possible that the NFPA could be subjected to exposure in product liability litigation. For example, a manufacturer may comply with Code requirements and produce a generator with an on-board GFCI. In the event the configuration has a safety flaw and does not prevent all possible ground faults, resulting in injury or death, the NFPA could be named as a defendant in a product liability lawsuit because the generator was designed to the required design specifications of 590.6.
The NFPA should give careful thought to the significant departure in the intent and purpose of the National Electrical Code reflected by the proposed change to 590.6, and should avoid acting in a manner that could expose it to potential liability resulting from the specification of product design features.
Panel Meeting Action: Reject
Panel Statement: The requirements for GFCI protection on certain receptacles concerning portable generators does not deal with product design or product specification, any more than requiring a GFCI receptacle for a bathroom receptacle deals with product design. This deals with GFCI protection for personnel for any temporary power used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities no matter if the power originates from the power company or from a generator.

Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:

AYER, L.: While it may seem like a good idea at first, there are numerous issues that must be studied prior to requiring GFCI protection for all 125V 15A, 20A, and 30A receptacles on portable generators. This requirement should be rejected until these issues have been resolved.

First, OSHA requires GFCI protection for receptacles on generators that are larger than 5 kW. This is required since larger units can have capacitive coupling between the generator frame and the winding causing a shock hazard and a complete path for the current to flow back to the generator. Units smaller than 5 kW are less of a concern since there is less risk for capacitive coupling. Allowing the text to go through as written will create conflict with the OSHA standards.

There are numerous instances in which having GFCI protection may create more harm than good. Individuals use portable generators for a wide variety of reasons beyond providing power for electrical construction tools. Connecting a generator to power a furnace during an ice storm, or using a portable generator with 300 foot long extension cords to power temporary lighting may be an issue if GFCI protection is mandated. Inrush currents on motors and leakage currents in long extension cords may cause inadvertent nuisance tripping. Contractors and maintenance personnel should be afforded the opportunity to place GFCI protection at the best possible location given the situation for which the generator is being used.

Portable generators are used in harsh environments. It is quite realistic that a lifespan of a GFCI device would be shortened due to the harsh conditions in which it would operate. Should this requirement pass workers may rely more heavily on the perception that they are protected by the generator rather than providing cord sets and external GFCI receptacle devices. Cord sets and external GFCI receptacles are much more likely to be either be tested prior to use or be replaced on a more frequent basis.

A study completed by the Construction Safety Association of Ontario (CSAO) in 1997 reviewed two different grounding schemes for portable generators: floating-neutral and bonding-neutral. The floating neutral is used mainly for generators 5 kw or less. The study concludes that floating neutral generators should have GFCI protection closest to the tool being used while bonding-neutral generators can have GFCI protection at the generators. These differences do not bode well to required GFCI protection at all portable generators regardless if the neutral-ground bond exists.

EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.

OWEN, S.: I agree with Mr. Pauley's comment 3-83. It is not within the purview of CMP-3 to require GFCI protection as an integral part of a generator. Further, I do not believe that there is substantiation provided to warrant the changes proposed requiring GFCI protection to be an integral part of a generator. I wish to apply this reasoning for comments 3-65 through 3-80, and 3-82 through 3-89.

3-66 Log #1315 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: Andrew S. McConnell, Boyle Fredrickson SC
Comment on Proposal No: 3-139
Recommendation: Proposal 13-139 should be rejected.
Substantiation: 90.2 specifically defines the National Electrical Code as an installation code, and Article 90.1(c) specifically indicates the National Electrical Code is not intended as a design specification. However, the proposed change to 590.6 concerns the design of portable generators, not their installation. This is a substantial departure from the historical intent and purpose of the National Electrical Code.

Under conventional and accepted use of the Code for safe installation practices, the NFPA would not have product liability exposures in the event a manufacturer produce a product that possesses some hidden safety flaw,. However, under the proposed product design specification of 590.6, it is possible that the NFPA could be subjected to exposure in product liability litigation. For example, a manufacturer may comply with Code requirements and produce a generator with an on-board GFCI. In the event the configuration has a safety flaw and does not prevent all possible ground faults, resulting in injury or death, the NFPA could be named as a defendant in a product liability lawsuit because the generator was designed to the required design specifications of 590.6.

The NFPA should give careful thought to the significant departure in the intent and purpose of the National Electrical Code reflected by the proposed change to 590.6, and should avoid acting in a manner that could expose it to potential liability resulting from the specification of product design features.
Panel Meeting Action: Reject
Panel Statement: See the panel statement in Comment 3-65.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:

AYER, L.: See negative statement on comment 3-65.

EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.

OWEN, S.: See comment on 3-65.

3-67 Log #1414 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: James Hendricks, Hendricks Hardware Co.
Comment on Proposal No: 3-140
Recommendation: Delete 590.6(3) as follows:

~~590.6(3) Receptacles an 15 kW or less Portable Generators. All 120 and 120/240 volt, single phase, 15,20, and 30 ampere receptacle outlets that are a part of a 15 kW or smaller portable generator shall have listed ground fault circuit interrupter protection for personnel.~~
Substantiation: Most of the commercially available small inverter generators like the Honda EU2000 (Honeywell, ETQ, and Onan are just a few of the others) feature a floating neutral. Tens of thousands of these are sold every year. Adding a GFCI to the receptacles will serve no purpose, as it will be completely ineffective on a floating neutral generator because the ground and neutral are not tied together. How can the NEC mandate a "safety" measure that won't work?
Panel Meeting Action: Reject
Panel Statement: A GFCI receptacle monitors the amount of current that goes out on the ungrounded conductor and then comes back on the neutral conductor and if there is leakage of 6 milliamps or greater that does not come back through the GFCI comparison device, then the GFCI device will trip. GFCIs will trip without the benefit of an equipment grounding conductor path back to the source but obviously having a lower impedance path back to the source is much more desirable since the equipment grounding conductor path back to the frame of the generator and then back to the source on the system bonding jumper to the neutral provides a much lower impedance path.
Section 250.20(B)(1) requires any AC system of 50 volts to 1000 volts to be grounded where the system can be grounded so that the maximum voltage to ground on the ungrounded conductor does not exceed 150 volts. Section 250.20(D) requires any separately derived system, as covered by 250.20(B) to be grounded in accordance with 250.30(A) of which a portable generator would be covered under this section.
In addition, 250.34 does not require the frame of a portable generator to be connected to a grounding electrode if the portable generator supplies only equipment mounted on the generator, cord-and-plug-connected equipment through receptacles mounted on the generator, or both. In addition, the normally non-current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are required to be connected to the generator frame. This section does not state that floating the neutral in the generator is acceptable since the generator is a separately derived system and must have a system bonding jumper installed from the equipment grounding system in the generator to the grounded or neutral conductor within the generator.
The 1975 NEC Section 210-8(b) required "all 120-volt single phase 15 and 20 ampere receptacle outlets which are not part of the permanent wiring of the building or structure, shall have ground fault circuit interrupters for personnel protection." An exception was inserted into 210-8(b) that permitted "receptacles on a portable generator rated not more than 5 kW, where the circuit conductors of the generator are insulated from earth and the generator frame is insulated from earth and all grounded surfaces."
This section and exception was moved to 305-4(a) in 1984 and the text in the exception was changed to "receptacles on a 2-wire, single-phase portable or vehicle-mounted generator rated not more than 5 kW, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces" need not be GFCI protected. This exception existed with similar wording until the 2002 NEC when it was removed by Panel 3 from 527-6(A) with the intent to require GFCI protection of all generator receptacles based on temporary installations on constructions sites.
Section 406.3(B), Exception No. 1 permits receptacles mounted on portable and vehicle mounted generators to comply with 250.34 but does not permit the equipment grounding conductor to just connect to the frame of the generator since there must be a complete path for fault current back to the generator coils based on 250.20(B) and (D) as well as 250.30(A) as stated above. Section 250.21 and 250.22 do not permit an ungrounded neutral for a 120 and 120/240 volt system.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 10 Negative: 4
Explanation of Negative:

AYER, L.: See negative statement on comment 3-65.

CASPARRO, P.: This comment should have been accepted. What is at stake here is the safety of the construction worker on the job site. OSHA enforces the lack of GFCI protection on construction sites. We know lives have been saved by the use of GFCI's, we just don't know how many

EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.

OWEN, S.: See comment on 3-65.

3-68 Log #1598 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: Kurt von Eckroth, Eckroth Engineering, LLC
Comment on Proposal No: 3-139
Recommendation: This proposal should be rejected.
Substantiation: Please see below for substantiation to reject Proposals 3-139 and 3-140.

· According to 90.2 of the NEC, the NEC is an installation code, not a construction code. As an installation code, the NEC can mandate that a particular feature exists (a disconnect at a certain location, for example), but not how it is to be achieved (circuit breaker, switch, properly rated plug-and-connector, etc.). Therefore, while the NEC can mandate ground fault protection for particular circuits, it is not within its authority to mandate that ground fault protection be, necessarily, provided by a GFCI outlet **Integral** to the generator. There are many different ways to achieve ground fault protection (GFCI outlet, GFCI circuit breaker, GFCI cord set, portable personal GFCI protection device, etc.). The only way the Code can mandate integral GFCI outlets in generators is if it becomes a product design and performance code, and 90.2 clearly states it is not.

This change creates the following consequences:

· It would effectively eliminate all other forms of personal GFCI protection for personnel on jobsites (GFCI cord set, portable personal GFCI protection device, GFCI protected spider boxes, etc.), replacing all with a GFCI device installed in a high vibration and heat environment, and far removed from the point of ground-fault.

·It would mandate the use of a product that currently does not exist—a high vibration/high temperature hardened GFCI.

· It would effectively eliminate all floating neutral generators (the most common kind), as the generator-mounted GFCI will not function unless the neutral and the ground are bonded together at the generator.

· It would force all generators to be tied to their own 6-foot ground rod. Without it, the GFCI will not function.

· Present lethality rates are extremely low to nonexistent under the present system. Generators are often used under conditions of duress in hurricanes, tornadoes, earthquakes, and ice storms. Most are portable. To provide the consumer with power supplies not easily set up (a ground rod must be driven) serves no prudent purpose in such events and may well cause more deaths as a result of spoiled food, lack of light and/or heat. We can well imagine the local fire marshal shutting down small generator sets using new "The New Codes" and employing the "force of law."

· When not allowed to purchase and freely employ generators people will heat with open gas burners.

· Under conditions of emergency consider the downside to driving the required ground rod into a local utility; particularly a gas main. These rods ARE eight feet long! Will they wait for "Diggers Hotline"?

Panel Meeting Action: Reject
Panel Statement: See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-69 Log #1646 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: Michael Flegel, Reliance Controls Corporation
Comment on Proposal No: 3-140
Recommendation: Reject the proposal.
Substantiation: Statement of Problems Proposal 3-140

Substantiation for Problems 1, 2, 3, 6, 8 and 9 is listed below:

1. It is impossible to have a ground fault back to the generator if it is not bonded and grounded, so GFCI protection on the generator doesn't make sense since no requirement exists for bonding and grounding. In complex systems and in harsh environments, neutrals can be pulled to ground beyond the generator. GFCI protection on generators that are not bonded and grounded does not protect people against these ground faults but they may believe it does. This may encourage bad safety practices and/or discourage people from taking further steps to protect themselves against ground faults.

2. The bonding and grounding needed in Problem 1 will create ground fault hazards. Why intentionally create a hazard and then have to add a device to protect against it, especially when the added device is an electronic device on a piece of hot, vibrating equipment which adds to the likelihood of its failure? It makes more sense to float the system. A floating neutral portable generator without GFCI protection is safer than a bonded neutral portable generator with GFCI protection in stand alone applications even if the latter if properly grounded. There is no need to have GFCI protection in stand alone applications even if the latter is properly grounded. There is no need to have GFCI protection built into a floating neutral generator.

3. Stand alone portable generator applications currently used for Temporary Installations are not required to be grounded making GFCI protection more effective closer to the individual performing the work. The protection should not be on the generator.

4. In paragraph 590(A)(3) conflicts with the Exception in 590(A) in the Proposal. If the Temporary Installation is powered by a portable generator 15 kW or less, people cannot substitute an assured equipment grounding program in lieu of GFCI protection because no non-GFCI outlet is available on the generator.

5. 90.2 of the National Electrical Code states that the Code only covers the installation of electrical conductors, equipment, and raceways, etc. It does not cover the design of equipment such as having GFCI protection built into a portable generator. The Code can and does address the following installation aspects of a portable generator:

a. Adding downstream GFCI protection—Article 590 (2008)

b. Bonded or not bonded—There are several sections addressing Separately and Non-separately derived systems

c. Receptacles connected to the frame— 250.34

In each case, the Code does not dictate that the generator has these design features but rather it instructs on how to install it when a generator has these features. The NEC does not develop product standards for the equipment that is installed. The NEC can specify how to install a bonded neutral generator with GFCI protection, or a floating neutral generator without GFCI protection but it shouldn't require that the generator have the protection built in.

6. 590.6 requires receptacles, installed as part of the permanent wiring of the building or structure and that are used for temporary electric power, to have ground-fault circuit-interrupter protection for personnel. It allows the use of cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use to meet this requirement. It does not require people to replace permanently installed non-GFCI with GFCI receptacles in Temporary Installations. Why should permanently installed receptacles in portable generators be any different than those in a building or structure? If anything, the utility system has more reasons to replace non GFCI receptacles with GFCI protected receptacles because the system is always bonded and grounded.

7. 525.23 (C) clearly states that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected. The purpose of this is to assure that egress lighting is always available. Since egress lighting can be powered by portable generators at these sorts of events, the proposal will not allow compliance to this Article.

8. Off-generator GFCI protection adds an additional level of protection to all portable generator applications but yet the proposal infers it should not be used on generators manufactured after January 1, 2011.

9. The proposal has not substantiated a safety problem; it just incorrectly states there is one. GFCI protection on the generator would ensure that people would use it but is only effective if people properly bond and ground the generator and is not as effective as other alternatives as stated above in Problems 1 and 2 and 3. Generally people are more concerned about the live cords and devices they contact on a regular basis like the ones connected to the power tools they are using and the power tools themselves. This is where downstream, personal GFCI devices really are more effective in harsh environments. Power cords to distribution boxes are seldom handled, or seldom need to be handled, when they are under power.

Do you know for a fact that the current safety record isn't due to the fact that very few portable generators are grounded and has nothing to do with the fact that some have GFCI protection or that people use other forms of GFCI protection with them**? Isolation is a powerful safety device and should not be ignored. Isolation and the extra protection of downstream GFCI protection is even better and it is essentially what is being done today since the generator is not required to be grounded.** Has somebody provided data to show that what is being done now is not safe?

Bonding and Grounding—Utility vs. Portable Generators

OSHA requires bonded neutral generators in their regulations for construction sites. In reading these regulations, they appear to be identical to the NEC requirements except for this bonding requirement. The interpretation in Appendix A explains their position. To completely understand OSHA's response, please read the request letter by Mr. Iwasa. It appears OSHA incorrectly interprets the NEC. It says a generator in stand alone use is a separately derived system (see Article 100) and as such needs to be bonded. Please note the interpretation does not have any safety arguments other than misinterpreting the NEC which leaves it with no technical merit. As such it has no relevance in this discussion.

Generators used in simple stand alone applications, operate in a much different environment than a premises wiring system being fed from the utility. There is no huge generator capable of outputting high fault current, no transformers and switchgear, and no large, elevated distribution system subject to lightning strikes all of which can create surges in the system. Such surges must be addressed through bonding and grounding rather than having them go through appliances and endanger safety. The reason for bonding and grounding is substantially reduced when utility power is removed. As a matter of fact, Article 250 agrees and does not require the grounding of a generator in stand-alone applications. This allows a floating system using either floating neutral generators or bonded-neutral generators that are not grounded.

Bonding and grounding have some pitfalls that are tolerated in order to get the desired protection described above from utility systems. **A bonded and grounded system creates numerous pathways for current to flow back to the power source (substantiation for Problem 6). These include the ground, and any metal object connected to the ground such as plumbing fixtures and popes and heating ducts. If someone comes in contact with a hot wire from the power source and one of these objects, the circuit is completed with disastrous results to the individual.** In fact, people did realize that these pitfalls created very dangerous situations for premises wiring systems. Products and systems were developed to mitigate the safety risks. Grounding wires were added to appliance plugs and grounding terminals were added to receptacles so that a hot wire faulting to the case of an appliance would cause a short, tripping the circuit breaker. This protected the user in case he touched the case and one of the extensive return paths to the power source created by bonding and grounding the system. The GFCI was invented to interrupt the current flow when the current out of a receptacle isn't the same amount as the returning current. If it isn't returning thro ugh the receptacle, then it probably is returning through a person that is touching one of those many objects that have a path back to the power source, again, as a result of bonding and grounding the system.

Why create a more dangerous situation by connecting multiple objects to a return path back to the source if there are no advantages in doing so like in stand alone portable generator applications? Some people would argue that the devices used to protect people in bonded and grounded systems no longer would work in a floating situation. **This is true but they fail to understand they are not necessary.** The circuit breaker tripping in the fault-to-case example above and the GFCI protection are two of the safety devices in bonded and grounded systems mentioned earlier. In the first case, the fault to the case represents only a connection of the person to one wire from the source in a floating system. Because there is no path back to the source, the individual holding the tool is not injured. Similarly, a GFCI would never trip because there is never a ground path available back to the generator i.e. a ground fault can never occur back to the source. **This truly is a paradigm shift in the way we think about electrical systems and it is important for people to understand they have to look at portable generator applications differently.**

Temporary Installations

For the casual user such as a camper of home owner working in the back yard, the floating neutral generator is the safest and most cost effective application that does not require additional ground fault protection using GFCIs. But what about harsher environments where multipoint failures occur like in more complex systems such as Temporary Installations? **The floating system still seems to be the safer of the two alternatives as shown in Appendix B (substantiation for Problems 1, 2, and 9).** As you know, Temporary Installations can have lots of exposed cords that come in contact with exposed beams, piping, sharp objects and other metal objects that create a higher probability that neutral will be pulled to ground somewhere in the system. Article 590 wisely requires GFCI protection on receptacles. If the receptacles do not have GFCI protection, people must use GFCI protection that is built in to extension cords or other GFCI devices. No doubt this is an excellent idea for installations using grounded and bonded utility power but is it really necessary for the protection to be built into portable generators? The answer depends on whether the generator is bonded and grounded. If it is, then the GFCI protection on the generator is needed but grounding the generator is unlikely since the NEC does not require it. If not grounded, the protection is unnecessary on the generator because you have a system that does not intentionally create any paths back to the source. If you are concerned that a neutral to ground fault would likely occur downstream from the generator receptacle because of the harsh environment, then adding GFCI protection with cord devices or other downstream GFCI devices is a good idea. See Figure supplied as supporting material.

The Figures also demonstrate that the closer the GFCI protection is to the person in a floating system, the more protection that person has (substantiation for Problems 3 and 8). A Temporary Installation should be either a bonded and grounded system with GFCI protection on the generator or a floating system without GFCI protection on the generator. For both and depending on the harshness of the environment, one may consider having additional ground fault protection close to the workers either in a distribution box in which the tools they are using are plugged or in belt mounted GFCIs. **The extra protection would protect them in the grounded system in case the GFCI on the generator failed or if the generator was not properly grounded and a neutral was accidentally pulled to ground elsewhere in the system. It would protect them in the floating system in case a neutral was accidentally pulled to ground in the system (substantiation for Problems 8 and 9)**

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-70 Log #1655 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: Nick Weinkauf, Industrial Sales Tech Inc.
Comment on Proposal No: 3-140
Recommendation: This proposal should be rejected.
Substantiation: GFCI protection integral to a generator may not necessarily ensure adequate personnel protection. In particular, a poorly grounded bonded-neutral generator may not provide a ground path adequate to allow the GFCI to trip. In such cases, a user would mistakenly be led to believe that he was adequately protected when, in fact, he was not. GFCI protection, when required by Code, is beset provided independently of the generator.
Panel Meeting Action: Reject
Panel Statement: See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-71 Log #2003 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: Jerry Qian, All Power America
Comment on Proposal No: 3-140
Recommendation: Proposal 3-140 should be rejected entirely.

Proposal 3-140 will add this Article to the NEC:

590.6(3). Receptacles on 15 kW or less Portable Generators used in Temporary Installations.

We have been made aware that this pending code proposal will require GFCI protection to be integral to all portable generators smaller than 15 kW, regardless of whether or not GFCI protection will perform as intended.

Proposal 3-140 should be rejected entirely.

Proposal 3-140 will the following to the NEC:

590.6(3). Receptacles on 15 kW or less Portable Generators used in Temporary Installations.

We have been made aware that this pending code proposal will require GFCI protection to be integral to all portable generators smaller than 15 kW, regardless of whether or not GFCI protection will perform as intended.

Substantiation:

Proposal 3-140 should be rejected entirely for the following reasons, including but not limited to:

1. GFCIs on generators will not function reliably unless the neutral and ground conductors are connected to a functional grounding system, which they generally are not.

The NEC does not require the grounding of portable generators when used in stand-alone applications. This becomes extremely important for workers at temporary installations, where GFCI protection is required by the NEC. In such cases, ineffective protection given by the GFCI protection on the portable generator can mistakenly lead personnel to believe that they are protected by the generator GFCI, and discontinue the use of personal or other supplemental GFCI protection that has kept them safe for years. This could be a serious mistake.

2. This Proposal would create at least two Code conflicts.

525.23(C) clearly states that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected. The purpose of this is to assure that egress lighting is always available. Since egress lighting is often powered by portable generators at these sorts of events, the proposed additional Articles cannot mandate GFCI outlets on portable generators.

In addition, proposed 590.6(A)(3) and the Exception under 590.6(A) are mutually exclusive. The Exception allows 590.6(B)(2) under circumstances that are "not compatible with GFCI protection" but the proposal does not provide for a portable generator where non-GFCI protection is allowed.

3. If floating neutral generators are used, there is no need for the GFCI.

In a system as complex as premises wiring, full isolation is not possible, and the reasons for grounding such unique electrical systems are spelled out in 250.4(A)(1). In such a case, the GFCI is necessary to protect the user from being injured or killed by the utility power since exposed metal parts are intentionally electrified through the bonding and grounding process. However, with a stand-alone portable generator, bonding and grounding is not required by the NEC, and full isolation is easily achievable. Therefore, public safety for portable generators is best served by protecting the user through the use of simple, dependable basic insulation and isolation, instead of through a process that deliberately:

(a) creates a ground path,
(b) allows the electrocution to begin and then,
(c) attempts to stop it before lethality is complete using a complicated and fragile electronic sensing and interrupting device.

Quite simply, if there is no ground fault path, then there can be no ground fault.

4. This proposal is clearly outside of the scope of the National Electrical Code.

UL addresses applications of small portable generators such as lighting on camp sites, powering table saws and hand-held tools, and so on. However, 90.2 of the National Electrical Code states that the Code only covers the installation of electrical conductors, equipment, and raceways, etc. It does not cover electrical equipment that is not installed. Neither the portable generator used in a stand-alone application nor the appliances it powers are installed. As a result, the NEC clearly has no jurisdiction over portable generators used in stand-alone applications.

5. The NEC cannot mandate design or construction requirements for equipment.

As an installation code, the NEC can mandate that a particfular feature exists (disconnect at a certain location, for example), but not how it is to be achieved (circuit breaker, switch, properly rated plug-and-connector, etc.). Therefore, while the NEC can mandate ground fault protection for particular circuits, it is not within its authority to mandate that said ground fault protection must be provided by a GFCI outlet integral to the generator.

We believe that this proposal is ill-conceived (even though well-intended) and will lead to confusion at the user level, will not improve portable generator safety as intended, or are better addressed by existing code requirements.

Panel Meeting Action: Reject
Panel Statement: See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-72 Log #2126 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: Lora Christensen, Reliance Controls Corp.
Comment on Proposal No: 3-140
Recommendation: Revise text to read as follows:

(3) Receptacles on 15 kW or less Portable Generators. All 125-volt and 125/250-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are a part of a 15 kW or smaller bonded-neutral portable generator shall have listed ground-fault circuit interrupter protection for personnel. Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be ~~permitted~~ required for use with ~~15kW or less~~ all portable generators ~~manufactured or remanufactured prior to January 1, 2011~~ except bonded-neutral generators with built in GFCI protection that are grounded in accordance with Article 250.

Substantiation: If there is no neutral connection to the ground, ground faults back to the source are impossible. Bonded-neutral generators have the frame of the generator tied to the neutral of the generator but if the frame is not properly grounded, no path exists for ground faults. Floating-neutral generators only have the grounding conductors tied to the frame isolating the neutral from any contact with the ground, even if the generator is grounded. No need to have GFCI protection built into a floating neutral generator. There is a need for a bonded-neutral generator but only if it is properly grounded. Since neutrals can be pulled to ground away from the generator in harsh applications, the use of off-generator GFCI protection should be encouraged for all generators not grounded, whether or not the generator has GFCI protection built in.

Panel Meeting Action: Reject
Panel Statement: See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-73 Log #2185 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: Jeffrey Flegel, Reliance Controls Corp.
Comment on Proposal No: 3-140
Recommendation: This proposal should be rejected.
Substantiation: This proposal will cause mass confusion in the marketplace. The installed base of double-pole, 120/240V manual transfer switches will not operate with generators with GFCI outlet protection and with the neutral bonded to the generator frame. Hundreds of thousands of double-pole manual transfer switches would be rendered inoperable and require replacement with more expensive three-pole transfer switches. These applications go far beyond home standby use and agricultural applications. For example, from New York to Florida, traffic signals along storm and flood evacuation routes are equipped with manual transfer switches that will not work with GFCI protected portable generators. Many of these routes are critical for Homeland Security and may be subject to the requirements of Article 708. Therefore, the NEC should consider the severe economic and safety impact on the public sector and reject this proposal.

Panel Meeting Action: Reject
Panel Statement: The requirement in 590.6 only applies to generators used for temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities and would not apply to home standby power and agricultural applications. See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-74 Log #2517 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: Bill Johnson, Champion Power Equipment
Comment on Proposal No: 3-140
Recommendation: Reject Proposal 3-140.
Substantiation: Requiring the addition of GFCI receptacles to portable generator panels rather than relying on GFCI cord sets may introduce safety hazards. GFCI receptacles are not reliable when exposed to the vibration and environment of portable generators powered by single cylinder reciprocating engines. Loss of electrical power to lighting (visibility) or power to tools caused by false tripping of generator mounted GFCI receptacles can create safety hazards. Also, panel mounted GFCI receptacles require bonding one hot leg of a 2-wire single phase 120 volt generator output to the generator frame in order to sense a ground fault. Many portable generators are designed for other markets, including emergency back up power and recreational activity. The use of floating neutrals in these applications is common in order to eliminate a return path, preventing an otherwise lethal condition in the event of an equipment short circuit. There is no guarantee that these floating neutral generators will not end up at job sites with GFCI receptacles installed, resulting in a false sense of security and a safety hazard.

Panel Meeting Action: Reject
Panel Statement: The requirement in 590.6 only applies to generators used for temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities and would not apply to other applications. See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-75 Log #2520 NEC-P03 **Final Action: Reject**
(590.6)

Submitter: James Jongkind, American Honda Motor Co., Inc.
Comment on Proposal No: 3-140
Recommendation: Please do not accept the proposal as it could be misinterpreted as requiring that all portable generators be installed with GFCls as original equipment. Mandatory wide-spread application of GFCls to portable generators could have serious unintended consequences.
Substantiation: This section already wrongly requires floating neutral generators to utilize GFCls when used for temporary power during certain professional use activities. See also
comment to Proposal 3-19. The proposal requires that GFCls be located at the source, but it does not clarify that this is an installation requirement in as much that an approved corded GFCI can satisfy the requirement.

Panel Meeting Action: Reject

Panel Statement: See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-76 Log #2448 NEC-P03 **Final Action: Reject**
(590.6(3))

Submitter: Jack Mandula, GenTran Corp.
Comment on Proposal No: 3-140
Recommendation: Delete entire proposal.
Substantiation: 1. Portable generators 15kW or smaller with GFCI protection will not operate with the installed base of non-automatic transfer switches used for standby power applications. Over 3/4 of portable generators sold are used at one time or another for standby power applications, connected to a manual transfer switch, to provide standby power to buildings. Adopting the proposal will create field user issues not solvable without modification to existing, installed equipment.

2. GFCIs on portable generators will not operate properly unless the generator ground and neutral are connected to grounding system, which is not required by the NEC in temporary applications, leading to false sense of security and defeating the possible GFCI protection benefits.

3. This proposal is not within the scope of the NEC. The NEC covers the installation, not the design of equipment. This proposal attempts to mandate certain designs for portable generators, the NEC does not apply.
Panel Meeting Action: Reject
Panel Statement: The requirement in 590.6 only applies to generators used for temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities and would not apply to other applications. See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-77 Log #2522 NEC-P03 **Final Action: Reject**
(590.6(3))

Submitter: Stewart Cleveland, Exhibit Logistics LLC
Comment on Proposal No: 3-139
Recommendation: Delete as follows:
~~590.6 (3) Receptacles on 15 kW or less Portable Generators. All 120 and 120/240 volt, single phase, 15, 20, and 30 ampere receptacle outlets that are a part of a 15 kW or smaller portable generator shall have listed ground-fault interrupter protection for personnel.~~
Substantiation: In the field, we have to be able to decide where GFCI protection is necessary or required and where it is required that we don't use it. 525.23 specifically prohibits use of GFCIs for egress lighting, and we commonly use portable generators for this purpose. Where GFCI protection is necessary, there are many commercially available GFCI solutions that can be installed close to the generator without being mounted on it. While well intentioned, the authors of this proposal have not thought through all of the far-reaching implications of this change or even considered conflicts with other parts of the NEC. Please strike this paragraph to avoid many problems.
Panel Meeting Action: Reject
Panel Statement: The requirement in 590.6 only applies to generators used for temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities and would not apply to other applications, such as carnivals and fairs. See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-78 Log #2523 NEC-P03 **Final Action: Reject**
(590.6(3))

Submitter: Stewart Cleveland, Exhibit Logistics LLC
Comment on Proposal No: 3-140
Recommendation: Delete text as follows:
~~590.6 (3) Receptacles on 15 kW or less Portable Generators. All 120 and 120/240 volt, single phase, 15, 20, and 30-ampere receptacle outlets that are a part of a 15 kW or smaller portable generator shall have listed ground fault circuit interrupter protection for personnel. Listed cord sets or devices incorporating listed ground fault circuit interrupter protection for personnel identified for portable use shall be permitted for use with 15 kW or less portable generators manufactured or remanufactured prior to January 1, 2011.~~
Substantiation: In the field, we have to be able to decide where GFCI protection is necessary or required and where it is required that we don't use it. 525.23 specifically prohibits use of GFCIs for egress lighting, and we commonly use portable generators for this purpose. Where GFCI protection is necessary, there are many commercially available GFCI solutions that can be installed close to the generator without being mounted on it. While well intentioned, the authors of this proposal have not thought through all of the far-reaching implications of this change or even considered conflicts with other parts of the NEC. Please strike this paragraph to avoid many problems.
Panel Meeting Action: Reject
Panel Statement: The requirement in 590.6 only applies to generators used for temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities and would not apply to other applications, such as carnivals and fairs. See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-79 Log #2524 NEC-P03 **Final Action: Reject**
(590.6(3))

Submitter: Howard Heaner, Howard Electric
Comment on Proposal No: 3-140
Recommendation: Delete as follows:
~~590.6 (3) Receptacles an I5 kW or less Portable Generators. All 120 and 120/240 volt, single phase, I5,20, and-30 ampere receptacle outlets that are a part of a 15 kW or smaller portable generator shall have listed ground fault circuit interrupter protection fur personnel. Listed cord sets or devices incorporating listed ground fault circuit interrupter protection for personnel identified for portable use shall be permitted for use with 15 kW or less portable generators manufactured or remanufactured prior to January 1, 2011.~~
Substantiation: This would create a real mess. In the field, we use personal GFCI protection with portable generators because the safest place for it is as close to the user as possible. This is common knowledge and common practice. The proposal moves the GFCI as far away from the user as possible and suggests that personal protection is no longer necessary. How are we supposed to know when a generator was manufactured? There is no date on them. And what about floating neutral generators? The GFCIs won't work. This irresponsible proposal jeopardizes my safety by moving the GFCI away from me and leaving unanswered questions about implementation and enforcement
Panel Meeting Action: Reject
Panel Statement: The requirement in 590.6 only applies to generators used for temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities and would not apply to other applications. There is no restriction in the NEC that would keep someone from also using portable personnel protection in addition to the GFCI requirement on the generator. Manufacturers of motors and countless other electrical appliances mark manufacturing dates on nameplates to indicate the date of manufacture of the equipment. See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-80 Log #1413 NEC-P03 **Final Action: Reject**
(590.6(3))

Submitter: James Hendricks, Hendricks Hardware Co.
Comment on Proposal No: 3-139
Recommendation: Delete 590.6(3) as follows:
~~590.6(3) Receptacles on 15 kW or less Portable Generators. All 120 and 120/240 volt, single phase, 15,20, and 30 ampere receptacle outlets that are a part of a 15 kW or smaller portable generator shall have listed ground fault circuit interrupter protection for personnel.~~
Substantiation: Most of the commercially available small inverter generators like the Honda EU2000 (Honeywell, ETQ, and Onan are just a few of the others) feature a floating neutral. Tens of thousands of these are sold every year. Adding a GFCI to the receptacles will serve no purpose, as it will be completely ineffective on a floating neutral generator because the ground and neutral are not tied together. How can the NEC mandate a "safety" measure that won't work?
Panel Meeting Action: Reject
Panel Statement: See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA's Explanation of Negative on Comment 3-83.
OWEN, S.: See comment on 3-65.

3-81 Log #1229 NEC-P03 **Final Action: Accept in Principle**
(590.6(A))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 3-141
Recommendation: This Proposal should be accepted to add new text to the requirement in Section 590.6(A).
Substantiation: Receptacles provided with equipment such as portable generators in temporary installations require the same degree of protection as for fixed installations according to 406.8. UL 2201, Portable Engine-Generator Assemblies, First Edition dated March 4, 2009, is up to date on the requirements of 406.8, requiring that all "15- and 20-A, 125 and 250 V non-locking receptacles shall be of the weather resistant type". UL 2201 also requires, in clause 15.7.6, that "Receptacles shall be protected from exposure to weather". The requirements in 406.8(A) provide the appropriate requirements to support the standard.

The Panel statement that this requirement would be "unenforceable" seems to imply that the protection needs to be added to the generator at the point of use. In fact, with the force of the Code, generator manufacturers and producers of other separately derived equipment would be compelled to provide the required protection, and thus the degree of safety required by 406.8. NEMA would like to point out that thousands of portable engine-generators are purchased by the general public each year. The requirement described in the new UL 2201 standard for portable generators is an example of how this standard has anticipated the necessity of this Code direction.
Panel Meeting Action: Accept in Principle

Add the following revised text as a second sentence to the accept in principle text 590.6(A)(3) in Proposal 3-140 to read as follows: All 15- and 20-ampere, 125- and 250-volt receptacles, including those that are part of a portable generator, used in a damp or wet location shall comply with Section 406.8(A) and (B).
Panel Statement: The word "all" provides an adjective to start the sentence, rather than a number, and the word "Section" has been deleted in compliance with the NEC Style Manual. Specific subsections (A) and (B) were added since most portable generators would not be applicable for 406.8(C) through (E). The panel added "including those that are part of a portable generator", and "used" instead of "installed" to more accurately reflect the scope of the equipment covered.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

3-82 Log #2701 NEC-P03 **Final Action: Reject**
(590.6(A))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 3-142
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: On page iii of the UL Research Report, preliminary testing was conducted on prototype samples submitted to UL. The testing demonstrated the ability of the PSP receptacle prototypes to detect an overheating condition occurring at the receptacle contacts and terminals at an early stage. Due to the limited number and prototype nature of the PSP receptacle specimens provided, a comprehensive safety evaluation was not possible.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
OWEN, S.: See comment on 3-65.

3-83 Log #1593 NEC-P03 **Final Action: Reject**
(590.6(A)(3))

Submitter: Jim Pauley, Schneider Electric
Comment on Proposal No: 3-140
Recommendation: Delete the section (3) added in the panel action text.
Substantiation: CMP 3 has stepped out of their scope with this requirement. The issue of whether or not a generator should have GFCI provided as part of the generator set is rightly under the purview of CMP 13 with Article 445 that covers generators. As it stands, CMP 3 has written a requirement that is in conflict with the provisions under review by CMP 13.

The issue for CMP 3 is ensuring that GFCI protection is provided for the worker under temporary wiring installations. Whether that is provided with a GFCI as part of the generator set or a GFCI that is part of the cord set, or a GFCI that is part of a spider box arrangement should not matter to the panel. As long as the GFCI is anywhere between the person being protected and the source of power, the GFCI can do its job.

Adding a requirement for GFCI protection as part of the generator creates a number of other issues that should not be ignored. Because of Y2K, ice storms, hurricanes and other natural disasters the industry has worked hard to get users to install proper transfer equipment so that generators can be connected. The vast majority of these installations are installed with a solidly grounded (not switched) neutral. When the portable generator with GFCI is properly connected to the transfer equipment, the GFCI will trip due because it will see a grounded neutral downstream. So the result then becomes using extension cords from the generator into the house, removing the equipment grounding connection and isolating the generator from ground to avoid in order to keep the GFCI from tripping.

CMP 3 should stick with their basic requirement that the receptacle being used for the temporary wiring must have GFCI protection and not attempt to be specific as to where that protection must be provided.
Panel Meeting Action: Reject
Panel Statement: In the 1984 NEC process, Section 210-8(b) and the exception covering the exclusion of GFCI protection on 5 kW and smaller portable generators was moved to 305-6(a) and came under the jurisdiction of Panel 3. The exception stated as follows: "Receptacles on a 2-wire, single-phase portable or vehicle-mounted generator rated not more than 5 kW, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces." The text clearly addresses receptacles on the 5 kW and smaller generator not being required to have GFCI protection. This exception was removed by Panel 3 during the 2002 NEC with the intention of requiring all sizes of generators and all sources of power on construction sites to have GFCI protection for personnel and this was further reinforced in the last sentence in 590.6 as follows: This section shall apply to power derived from an electric utility company or from an on-site generated power source." To say that Panel 3 does not have jurisdiction over this issue for temporary construction sites and that it is outside the scope of Panel 3 would mean that none of the actions or involvement of Panel 3 since it was moved into Article 305, 527, or 590 was correct. The text in the 1983 TCR stated that the NEC TCC was transferring GFCI requirements and the exception for 5 kW and smaller generators for construction sites to Article 305 and Panel 3.
See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: Neither the code nor the proposal contains any grounding requirements for a generator in stand alone use. Without grounding, a ground fault back to the generator is impossible so that the GFCI protection on the generator is useless and so it should not be required. Grounding away from the generator in Temporary Installations can occur by a neutral contacting the ground downstream from the generator. GFCI protection on the generator will protect no one in this instance and will be useless. People seeing GFCI on the generator will make no further effort to protect themselves.

There is a correlation issue that should be addressed by the TCC. The requirements for a generator itself belong to CMP 13 and not CMP 3. CMP 3 should only specify that GFCI protection is required and the protection can be provided in various ways.

No substantiation was provided suggesting that a safety problem exists with the way portable generators are now used in Temporary Installations nor was substantiation provided to show that proposal 3-140 will improve safety.

The panel members considered only grounded systems and did not consider a floating system.

OWEN, S.: See comment on 3-65.

3-84 Log #1659 NEC-P03 **Final Action: Reject**
(590.6(A)(3))

Submitter: Bryan Landerman, Milwaukee, WI
Comment on Proposal No: 3-140
Recommendation: This proposal should be rejected.
Substantiation: Proposed 590.6(A)(3) and the Exception under 590.6(A) are contradictory. The Exception allows "an assured equipment grounding program as specified in 590.6(B)(2)" under circumstances that "would create a greater hazard if power were interrupted or having a design that is not compatible with GFCI protection." The proposal does not provide for a portable generator where GFCI protection is not present.
Panel Meeting Action: Reject
Panel Statement: Section 590.6(A)(3) and the exception in 590.6(A) are not contradictory since there are many generators on job sites that are larger than 15 kW and would not be required to comply with 590.6(A)(3) and could use the assured grounding program. See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA Explanation of Negative on comment 3-83.
OWEN, S.: See comment on 3-65.

3-85 Log #1660 NEC-P03 **Final Action: Reject**
(590.6(A)(3))

Submitter: Erv Meier, Brookfield, WI
Comment on Proposal No: 3-140
Recommendation: This proposal should be rejected.
Substantiation: There is a large installed base of transfer switches for switching only the hot leg of a 120 volt utility and portable generator source. These appear in numerous municipal and state traffic signal installations that have been designed for portable generator backup during a power outage, many of which are located on hurricane evacuation routes. GFCI receptacles on bonded neutral generators will trip if an attempt is made to use them on these systems, thereby creating the possibility of a safety threat far more serious than that which the GFCI is intended to prevent. GFCI protection, when required by the Code, can be easily added independent of the generator.
Panel Meeting Action: Reject
Panel Statement: The requirement in 590.6 only applies to generators used for temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities and would not apply to other applications. See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA Explanation of Negative on comment 3-83.
OWEN, S.: See comment on 3-65.

3-86 Log #1874 NEC-P03 **Final Action: Reject**
(590.6(A)(3))

Submitter: Robert Hamilton, Osprey, FL
Comment on Proposal No: 3-140
Recommendation: Delete text.
~~**590.6(A)(3) Receptacles on 15kW or less Portable Generators.** All 125 volt and 125/250 volt, single phase, 15, 20, and 30 ampere receptacle outlets that are a part of a 15 kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel. Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15 kW or less portable generators manufactured or remanufactured prior to January 1, 2011.~~
Substantiation: This proposal should be rejected. Here in Florida, there are many single pole transfer switches installed by municipalities and the state for backup 120-volt generator control of traffic signals. The GFCIs on bonded-neutral generators will trip if used under these circumstances, thereby, causing a loss of generator power and resulting in consequences that could be far more serious than those which the GFCI was intended to prevent, especially during an emergency evacuation.
Panel Meeting Action: Reject
Panel Statement: The requirement in 590.6 only applies to generators used for temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities and would not apply to other applications. See the panel statement in Comment 3-67.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA Explanation of Negative on comment 3-83.
OWEN, S.: See comment on 3-65.

3-87 Log #1877 NEC-P03 **Final Action: Reject**
(590.6(A)(3))

Submitter: David Flegel, Reliance Controls Corp.
Comment on Proposal No: 3-139
Recommendation: Delete text.
~~**590.6(A)(3) Receptacles on 15kW or less Portable Generators.** All 125 volt and 125/250 volt, single phase, 15, 20, and 30 ampere receptacle outlets that are a part of a 15 kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel.~~
Substantiation: 590.6(A)(3) should be rejected. 590.6(A)(3) and 590.6(A)(4) are mutually exclusive. 590.6(A)(4) allows 590.6(B)(2) under circumstances that are "not compatible with GFCI protection," but the proposed 590.6(A)(3) does not provide for a portable generator where non-GFCI protection is allowed. Additionally, this proposal conflicts with 525.23(C) which requires that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected.
Panel Meeting Action: Reject
Panel Statement: Section 590.6(A)(3) and (A)(4) are not mutually exclusive since there is not a 590.6(A)(4). See the panel statement in Comments 3-67 and 3-78.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:
AYER, L.: See negative statement on comment 3-65.
EASTER, L.: See NEMA Explanation of Negative on comment 3-83.
OWEN, S.: See comment on 3-65.

3-88 Log #1878 NEC-P03 **Final Action: Reject**
(590.6(A)(3))

Submitter: David Flegel, Reliance Controls Corp.
Comment on Proposal No: 3-140
Recommendation: Delete text.
~~**590.6(A)(3) Receptacles on 15kW or less Portable Generators.** All 125 volt and 125/250 volt, single phase, 15, 20, and 30 ampere receptacle outlets that are a part of a 15 kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel. Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15 kW or less portable generators manufactured or remanufactured prior to January 1, 2011.~~
Substantiation: This proposal should be rejected for the following reasons:

1) 590.6(A)(3) and the exception under 590.6(A) are mutually exclusive. The exception allows 590.6(B)(2) under circumstances that are "not compatible with GFCI protection," but the proposal fails to allow for a small portable generator where GFCI protection is not present.

2) There is no means for a user or AHJ to determine a generator manufacture date, and no proposal to require such a date to be shown. As such, any reference to a generator manufacture date is meaningless.

3) This proposal conflicts with 525.23(C) which requires that egress lighting circuits for carnivals, circuses, fairs, and similar events cannot be GFCI protected. Small portable generators are frequently used in this type of application.

4) It is doubtful that GFCI protection would be at all effective if a generator is not properly grounded, and there is no provision in the code to require grounding [see 250.34(A)]. This is hardly comforting for the user and certainly not an improvement over existing code requirements for GFCI protection.

5) 90.1(C) clearly states that the Code is not intended as a design specification. Accordingly, the Code is clearly not intended to direct a manufacturer to design their product in a particular manner, including making GFCI outlets integral to a generator. This proposal should be rejected at least until all the negative consequences of undertaking the responsibilities of product design are thoroughly evaluated.

6) There is a very large installed base of municipal traffic signal transfer switches that are single-pole 120-volt. A bonded neutral generator with GFCIs integral to the generator will not work in these applications. This is because generator bonding will cause a small amount of current to return to the generator through the grounding conductor, creating an imbalance that will always trip the GFCI. Thus, GFCIs under power will not be able to establish a non-tripped condition. Failure to establish temporary backup power for traffic signals (particularly those located on emergency evacuation routes) would disrupt "public health and safety", a condition that is not permitted under the scope of 708.1.

7) This proposal should be rejected at least until all the conflicting issues, a number of which have been described above, can be examined. The use of portable generators for a variety of power purposes (stand-alone, temporary, stand-by, etc.) and at a variety of locations, creates a variety of situations that are at the same time simple, complex, common, and unique. All are addressed in at least two sections, and maybe more, of the Code. Declaring that all small portable generators be integrally GFCI-equipped (especially without substantiating that any electrical ground-fault safety problem with non-GFCI-equipped generators exists) is premature, and time should be taken to examine closely all the conflicting issues.

Panel Meeting Action: Reject

Panel Statement: Section 590.6(A)(3) and the exception in 590.6(A) are not mutually exclusive since there are many generators on job sites that are larger than 15 kW and would not be required to comply with 590.6(A)(3) and could use the assured grounding program. Manufacturers of motors and countless other electrical appliances mark manufacturing dates on nameplates to indicate the date of manufacture of the equipment. See the panel statement in Comment 3-67.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

AYER, L.: See negative statement on comment 3-65.

EASTER, L.: See NEMA Explanation of Negative on comment 3-83.

OWEN, S.: See comment on 3-65.

3-89 Log #1879 NEC-P03 **Final Action: Reject**

(590.6(A)(3))

Submitter: David Flegel, Reliance Controls Corp.

Comment on Proposal No: 3-140

Recommendation: Revise to read as follows:

590.6(A)(3) Receptacles on 15kW or less Portable Generators. All 125 volt ~~and 125/250 volt,~~ single phase, -15, -20, and 30-ampere receptacle outlets that are a part of a 15 kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel. ~~Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15 kW or less portable generators manufactured or remanufactured prior to January 1, 2011.~~

Substantiation: 1) As written, this proposal conflicts with Proposal 13-19, which intentionally does not require GFCI protection on 20- and 30-ampere 125/250 volt receptacles. This is specifically for the purpose of permitting a portable generator to be used for supplying power to a residential or small commercial system during a utility power outage according to text that appears in the substantiation:

"By limiting GFCI protection only to 15, 20-, and 30-ampere, single phase, 120 volt circuits, these small portable generators can still be used for supplying standby power for non-GFCI protected 20- and 30-ampere, and larger 120/240 single phase, 3-wire with ground... for houses and small commercial buildings. " While Proposal 13-19 and its substantiation may not appear to have an impact on Proposal 3-140, the fact remains that this will lead to considerable confusion in the marketplace. It will be quite possible to have two identical-appearing portable generators, one with GFCI protection on the 125/250 volt twistlock, and the other without.

2) All other means of supplemental GFCI protection for personnel should then continue to be allowed in view of the fact that the 125/250-volt receptacle is not GFCI protected.

3) There is a huge installed base of 2-pole residential transfer switches used for establishing a non separately derived system with a floating neutral portable generator. Generator manufacturer research has shown that the most common application for portable generators is for home standby systems (in excess of 70% of small portable generators sold.) A bonded neutral generator with GFCIs integral to the generator will not work at all on these systems. This is because generator bonding will cause a small amount of current to return to the generator through the grounding wire, causing an imbalance that will always trip the GFCI. Thus, GFCIs under power will not be able to establish a non-tripped condition. At a minimum, some provision should be made to allow for a non-GFCI protected 125/250 volt twist lock outlet which would then allow a generator to be used in this type of application.

Panel Meeting Action: Reject

Panel Statement: The requirements in the accept in principle in Proposal 3-140 are not in conflict with Proposal 13-19 since Proposal 3-140 applies only to construction installations and not to optional standby power for commercial and residential applications. A generator manufacturer may elect to manufacture a construction site generator and an optional standby power generator. The optional standby generator would not require GFCI protection on 30 ampere 125/250 volt four-wire power wiring to a residential or small commercial application.

The requirement in 590.6 only applies to generators used for temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities and would not apply to other applications. See the panel statement in Comment 3-67.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

AYER, L.: See negative statement on comment 3-65.

EASTER, L.: See NEMA Explanation of Negative on comment 3-83.

OWEN, S.: See comment on 3-65.

ARTICLE 600 — ELECTRIC SIGNS AND OUTLINE LIGHTING

18-65 Log #590 NEC-P18 **Final Action: Reject**

(600.2)

Submitter: Mark E. Duffy, GE Consumer & Industrial

Comment on Proposal No: 18-201

Recommendation: Revise to read as follows:

Neon or LED tubing that is itself the sign or outline lighting and is not attached to an enclosure or sign body.

Substantiation: Skeleton tubing can now also be done using LEDs. There are products that GE offers that fit this definition and are not made of glass. The definition should be updated to include "LEDs" also.

Panel Meeting Action: Reject

Panel Statement: Neon tubing is defined in 600.2. LEDs may simulate neon outline lighting but they do not fit definition/description of a neon tube. LEDs are not electric discharge lighting or filled with inert gases.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-66 Log #1933 NEC-P18 **Final Action: Accept**

(600.2 Neon Tubing)

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association

Comment on Proposal No: 18-200

Recommendation: Revise text to read as follows:

Neon Tubing. Electric-discharge luminous tubing that is manufactured into shapes ~~that~~ to illuminate signs, form letters, part of letters, skeleton tubing, outline lighting, other decorative elements, or art forms and filled with various inert gases.

Substantiation: Grammatical correction to more clearly represent action/intended use of neon tubing. Restore same word used in original ISA proposal.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-67 Log #397 NEC-P18 **Final Action: Accept**

(600.4(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 18-203

Recommendation: Reject the proposal.

Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

WELLS, J.: Benedictum, aestimo ooratoris cogitabundum et penitus investigatum argumentum una cum documento Latine subtiliter incluso.

18-68 Log #1183 NEC-P18 **Final Action: Reject**
(600.5(C)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-209
Recommendation: Accept the proposal with the following revisions:
Enclosures for signs and associated transformers and ballasts shall be permitted to be used for conductors supplying other signs, outline lighting systems, luminaires, and lampholders that are a part of a sign system.
Substantiation: Enclosures should be part of the sign system, not just part of a sign (singular). "Conductors" covers feeder, branch, and secondary wiring. Luminaires and lampholders that are not "floodlights" should be included.
Panel Meeting Action: Reject
Panel Statement: The recommended language is incomplete and in conflict with the submitter's Comment 18-69. The panel is not able to determine what parts of the two comments the submitter wishes to offer.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-69 Log #1688 NEC-P18 **Final Action: Reject**
(600.5(C)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-209
Recommendation: Accept the proposal revised as follows: Signs and enclosures for transformers, ballasts, and other equipment shall be permitted to enclose conductors associated with the sign(s) or outline lighting system if they comply with 110.3 and 110.26.
Substantiation: Reference to these two sections will specifically indicate those sections are applicable and not amended by this section.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-68.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-70 Log #763 NEC-P18 **Final Action: Reject**
(600.6)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-211
Recommendation: Accept the proposal.
Substantiation: The disconnecting means should be required for both branch circuits and feeders, not branch circuit OR feeder. The disconnecting means should be manually operable; remote control is "externally" operable.
Reflecting pools should be included; many do not have fountains.
The present wording of Exceptions No. 1 and No. 2 delete the requirements for a branch circuit disconnecting means.
Exception No. 1 should provide for directional signs that are not an exit, such as directions to the elevators, stairs, and "Do not use elevator in case of fire."
"Will" does not comply with 3.3.1 of the NEC Style Manual which states: "Do not write in the future tense."
Panel Meeting Action: Reject
Panel Statement: The additional substantiation provided with this comment is not sufficient for the panel to change their original panel action on Proposal 18-211. The panel's action on Proposal 18-210 adequately conveys the intent of this requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-71 Log #1675 NEC-P18 **Final Action: Reject**
(600.6)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-210
Recommendation: Accept the proposal with the following revisions:
Disconnects. Each sign and outline lighting system or each branch circuit and that portion of a feeder terminated at a sign or outline lighting system shall be controlled by an externally manually operated switch or circuit breaker that controls no other load and simultaneously opens all ungrounded conductors of the circuit it controls. Signs and outline lighting systems installed in pools or fountains shall have the disconnects located in accordance with 680.12.
Exception No. 1: A disconnecting means other than the branch circuit disconnecting means shall not be provided for exit signs or other directional signs.
Exception No. 2: A disconnecting means other than the branch disconnecting means shall not be required for cord-and-plug connected signs.
(A) Location.
(1) Within Sight of the Sign. The disconnecting means shall be within sight of the sign or outline lighting system it controls. Where the disconnecting means is not within sight from any section of the sign or outline lighting system, it shall be provided with an approved permanent means for locking the open (off) position.
(2) Within Sight of the Controller. The following shall apply for signs and outline lighting systems operated by electronic or electromechanical controllers located external of the sign or outline lighting system.
(a) A switch or circuit breaker shall be provided within sight of the controller or within the controller enclosure.
(b) The disconnecting means shall simultaneously disconnect all ungrounded conductors supplying the sign or outline lighting system and the controller.
(c) The disconnect means shall be provided with an approved permanent means for locking in the open (off) position.
Substantiation: The panel action requires a feeder disconnect that controls no other load which in effect requires a dedicated feeder. Feeders are generally not restricted to one type of load. Switches and circuit breakers should be specified as externally manually operable and providing simultaneous disconnection of ungrounded conductors.
In Exception No. 1, a branch circuit disconnecting means is required for exit signs.
In Exception No. 2, normally the cord, not the sign, has the attachment plug.
In (A)(2)(1), "permitted" does not impose a requirement per 90.5(B) and is not enforceable.
Proposed (A)(2)(3) reduces unnecessary verbiage.
Panel Meeting Action: Reject
Panel Statement: In the case of large signs, feeders are used to supply the sign and therefore there are installations where a dedicated feeder is required for some large signs. If no directional signs are required to have a disconnect then the sign in the parking lot that says "park here" in the shape of an arrow would not require a disconnect. The proposed change to Exception No. 2 is redundant. "Permitted in (A)(2)(1)" recognizes the fact that there are other means of disconnecting the sign feeder or circuit. The rewrite of (A)(2)(3) is not necessary as the panel intends for the requirements to be stated in full.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-72 Log #1934 NEC-P18 **Final Action: Accept**
(600.6)

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association
Comment on Proposal No: 18-210
Recommendation: Revise text to read as follows:
600.6 Disconnects. Each sign and outline lighting system, feeder circuit, or branch circuit supplying a sign, outline lighting system, or skeleton tubing shall be controlled by an externally operable switch or circuit breaker that will open all ungrounded conductors. The switch or circuit breaker shall open all ungrounded conductors simultaneously on multi-wire branch circuits in accordance with 210.4(B). Signs and outline lighting systems located within fountains shall have the disconnect located in accordance with 680.12.
Substantiation: A Multiwire branch circuit, as defined in the 2008 NEC is a common branch circuit supplying signs and outline lighting, and poses a significant safety hazard because it exposes sign service personnel to servicing equipment that may be only partially de-energized. In the 2008 Code Cycle, 210.4(B) was introduced and adopted to mitigate this potential shock and arc hazard. A special condition for disconnecting signs in fountains is included in 600.6. A multiwire branch circuit supplying a sign is also a special situation for a sign disconnecting means. Logically, this special requirement for disconnects should be referenced in 600.6. CMP 18 applied the disconnect rule for multiwire branch circuits to luminaires. (410.130(C)(2))Including the reference to 210.4(B) is necessary because unlike a disconnect located on a sign, the *disconnect for a multiwire branch circuit must be at the location where the branch circuit originates*. Including a reference for the disconnecting requirement for multi-wire branch circuits will contribute to the safety of sign personnel servicing signs and outline lighting just as it has for safe maintenance of luminaires covered in 410.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-73 Log #244 NEC-P18 **Final Action: Accept**
(600.6(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 18-213
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered by Code-Making Panel 18 based upon the action of Code-Making Panel 1 taken on Proposal 1-63.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the Technical Correlating Committee direction to review their action on Proposal 18-213 and rejects that action.

Panel Statement: Because Proposal 1-63 was rejected, the term "lockable" is not an appropriate substitute for the text of 600.6(A) contained in the 2008 edition of the NEC. The panel directs staff to restore the 2008 text for this section.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-74 Log #929 NEC-P18 **Final Action: Reject**
(600.6(A))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 18-213

Recommendation: Accept the proposal with the following revisions:

Location. (1) Within sight of the sign. The disconnecting means shall be within sight of the sign(s) or outline lighting system(s) that it controls, and where not in or on the sign shall be readily accessible. Where the disconnecting means is not within sight of any part of an electric sign or outline lighting system it shall be provided with an approved permanent means for locking in the open (off) position.

(2) Within sight of the Controller. The following shall apply for signs and outline lighting systems operated by electronic or electromechanical controllers located remote from the sign or outline lighting system:

(1) The disconnecting means shall be readily accessible and located within sight of the controller or in the controller enclosure.

(2) The disconnecting means shall simultaneously disconnect all ungrounded conductors supplying the controller.

(3) The disconnecting means shall be provided with an approved permanent means for locking in the open (off) position.

Substantiation: Disconnecting means not in or on the sign should be readily accessible. The present "external" implies "remote." If the disconnecting means disconnects the controller, it will likely disconnect the sign. The proposal for locking is concise and requires locking in the open (off) position, not open cover or door position. (A)(2)(1) permits, but does not require the disconnect in sight of the controller. See 90.5(B).

Panel Meeting Action: Reject

Panel Statement: The panel rejects the recommendation based on their action on Comment 18-72. The concept of requiring the controller disconnecting means to be readily accessible is introducing a concept that was not discussed in Proposal 18-213. Although the panel is of the opinion that this provision is warranted, it needs to be submitted as a Proposal with technical substantiation for the 2014 edition of the NEC and subjected to public review and comment.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-75 Log #2632 NEC-P18 **Final Action: Reject**
(600.6(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 18-213

Recommendation: Accept the proposal as written, contingent on the companion comment to this being accepted by CMP 1.

Substantiation: The additional material need not be duplicated if the relevant text enters Chapter 1. The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:

"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-73.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-76 Log #1935 NEC-P18 **Final Action: Reject**
(600.6(A)(1) and 600.6(A)(2)(3))

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association

Comment on Proposal No: 18-213

Recommendation: Revise text to read as follows:

600.6(A)(1) The disconnecting means…shall be ~~lockable~~ capable of being locked in the open position.

600.6(A)(2)(3) The ~~lockable~~ disconnecting means shall be designed such that no pole can be opened independently and shall be capable of being locked in the open position.

Substantiation: The TCC has recommended that CMP 18 reconsider its inclusion of *Lockable* in 600.6(A) because the proposal to add *lockable* to the Article 100 definitions was rejected by CMP-1. (1-63 Log #156, NEC-P01). I agree with Mr. Carpenter's conclusion, as noted in the Explanation of the Negative Vote, the terminology should not be used in 600.6.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-73.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-77 Log #2633 NEC-P18 **Final Action: Accept**
(600.6(A)(1) Exception (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 18-214

Recommendation: Continue to reject the proposal.

Substantiation: The panel has cured the problem by placing a "no other load" provision in 600.6 under Proposal 18-210. This was the single most essential characteristic of Proposal 18-214. The reason this comment is submitted is to take exception to the panel statement that the proposal was substantiated by a code violation. The scenario described was not a violation of the literal text of the current code, as the substantiation carefully set forth, step by step, showing how every provision of the rule was literally satisfied, however outrageous the result. The litigating attorney had the same problem.

It would be a violation of the code as now will amended by CMP 18, and that was the point. The proposal, in effect, was accepted in principle, at least in the most relevant part. This submitter is satisfied that the concern has been adequately addressed, but the panel statement required a response on the written record.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-78 Log #1181 NEC-P18 **Final Action: Reject**
(600.7(A)(1) Exception)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 18-216

Recommendation: Accept the proposal with the following revisions:

(A)(1) Exception: Listed cord-connected signs shall not be required to be connected to the equipment grounding conductor where protected by a system of double insulation and durably marked to indicate such protection.

Substantiation: 250.110, Exception No. 3 requires double-insulated equipment to be listed which includes the double insulation. This section appears to amend the listing requirement with no substantiation. If the sign is listed, the listing protocol will include the double insulation. Such double insulation, not part of listed equipment, cannot be evaluated by the installer or Authority Having Jurisdiction. (A)(2) and (B)(2) are already covered by Article 250. See 90.3

Panel Meeting Action: Reject

Panel Statement: Adding "listed" is redundant. 600.3 requires all electric signs to be listed. The cord is an integral part of a sign that would have to be listed under the requirement in 600.3 and the sign safety standard.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-79 Log #1199 NEC-P18 **Final Action: Reject**
(600.7(A)(1) Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-216
Recommendation: Accept the proposal with the following revisions:
Exception: Listed cord-connected signs shall not be required to be connected to the equipment grounding conductor where protected by a system of double insulation and durably marked to indicate such protection.
Substantiation: 250.110, Exception No. 3 requires double-insulated equipment to be listed which includes the double insulation. This section appears to amend the listing requirement with no substantiation. If the sign is listed, the listing protocol will include the double insulation. Such double insulation is not part of the listed equipment and cannot be evaluated by the installer or AHJ.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 18-78.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-80 Log #903 NEC-P18 **Final Action: Reject**
(600.8(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-226
Recommendation: Accept the proposal with the following revisions:
(A) Strength. Enclosures shall have mechanical strength and durability that provides protection for the enclosed equipment.
Substantiation: 110.3 uses the phrase that is proposed which is more specific than "ample" which is subjective and not Code defined.
Panel Meeting Action: Reject
Panel Statement: The substantiation has not demonstrated that the use of "ample" in this section is not clearly understood by qualified persons.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-81 Log #764 NEC-P18 **Final Action: Reject**
(600.8(A) and (D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-266
Recommendation: Accept with the following revisions:
"(A) Enclosures shall comply with 110.3(A)(1) through (8) and (B).
(D) Metal parts shall be corrosion resistant or protected from corrosion by approved means."
Substantiation: Section 110 provides specific provisions, whereas "ample strength and rigidity" is subjective.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-80.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-82 Log #928 NEC-P18 **Final Action: Reject**
(600.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-227
Recommendation: Accept the proposal with the following revisions:
In (A) Support. Portable and mobile signs shall be securely supported.
Delete (B).
(C)(1) Cords. Flexible cords shall comply with 400.3, contain an equipment grounding conductor, and not exceed 4.5 m (15 ft) in length.
(2) Ground-Fault Circuit Interrupter. Portable and mobile signs in wet locations shall be provided with GFCI protection.
Delete (D).
Substantiation: Other type cords that comply with 400.3 should be acceptable. Many small portable signs with cords are directly connected, the present (C) doesn't address cord length in wet locations. Mobile signs that are on vehicles with integral self-contained power supply such as a generator or solar panels commonly used in highway and other construction are directly wired without cords or plugs. Proposed (C)(1) covers present (D).
Panel Meeting Action: Reject
Panel Statement: The substantiation included in this comment does not provide additional information to support the recommended change and does not demonstrate that the current requirement is being misapplied. See the panel statement on Proposal 18-227.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-83 Log #1182 NEC-P18 **Final Action: Reject**
(600.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-227
Recommendation: Accept the proposal with the following revisions:
In (A), change "adequately" to "securely".
(B) Attachment Plug. A grounding type attachment plug shall be provided for each portable or mobile sign equipped with a flexible cord.
(C)(1) All cords shall be a hard usage or extra-hard usage type that contains an equipment grounding conductor and complies with 400.3.
Exception: In dry locations, cords shall be permitted to be SP2, SPE-2, or SPT-2.
Delete (D).
Substantiation: "Adequately" is subjective and a term to be avoided per the NEC Manual. "Secured" and "securely" are terms used many times in the NEC. Cords should be noted to comply with 400.3, since all are not suitable for wet locations or sunlight resistance and this section may be deemed to amend 400.3.
Panel Meeting Action: Reject
Panel Statement: The substantiation has not demonstrated that the use of the cited terms in this section is not clearly understood by qualified persons. The product standard adequately addresses the types of cords that are acceptable for this application and again, the substantiation does not demonstrate that there are hazards created by the current requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-84 Log #2722 NEC-P18 **Final Action: Reject**
(600.10(C)(2))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 18-228
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-6.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-85 Log #245 NEC-P18 **Final Action: Accept**
(600.12(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 18-232
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the direction of the Technical Correlating Committee to review the comment made on the affirmative vote and amends the panel action on Proposal 18-232 to reference 600.24 in 600.12(C)(2).
Panel Statement: The panel has reviewed the comment expressed in the Panel voting and agrees that the panel action refers to the incorrect section.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-86 Log #1936 NEC-P18 **Final Action: Accept in Principle**
(600.12(C))

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association
Comment on Proposal No: 18-232
Recommendation: Revise text to read as follows:

600.12(C) Class 2. Secondary Class 2 circuit wiring shall be installed in accordance with ~~either of~~ the following:

~~(1) Any wiring method included in 600.33 and in Chapter 3 suitable for the conditions~~

(~~2~~1) Where the power source provides Class 2 output and complies with 600.2~~433~~, any wiring method identified in 600.33, Chapter 3 or 725.III, as determined by the installation conditions, shall be permitted.

Substantiation: The notation by the TCC suggests the final wording of 600.12(C) will be corrected during the public comment stage. The comment by P. Costello is valid. Class 2 power sources are covered in 600.24, not 600.33. But solely making that correction is not sufficient. Use of the term "suitable" in (C)(1) is a term that is vague and possibly unenforceable, as described in the NEC Style Manual. Two subsections are redundant and not necessary to state the rule for Class 2 *field installed wiring*.

725.III contains wiring rules that most closely match Class 2 circuit *field wiring* for LED illuminated signs. Rules in 725.III have been incorporated in Article Article 600 since 2005. The Code Panel Meeting Action this code cycle indirectly refers to Article 725 in ROP 18-241. Additionally, a reference to Article 725 is in new 600.33 [ROP 18-249a].

It appears contradictory for CMP 18 to apply the rationale that Article 725 does not apply to electric signs [18-245] while globally incorporating references to Chapter 3 in 600. As defined by the *Code*, both electric signs and appliances are utilization equipment. Chapter 3 and 725 do not pertain to wiring that is part of utilization equipment but both are referenced throughout Article 600 because they contain rules generally applicable to *field installed wiring* in signs.

Panel Meeting Action: Accept in Principle

Revise 600.12(C) to read as follows:

600.12(C) Where the installation complies with 600.33 and the power source provides a Class 2 output that complies with 600.24 either of the following wiring methods shall be permitted as determined by the installation conditions.

(1) Wiring methods identified in Chapter 3
(2) Class 2 cables complying with Part III of Article 725.

Panel Statement: The panel action clarifies the permitted wiring methods and installation requirements for circuits on the secondary side of a Class 2 power supply.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

WRIGHT, R.: The agreed action was to use the "wiring methods" (wire and cable) from 725 Part III not the requirements. This will only confuse the reason for 600.33 and the installation requirements placed in this section to regulate Class 2 secondary wiring in signs. The Panel Statement is clear and clarifies the intent. 725 Part III is combined with Class 2 and Class 3 requirements. Class 3 is a higher low voltage requirement and is not intended to allow the equipment grounding conductor exception we allowed for Class 2 only. See 600.7 (B) 1 Exception. (2010 Draft)

18-87 Log #902 NEC-P18 **Final Action: Reject**
(600.22(B) Exception (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-236
Recommendation: Accept the proposal with the following revisions:

Add new Exception after (B) to read as follows:

Exception as specified in 410.130 (E).

Substantiation: The panel reference to 410.30 is irrelevant; it relates to support; the proposal relates to 410.130. This section amends 410.130 and and can result in thermal protection deenergizing exit fixtures and luiminaries necessary for safe egress.
Panel Meeting Action: Reject
Panel Statement: The submitter has not documented a problem to substantiate a change in the Code. See Section 90.3. Article 600 modifies Chapters 1 thru 4 of the NEC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-88 Log #1937 NEC-P18 **Final Action: Reject**
(600.23(F))

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association
Comment on Proposal No: 18-238
Recommendation: Revise text to read as follows:

~~600.23(F) Marking. Transformers and electronic power supplies that are equipped with secondary-circuit ground-fault protections shall be so marked.~~

Substantiation: All transformers and electronic power supplies are required to be listed. (600.23(A). Labeling of transformers and electronic power supplies is a requirement of an electrical product standard and listing. UL2161 adequately details transformer marking and labeling. 600.23(B) clearly identifies types of transformers that do not require secondary ground fault equipment protection. This addition is redundant and should be removed.
Panel Meeting Action: Reject
Panel Statement: Retention of the marking requirement is considered necessary to ensure that these special units are marked. This provides direction to the power supply manufacturer, sign manufacturer, follow-up services, and electrical inspector that helps eliminate any confusion or misapplication of product.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-89 Log #1938 NEC-P18 **Final Action: Accept in Principle**
(600.24(A))

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association
Comment on Proposal No: 18-241
Recommendation: Revise text to read as follows:

600.24 (A) Listing. Class 2 power supplies and power sources shall be listed or identified for use with electric signs and outline lighting systems.

Substantiation: Class 2 power supplies and power sources used in UL listed signs are not listed, but are "Recognized Components" within an Underwriter Laboratories procedure for listing Class 2 LED sign illumination systems. Compliance with the rule as written is not possible. The use of non-listed "Recognized Component" Class 2 power sources in UL Listed signs raises a compliance issue for the AHJ and sign company.

Qualified electrical testing laboratories other than UL employ different protocols for listing Class 2 sign systems and are not bound by UL's proprietary Recognized Component procedure. They should have the latitude to accept a Listed Class 2 power source, that is not limited to use in signs and outline lighting, but meets the voltage and load requirements of a low voltage sign illumination system.

Adding "identified" can lead to a resolution of these issues because it will provide the latitude to use either a listed Class 2 power source or a Recognized Component with its limited use, in a sign listed by a qualified testing laboratory.

"Identified", is defined in 100 as "recognizable as suitable for the specific purpose, function, use, environment, application…" This definition closely matches the procedure employed by UL for Class 2 LED illumination systems. UL's "Component Recognition" and proprietary *Sign Component Manual* (SAM) is an example of the circumstance alluded to in the Informational Note accompanying the definition for "Identified". Suitability for a specific purpose has been determined under a system employed by a qualified electrical testing laboratory. Adding "identified" will clarify for the AHJ that the use of UL Recognized Component Class 2 power supplies and power sources meets the *Code* requirement for listing while at the same time providing an option to use a listed general use Class 2 power source in LED sign and outline lighting installations.
Panel Meeting Action: Accept in Principle

Revise the recommendation to read:

600.24 (A) Listing. Class 2 power supplies and power sources shall be listed for use with electric signs and outline lighting systems or shall be a component in a listed electric sign.

Panel Statement: The panel action covers listed power supplies and power supplies that are recognized components in an electric sign that has an overall listing.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-90 Log #1939 NEC-P18 **Final Action: Reject**
(600.24(B))

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association
Comment on Proposal No: 18-241
Recommendation: Revise text to read as follows:
600.24(B) Grounding. Metal parts of Class 2 Power Sources and enclosures ~~signs and outline lighting systems~~ shall be grounded and bonded in accordance with 600.7.
Substantiation: CMP 18 member Wright called attention to a potential misunderstanding and problem regarding the grounding of Class 2 sign illumination systems. The title of this Section is "Class 2 Power Sources" and the grounding rule in this Section should be specific to these devices, not a description of sign or outline lighting system metal parts, such as in Section Letters remote from the power source. A modification of the text is needed to more clearly harmonize the rule with the Section Title.
Some Class 2 Power Sources are non-metallic with hubs for the attachment of a conduit assembly or box for the connection of the branch circuit with the equipment ground to the Class 2 Power Source. Other Class 2 Power Sources have no hub for the connection of the branch circuit and must be installed in a metal enclosure which is required to be bonded to the equipment ground conductor. The same applies to the majority of the power sources having metal bodies that are bonded to the branch circuit equipment ground even though no bonding will be required for remote metal parts on the load side under the provisions of 600.7(B)(1). [ROP 18-223].
Modifying the syntax of 600.24(B) will address this concern and contribute to a clearer understanding that grounding rules in this section apply to Class 2 power sources and their associated metal parts whether located as a remote subsection of a Section Sign or located within a metal Section Letter sign body.
Panel Meeting Action: Reject
Panel Statement: The word "systems" includes the enclosures and power supplies. Acceptance of the recommendation does not provide additional clarity to the grounding and bonding requirements.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-91 Log #767 NEC-P18 **Final Action: Reject**
(600.32(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-248
Recommendation: Accept the proposal.
Substantiation: See the Explanation of Negative Vote for Proposal 7-9 for 320.12(1) of the 2010 Report on Proposals.
Panel Meeting Action: Reject
Panel Statement: Until such time that each change or maintenance done on the electrical of a facility and has an inspection, "likely" still remains subjective and unenforceable. The panel concurs with the action of CMP 7 taken on Proposal 7-9.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-92 Log #901 NEC-P18 **Final Action: Reject**
(600.32(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-248
Recommendation: Accept the proposal.
Substantiation: Conductors may not be subject to physical damage when first installed, but conditions may indicate that damage is likely to occur. "Likely" is a term used more than 80 times in the NEC.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-91.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-93 Log #1940 NEC-P18 **Final Action: Accept in Principle**
(600.33)

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association
Comment on Proposal No: 18-249a
Recommendation: Revise text to read as follows:
600.33 LED Sign Illumination Systems, Secondary Wiring. The wiring methods and materials shall be installed in accordance with the sign manufacturer's installation instructions using any applicable wiring methods from Chapter 3 and 725.III.
Substantiation: Solely referencing Chapter 3 is inadequate because Chapter 3 does not contain requirements for Class 2 circuits. Only 725.III contains wiring that most closely matches Class 2 circuit field installed wiring for LED illuminated signs. The Code Panel Meeting Action indirectly refers to Article 725 in 18-241 Log #3548. [ROP 18-241] Additionally a reference to 725 is in new 600.33(A). [ROP 18-249a].
As far as the applicability of 725 to electric signs, the rationale employed by CMP 18 as the basis for rejecting 18-245 Log #4039 (600.24(D) is inconsistent with its other current and prior actions during the 2005 and 2008 *Code* cycles, incorporating references to 725 in 600. The rationale for rejecting references to 725 appears contradictory while globally incorporating references to Chapter 3 in 600. As defined by the *Code*, both electric signs and appliances are utilization equipment. Chapter 3 and 725 do not pertain to wiring that is part of utilization equipment but both are referenced throughout 600 because they contain basic rules for installing field wiring in signs. In as much as it is not feasible to copy all the rules in 725.III that fit Class 2 field wiring in signs, including a reference to 725.III will point the Code user to these additional rules for an electrically safe installation.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
600.33 LED Sign Illumination Systems, Secondary Wiring. The wiring methods and materials shall be installed in accordance with the sign manufacturer's installation instructions using any applicable wiring methods from Chapter 3 and the requirements for Class 2 circuits contained in Part III of Article 725.
Panel Statement: The panel action clarifies the intent that only the requirements for Class 2 circuits contained in Article 725 are applicable.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
WRIGHT, R.: I believe the work "requirements" was substituted for "wiring methods". The agreed upon action was to use only Class 2 wiring methods(wire and cable) as referenced in 725 Part III. The installation procedures shall be taken from 600.33.

18-94 Log #2892 NEC-P18 **Final Action: Accept in Principle**
(600.33)

Submitter: Randall K. Wright, RKW Consulting
Comment on Proposal No: 18-249a
Recommendation: Revise text as follows:
600.33 LED Sign Illumination Systems, Secondary Wiring. The wiring methods and materials shall be installed in accordance with the sign manufacturer's installation instructions using any applicable wiring methods from Chapter 3~~:~~ or the wiring methods in 600.33 for the secondary wiring of LED sign illumination systems where supplied by a listed Class 2 power source.
Substantiation: To clarify the wiring methods need to be from Chapter 3 and when secondary wiring is provided from a listed Class 2 power supply this wiring can be modified as outlined in 600.33. The task group wanted to keep the wiring methods in Article 600 for use in signs and channel letters.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel action on Comment 18-93 addresses this recommendation and substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
CARPENTER, F.: The comment referenced in the panel statement is incorrect; it should be Comment 18-93. The panel statement should read, "The panel action on Comment 18-93 addresses this recommendation and substantiation."
WRIGHT, R.: The reference to 18-94 in the Panel Statement is incorrect. It should refer to 18-93.

18-95 Log #1941 NEC-P18 **Final Action: Accept in Principle**
(600.33(A))

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association
Comment on Proposal No: 18-249a
Recommendation: Revise text to read as follows:
600.33(A) Insulation and Sizing of Class 2 Conductors. Listed Class 2 cable that complies with Table 725.154(G) shall be installed on the load side of the Class 2 power source. The conductors shall be sized for the load and not be smaller than 22 AWG.
Substantiation: Improperly sized conductors on the load side can result in over-heating and pose a fire safety hazard. The secondary circuit load is the accepted basis for determining the conductor size.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
600.33(A) Insulation and Sizing of Class 2 Conductors. Listed Class 2 cable that complies with Table 725.154(G) shall be installed on the load side of the Class 2 power source. The conductors shall have an ampacity not less than the load to be supplied and shall not be sized smaller than 22 AWG.

Panel Statement: The panel action revises the text to use language regarding the sizing of conductors that is used elsewhere in the Code.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-96 Log #2890 NEC-P18 **Final Action: Accept in Principle**
(600.33(A))

Submitter: Randall K. Wright, RKW Consulting
Comment on Proposal No: 18-249a
Recommendation: Revise text as follows:
(A) Insulation and Sizing of Class 2 Conductors. Listed Class 2 cable that complies with Table 725.154G shall be installed on the load side of the class 2 power source. The conductors shall be sized for the load and shall not be smaller than 22 AWG.
Substantiation: For clarity as a reminder to size the wire for the load.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 18-95.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-97 Log #1942 NEC-P18 **Final Action: Accept in Principle**
(600.33(A)(1) and (2))

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association
Comment on Proposal No: 18-249a
Recommendation: Revise text to read as follows:
600.33(A)(1) Wet Locations. Class 2 cable used in a wet location shall be identified for use in wet locations. ~~or have a moisture impervious metal sheath.~~
600.33(A)(2) D~~amp~~ry Locations. Class 2 cable used in a d~~amp~~ry location shall be identified for use in a ~~damp~~ dry location. ~~or shall have the outer jacket of sunlight and moisture resistant nonmetallic material.~~
Substantiation: Describing the cable construction is a function of the entity that has identified the cable as suitable for use in the environment it is installed in. Specifying the cable design is superfluous and not necessary since its identification will be the result of third party evaluation.
The FPN (Informational Note] to the *Code* definition of *Identified* states that suitability for the environment includes "investigations by a qualified testing laboratory, listing and labeling, an inspection agency or other organizations concerned with product evaluation."
With all due respect to Mr. Carpenter, the Explanation of Negative is not a historically valid reason for rejecting a *Code* rule. There is a long *Code* history of adopting rules requiring electrical equipment and devices that are not in production at the time a *Code* rule is adopted. If this rationale would have been used in 1996 by CMP 18, there would be no GFPE neon transformers. In more universally recognized rules that preceded the availability of a *Code* compliant devices, GFCI Receptacles, Combination GFCI and Arc Fault Receptacles, and Tamper Resistant Receptacles are examples.
Amending "Damp" to "Dry" simplifies the requirements for Class 2 secondary cable, providing two alternatives for the sign designer and installer, easily associated with indoor and outdoor installations of exposed Class 2 cable.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 18-98 addresses the intent of the recommendation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-98 Log #2891 NEC-P18 **Final Action: Accept**
(600.33(A)(2))

Submitter: Randall K. Wright, RKW Consulting
Comment on Proposal No: 18-249a
Recommendation: Delete text as follows:
~~**(2) Damp Locations.** Class 2 cable used in a damp location shall be identified for use in a damp location or shall have the outer jacket of sunlight- and moisture-resistant nonmetallic material.~~
Substantiation: The task group removed this cable since it does not currently exist; the wire will need the same characteristics as used in a wet location when used in a damp location. The section "other" will allow any new or other cables to be developed or used in a specific use.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-99 Log #1932 NEC-P18 **Final Action: Accept**
(600.33(B))

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association
Comment on Proposal No: 18-249a
Recommendation: Revise text to read as follows:
600.33(B) Installation. ~~Circuits~~ Wiring shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4(D).
Substantiation: Wiring makes up a Class 2 illumination circuit, and *wiring* more appropriately describes the content of the rule. *Wiring* harmonizes with the title of the section, "Secondary Wiring" and is consistent with the other sections under Part II covering installation of field installed secondary wiring.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-100 Log #1931 NEC-P18 **Final Action: Accept**
(600.33(B)(1))

Submitter: David Servine, Channelume/Let-R-Edge Co. / Rep. International Sign Association
Comment on Proposal No: 18-249a
Recommendation: Add new text to read as follows:
600.33(B)(1) Connections in cable and conductors shall be made with listed insulating devices and be accessible after installation. Where made in a wall, connections shall be enclosed in a listed box.
Substantiation: Connections in Class 2 cable are likely. 110.14(A) and (B) contains rules for terminating and splicing conductors, and by *Code* structure applies to wiring in 600.33. The goal of placing all requirements, as is practical, for field wiring Class 2 sign illumination in 600.33 requires addition of a rule for splicing Class 2 Cable.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-101 Log #758 NEC-P18 **Final Action: Reject**
(600.41)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-252
Recommendation: Accept revised as follows:
"Field-installed skeleton tubing shall not be installed where likely to be subject to physical damage. Where readily accessible to other than qualified persons, it shall be guarded by approved means."
Substantiation: Tubing may not be subject to physical damage at the time of installation or inspection, but conditions may indicate the likelihood of damage. The definition of "Guarded" in Article 100 is clear and comprehensive regarding purpose and uses the term "likelihood." "Likely" is used over 80 times in the NEC.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Proposal 18-252. Additionally, the submitter does not identify the subsections in 600.41 to which the recommended changes would apply.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 604 — MANUFACTURED WIRING SYSTEMS

19-201 Log #27 NEC-P19 **Final Action: Reject**
(604.6(A)(2) Exception No. 2)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 19-294
Recommendation: Accept the proposal
Substantiation: Accepting this proposal will make the text of 604.6(a)(2) exception 2 correlate with the title of Article 800. "Communications Circuits".
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to reject Proposal 19-294.
The submitter has not provided any additional substantiation for the proposed revision.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-202 Log #2634 NEC-P19 **Final Action: Accept**
(604.6(A)(2) Exception No. 3 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-295
Recommendation: Accept the proposal in principle.
Change "permitted in Article 348 when supplied with fittings and conductors" to "permitted by 348.20(A) provided the wiring systems are supplied with fittings and conductors at the time of manufacture."
Substantiation: This wording avoids the whole-article reference prohibition in the NEC Style Manual at 4.1.1, as well as an incorrect use of the word "when" because this is not a condition of time. This wording also clarifies that the special fittings are to be supplied by the system manufacturer.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-203 Log #246 NEC-P19 **Final Action: Accept**
(604.6(A)(2) Exception No. 3 to (2) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-295
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal regarding 4.1.1 of the NEC Style Manual to not reference an entire article.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 19-202.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-204 Log #780 NEC-P19 **Final Action: Reject**
(604.6(A)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-293
Recommendation: Accept the proposal with the following revisions:
Hard usage and extra-hard usage types, flexible cords and cables not exceeding 1.8 m (6 ft) in length that comply with 400.3, with an equipment grounding conductor, and minimum 12 AWG conductors shall be permitted as part of a listed factory-made assembly where making a transition between components or a manufactured wiring system and utilization equipment not permanently secured in place. The flexible cord and cable shall be visible for its entire length and not subject to strain on terminations or physical damage.
Substantiation: Flexible cables should be permitted and cords and cable should be noted to comply with 400.3, since this section may be perceived as amending it. All hard usage and extra-hard usage type cords and cables may not be suitable, e.g., electric vehicle cables and those not designated "W" for wet locations and sunlight resistance. An EGC should be specified. "Not subject to strain" permits use of strain relief devices. The 6 ft restriction should specifically apply to the flexible cord, not the factory made assembly.
Panel Meeting Action: Reject
Panel Statement: Article 400 applies except as amended according to 90.3. so there is no need to refer to 400.3. To reiterate the panel statement on Proposal 19-293: "flexible cord is only permitted to be used as part of a listed factory made assembly...". Therefore, its suitability for the intended application will be determined as part of its listing. Flexible cord always contains an equipment grounding conductor. Other flexible cables either have an equipment grounding conductor or are recognized as an equipment grounding conductor in 250.118. The requirement to always provide strain relief makes it unnecessary to determine if strain will be present or not. No substantiation was provided to limit the 6 ft length to flexible cord only.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-205 Log #1617 NEC-P19 **Final Action: Accept**
(604.6(A)(4))

Submitter: Thomas R. Lichtenstein, Underwriters Laboratories Inc.
Comment on Proposal No: 19-296
Recommendation: Revise text to read as follows:
604.6(A)(4) Busways. Busways shall be listed ~~plug-in or~~ continuous plug-in type containing factory mounted, bare or insulated conductors, which shall be copper or aluminum bars, rods, or tubes. The busway shall be ~~grounded and~~ provided with an equipment ground ~~busbar equivalent in size to the ungrounded busbar~~. The busway shall be rated nominal 600 volts, 20, 30, or 40 amperes. Busways shall be installed in accordance with 368.12, 368.17(D), and 368.30.
Substantiation: Manufactured Wiring Systems are typically comprised of modular connector, plug together type systems. They are installed in locations that are accessible to the general public. They are found in Computer Rooms, Libraries and Universities on chair and table systems to power laptop computers and other electronic devices. The traditional "plug-in" busway that ROP Proposal 19-296 wants to include, requires the removal of a cover to make a plug in connection to the busway. When the cover is removed, there is full access of the unisulated live bus bars by users. To allow the use of plug-in busway has the potential to expose the general public to an electrical shock hazard.
The addition of busways to Article 604 in the 2008 Code was specifically limited to Continuous Plug-in Busway because of the more restrictive accessibility requirements (UL 857 Standard for Safety for Busways, Articulated Finger Probe - Figure 2 below). UL 857 defines Continuous plug-in busway as suitable for use within the reach of persons. Other busway types are not required to meet the more restrictive accessibility requirements to uninsulated live parts. The panel must reject plug-in type busways to protect the public from a potential shock hazard. See information provided below.
Panel Statement From 2008 Cycle.
2008 19-132 Log #1710
Panel Statement: The panel accepts in principle the addition of busway as a wiring method and describing construction, ratings and use of the busways. The panel replaced "trolley type" busway with "continuous plug-in type" busway because trolley type may be provided with accessible uninsulated live parts and is not intended to be placed within reach of individuals. A continuous plug-in busway has no exposed bus bars, and is intended for general use, including installation within the reach of persons. Busway is not sized in AWG so guidance on the acceptable ampacity of the branch circuit busway is required. 20 – 40 amps falls within the current 12 - 8 AWG wire range accepted in Article 604.
Included below are references from UL 857 to support the above statements.
ANSI/UL 857 Thirteenth Edition Dated March 25, 2009
2.3.4.3 Continuous plug-in busway
2.3.4.3.1 In Canada and Mexico, a continuous plug-in busway is rated at 400 A or less, has no exposed bus bars, and is intended for general use, including installation within the reach of persons. In the United States, a continuous plug-in busway is rated at 225 A or less.
7.2.5 An opening for a plug-in device in other than a continuous plug-in busway or a lighting busway shall:
a) Be provided with a cover that is hinged, sliding, or otherwise secured against removal and with a latch or the equivalent to hold the cover in a closed position or
b) Have each uninsulated live part inside the enclosure recessed behind the plane of the opening by a distance no less than the smaller dimension of the opening, and
1) The opening is no larger than 9.5 mm by 15.9 mm (3/8 in by 5/8 in) or
2) If the opening has one dimension larger than 15.9 mm (5/8 in), it will not admit a 6.7 mm (17/64 in) diameter rod.
7.2.6 In a continuous plug-in busway or a lighting busway that is not also rated as a trolley busway, the size of the openings that accommodate plug-in devices, the insulation on the bus bars, or both, shall be such that adequate guarding against unintentional contact with a bare live part will be provided.
7.4.5 For a continuous plug-in busway, an uninsulated live part shall be located or shielded so it is not accessible to unintentional contact by persons during intended use.
7.4.6 An uninsulated live part shall be considered inaccessible if a probe as illustrated in Figure 2 cannot be made to touch any part that involves the risk of electric shock to earth ground or to another uninsulated live part when the system is completely installed as intended. No force shall be used when placing the probe in the opening.
We support the rewording of the section addressing the ground bus bars and equipment grounding.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 8 Negative: 1

Explanation of Negative:
MCNEIVE, T.: In discussion leading to the decision to accept comment 19-205, which results in rejection of proposal 19-296, the submitter of the comment and the code-making panel agreed in principle that plug-in type busway is not intrinsically less safe than continuous busway when installed for normal use as a manufactured wiring system. The panel's conclusion was based solely on unwarranted concerns that by design, plug-in type busway may permit access by maintenance personnel to current carrying components on the interior of the busway if the doors or covers are not closed. It is true that one of the features of plug-in type busway is its versatility that enables outlets (taps) the be added or removed. However, by their very nature and definition, manufactured wiring systems are typically designed for a single use and are not expected to be modified or to require maintenance, except perhaps complete replacement, over their life time. The panel also conceded that the uses of manufactured wiring systems constructed of busway are typically such that they are located out of the reach of unqualified personnel, even though Article 368 does not require such placement for busway.

19-206 Log #247 NEC-P19 **Final Action: Accept**
(604.6(A)(5) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-297
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal regarding complete sentences to comply with 3.3.1 of the NEC Style Manual.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: Revise (5) to read as follows:
(5) Raceway. Prewired, modular, surface mount raceways shall be listed for the use, rated nominal 600 volts, 20 amp, and installed in accordance with 386.12, 386.30, 386.60 and 386.100.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

ARTICLE 605 — OFFICE FURNISHINGS (CONSISTING OF LIGHTING ACCESSORIES AND WIRED PARTITIONS)

18-102 Log #900 NEC-P18 **Final Action: Reject**
(605.6)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-258
Recommendation: Accept the proposal.
Substantiation: There is nothing in this article that specifically requires a panelboard, and no prohibition of a branch circuit supplied by a single enclosed circuit breaker or fused switch.
Panel Meeting Action: Reject
Panel Statement: The panel action on Proposal 18-257 has removed the second sentence of 605.6, thus this comment is not applicable.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-103 Log #714 NEC-P18 **Final Action: Reject**
(605.7)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-263
Recommendation: Accept the proposal and revise as follows:
Partitions of the free-standing type (not fixed) shall be connected to the building wiring system by an approved wiring method that includes an equipment grounding conductor.
Substantiation: Chapter 3 does not include Article 4 which is permitted by 605.8. The wiring method should provide an EGC.
Panel Meeting Action: Reject
Panel Statement: The panel action on Proposal 18-262 has removed the second sentence of 605.7, thus this comment is not applicable.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

18-104 Log #899 NEC-P18 **Final Action: Reject**
(605.7)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-263
Recommendation: Accept the proposal.
Substantiation: "Permitted" does not impose a requirement per 90.5(B) and is optional and not enforceable. There is no specific requirement in this article to provide a panelboard, and no prohibition of a branch circuit supplied by an individual enclosed circuit breaker or fused switch.
Panel Meeting Action: Reject
Panel Statement: The panel action on Proposal 18-262 has removed the second sentence of 605.7, thus this portion of the comment is not applicable. "Shall be permitted" is perfectly acceptable code language and is enforceable.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 606 — PREFABRICATED (WIRING) ASSEMBLIES

19-207 Log #248 NEC-P19 **Final Action: Accept**
(606 (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 19-298
Recommendation: The Technical Correlating Committee requests that the panel clarify the need for the Article, since it appears the installation requirements of the product are already covered in the Code. The remaining requirements are prescriptive and are better suited for a product standard.
The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Rejects the panel action related to the Scope. As written, the Scope more clearly defines what a prefabricated wiring assembly is not, rather than what it is.
The Technical Correlating Committee notes that the proposed Scope will appear in the NEC ROP Draft so that it is available for public comment.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel agrees with the Technical Correlating Committee that the installation requirements of the product are already covered in the Code. The proposed requirements may be better suited for a product standard.
See panel action on Comments 19-208, 209, 210, 211, 212, 213, 214, and 215.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-208 Log #1266 NEC-P19 **Final Action: Accept**
(606 (New))

Submitter: David L. Hittinger, Independent Electrical Contractors of Greater Cincinnati
Comment on Proposal No: 19-298
Recommendation: Delete the entire proposed article.
Substantiation: The installation requirements of the product are already covered in the Code. The prescriptive requirements are better suited for a product standard. There are many companies that have a prefabricated wiring assemblies for years without a specific Code article to describe what they do. These products are listed for the application and sold nationally in electric supply houses and recognized by the inspection community when installed on the jobsite. The substantiation does not identify a problem that the proposed article will solve. The scope clearly defines what a prefabricated wiring assembly is not rather than what it is. This proposed article does not add clarity to the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-209 Log #1290 NEC-P19 **Final Action: Accept**
(606 (New))

Submitter: Jerome Perrone, America Cable Systems
Comment on Proposal No: 19-298
Recommendation: Reject the proposal. Do not add a new NEC Article on Prefabricated (Wiring) Assemblies.
Substantiation: The proposed new article will introduce limitations on product design and listing. This new article will not increase safety and provides no benefit to AHJs or installers. At present prewired assemblies are permitted either assembled on site or as a listed product under UL category QQYZ:

As per the UL Directory: "This category [QQYZ] covers prefabricated wiring systems comprised of Listed electrical components that could be field assembled and inspected by an Authority Having Jurisdiction (AHJ), but are assembled in the factory prior to field installation. Prefabricated wiring assemblies incorporate Listed conduit, tubing or cable, conductors and fittings intended for field installation in accordance with ANSI/NFPA 70, "National Electrical Code" (NEC)."

1) The requirements for installation are already contained within the NEC.

2) The addition of this Article does not clarify or add any additional value. However it will limit listing of prewired assemblies to only constructions permitted by the new article requiring a code revision in order to obtain listing on new constructions that deviate from the new Article.

3) The requirements of the Article impose additional restrictions on listed assemblies that are not imposed on unlisted assemblies.

4) The requirements of the article includes requirement that prewired assemblies be disassembled to assure the secureness of connections. This defeats the purpose for having a listed prewired assembly in the first place.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-210 Log #1618 NEC-P19 **Final Action: Accept**
(606 (New))

Submitter: Thomas R. Lichtenstein, Underwriters Laboratories Inc.
Comment on Proposal No: 19-298
Recommendation: The panel should reject Article 606.
The Technical Correlating Committee comments are accurate and should be accepted by the panel. The requirements specified in the proposed new article are either already addressed within the code, are best addressed by a product safety standard or are unenforceable by the inspection authority. Examples are provided below. The article as written does not belong in the National Electric Code and should be rejected.
Substantiation: 1. Scope. The scope of the article and definition of a Prefabricated wiring assembly is vague. Most assembled products and assemblies fit the definition proposed for Article 606. No unique property is identified that places an assembly or subassembly into this article. An inspection authority is left with which article applies to the assembly they inspecting as other articles address the same assemblies in a more complete manner. Example: Luminaires, Industrial Control Panels.
2. Construction - 606(A)(3) Exception: "*Exception: A component of a listed prefabricated (wiring) assembly is not required to comply with a specific requirement that involves a feature or characteristic not required in the specific application for which the assembly is identified and marked. Such component(s) shall be factory assembled."*
This phrase is used within product standards where the testing laboratory can investigate a component in accordance with its intended use. An inspection authority has no method of determining its acceptability other than having to accept the construction because it was assembled in the factory. Assembly in the factory does not insure a safe construction.
3. (B) Assembly 606(B)(3). "*(3) Assemblies of permanently connected components shall be listed. Examples of permanent connections include factory applied rivets, or specialty tool applied fasteners"*
The assembly statement is unclear. Is this addressing electrical components, devices, fasteners? Not all components (screws, rivets, etc.) have standards or requirements that would currently require listing. What is a specialty tool?
4. (C) Protection of Wiring Devices and Conductors *" A prefabricated (wiring) assembly that includes an outlet box, device box or junction box or other enclosure intended for flush mounting, that contains conductors or wiring devices shall be provided with a protective cover that will prevent damage to the conductors and wiring devices during preparation and installation of the finished wall or ceiling surface. The protective cover if metallic, need not be electrically bonded or fixed by screws to the box but shall remain in place. The protective cover shall provide mechanical protection equivalent to the enclosure to which it is attached and shall be able to be easily removed without damage to the box or enclosure, the enclosed conductors or wiring devices."*
The requirements "*with a protective cover that will prevent damage", "but shall remain in place" The protective cover shall provide mechanical protection equivalent to the enclosure"* are unenforceable by the inspection authority. There are no listed covers nor a standard to evaluate them. *"The protective cover if metallic, need not be electrically bonded"*. There is a potential shock hazard if the system is energized and the covers are not bonded. Protective covers were rejected by code panel 3 during the 2008 NEC process. Refer to 3-32 Log #147.
606.7(B) Secureness of Connections. *"The secureness of all pre-assembled mechanical and electrical connections shall be verified at installation."*
This provision requires that all electrical and mechanical connections be verified at the installation site. While this may be well intentioned this is not practical for an inspection authority to verify. All factory assembled products are shipped and do not become loose and disassembled in the process. The need for this requirement is questionable.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-211 Log #2218 NEC-P19 **Final Action: Accept**
(606 (New))

Submitter: Chuck Bull, Rough-in Ready
Comment on Proposal No: 19-298
Recommendation: Delete the entire proposed article.
Substantiation: The installation requirements of the product are already covered in the Code. The prescriptive requirements are better suited for a product standard. There are many companies that have prefabricated wiring assemblies for years without a specific Code article to describe what they do. These products are listed for the application and are sold nationally in electric supply houses and recognized by the inspection community when installed on the jobsite. The substantiation does not identify a problem that the proposed article will solve. The scope clearly defines what a prefabricated wiring assembly is not rather than what it is. This proposed article does not add clarity to the Code. We, at Rough-in Ready have a UL listing on our product that certifies that it has been, and continues to be, tested and inspected to the highest standard and is recognized by the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-212 Log #2219 NEC-P19 **Final Action: Accept**
(606 (New))

Submitter: Chuck Bull, Rough-in Ready
Comment on Proposal No: 19-298
Recommendation: Delete the entire proposed article.
Substantiation: The installation requirements of the product are already covered in the Code. The prescriptive requirements are better suited for a product standard. There are many companies that have prefabricated wiring assemblies for years without a specific Code article to describe what they do. These products are listed for the application and sold nationally in electric supply houses and recognized by the inspection community when installed on the jobsite. The substantiation does not identify a problem that the proposed article will solve. The scope clearly defines what a prefabricated wiring assembly is not rather than what it is. This proposed article does not add clarity to the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-213 Log #2447 NEC-P19 **Final Action: Accept**
(606 (New))

Submitter: Michael Kallmeyer, Denier Electric Co., Inc.
Comment on Proposal No: 19-298
Recommendation: Delete the entire proposed article.
Substantiation: Any and all installation requirements proposed in this article are redundant to other sections of the code, and as such are unnecessary. There is no technical
substantiation for the additional restrictions placed on the manufacturer of the Prefabricated (Wiring) Assembly in proposed sections 606.5(e)(4) and 606.5(e)(5) and may serve to provide a competitive advantage to individual manufacturers. Proposed section 606.5(C)(3) is confusing and open to misinterpretation by the AHJ.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-214 Log #2635 NEC-P19 **Final Action: Reject**
(606 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-298
Recommendation: Accept the proposal in principle.

Retain the protection rule in 606.5(C), and locate the new article in Chapter 7, possibly as Article 735.

Substantiation: These assemblies are shipped in interstate commerce and the protection rule is justified in this case, whether or not it may be justified in Chapter 3 for wiring generally. Although it is true that CMP 9 continues to reject these plates as a mandatory feature, an article in Chapters 5, 6, or 7 can amend or impose such a provision. The principal focus of this comment will be the TCC concerns, which deserve very careful thought. The wiring covered by this article will test the flexibility of the NEC process because it has the capability to unsettle established procedures with respect to licensing and field inspection of electrical work. These topics will need to be addressed by the various jurisdictions, but the protection of the market share of local labor is not a legitimate NEC target.

It is quite correct that this article addresses wiring that in almost every particular will simply comply with current NEC requirements, although assembled off site. However, if this technology is to become available on a routine basis, a protocol must be in place to assure disinterested third party inspection at the assembly site. Section 606.5(B)(3) contains that requirement through the listing process. The fact that there are no special features of this equipment leads to the conclusion that this article does not describe equipment, but rather a special condition, and therefore a Chapter 7 location is more appropriate.

In regard to the general question, lessons can be drawn from the market for manufactured buildings, which are not disassembled on site to repeat rough inspections. Instead, third party inspection agencies cover the assembly facility and certify the results. Admittedly, the comprehensiveness of these inspections and the competence of the supervision exercised, particularly with respect to electrical work, has been a recurring issue. If this article is accepted, the testing laboratories will need to step up their follow-up work so as to make sure no comparable issues arise. The fact that these assemblies are also capable of field inspection on site [see 606.5(A)(4)] will assist in this process.

We cannot say whether this construction method will succeed in the market or not, any more than we could predict in the 1987 NEC whether smart homes would succeed. The National Electrical Code Committee did the correct thing at that time and accepted Article 780. This meant that technology could move forward with the NEC neither helping nor hindering the effort. And when that market failed, the NEC removed Article 780 in the 2008 edition. This was as it should have been, and as it should be now with this new article.

Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 19-208 and the panel action and statement on Comment 19-207.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-215 Log #2741 NEC-P19 **Final Action: Accept**
(606 (New))

Submitter: Christel K. Hunter, Alcan Cable
Comment on Proposal No: 19-298
Recommendation: Delete entire new Article 606, Prefabricated (Wiring) Assemblies.
Substantiation: This article is unnecessary and the need for the new requirements included has not been substantiated. The requirements for installation are already contained within the NEC in the appropriate articles for wiring methods, boxes, etc. This new article attempts to include requirements that are more appropriately considered in a product standard.

The addition of this Article does not increase safety. Because of the prescriptive requirements in the new language, it will hinder innovation by requiring code revisions each time a change is made to a listed system.

This new Article includes a requirement that prewired assemblies be disassembled to assure the secureness of connections. This defeats the purpose for having a listed prewired assembly and essentially indicates that the listing process is inadequate and unreliable. Since our electrical system is in large part based on reliance of the suitability of listed products, this Article is the first step down the road to completely changing our product acceptance practices in the United States.

Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

12-5 Log #249 NEC-P12 **Final Action: Accept**
(610.2 (New), 610.11(E), and 610.13(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-4
Recommendation: The Technical Correlating Committee directs that the last two sentences in proposed 610.2 be deleted from the definition to comply with 2.2.2 of the NEC Style Manual.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Add the following “Informational Note” after the new definition for Festoon Cable.

Informational Note: Festoon cable consists of one or more insulated conductors cabled together with an overall jacket. It is rated 60°C (140°F), 75°C (167°F), 90°C (194°F), or 105°C (221°F) and 600 V.

Panel Statement: The panel accepts the direction of the TCC to review the proposal to comply with the NEC Style Manual.

The panel accepts the deletion of the last two sentences in the definition of festoon cable from Proposal 12-4 and adds an informational note containing the deleted text. The informational note provides characteristics of festoon cable and complies with the NEC Style Manual.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-6 Log #898 NEC-P12 **Final Action: Reject**
(610.11(C), (D), and (E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-11
Recommendation: Accept the proposal with the following revisions:

Wiring Method.

Conductor shall be in approved raceways, or be Type AC or Type MC cable with insulated grounding conductor, or Type MI cable unless otherwise permitted or required in 610.11(A) through (E).

(A) no change.

(B) No change

(C) Flexible Connections. Where flexible connections are required, flexible stranded conductors shall be used.

(D) Pushbuton Station. Where multiconductor cable of flexible cord or cable is used with a suspended pushbutton or other device, the control station or other device shall be supported by approved means that prevents strain on the conductor terminals.

(E) Moving Parts. Where flexibility is required for moving parts a flexible cord or cable that complies with 400.3 and contains an equipment grounding conductor shall be permitted in accordance with the following:

(1) Approved strain relief and protection from physical damage is provided.

(2) In Class I Division 2 locations the flexible cord or cable is an extra- hard usage type that complies with 400.3 and contains an equipment grounding conductor.

Substantiation: Raceways should be approved for the use; this section may be deemed to amend “uses not permitted.” (C) should not be limited to motors and similar equipment. (D) should include devices other than pushbuttons. All flexible cords and cables should comply with 400.3. This section may be deemed to amend that section. Equipment grounding conductors should be specified for flexible cords and cables. Present wiring methods in (C) are covered in the first paragraph.

Panel Meeting Action: Reject
Panel Statement: The submitter’s text does not comply with 4.4.5(c) and (d) of the Regulations Governing Committee Projects in that the statement of the problem and substantiation for the comment do not contain a statement of the problem including a rationale to change the present requirements. The submitter just restated the same assertion in the comment.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-7 Log #908 NEC-P12 **Final Action: Reject**
(610.22)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-12
Recommendation: Delete existing test and revise as follows:
Class III Locations. Collectors shall be designed so as to minimize sparking between them and the contact conductor and where located in Class III locations shall comply with 503.155.
Substantiation: The provision should apply where the location is classified, which is determined by the degree of hazard. "Minimum" is not defined; minimum would be zero.
Panel Meeting Action: Reject
Panel Statement: As revised, the text applies to only Class III locations whereas the original text applied anywhere and had special provisions in Class III locations.
The submitter has not provided definitive substantiation to justify limiting the requirements of 610.22 to Class III locations only.
Section 610.22 is not intended to apply solely to Hazardous (Classified) areas. The definition of minimum in this context is the least quantity assignable, admissible, or possible. Accordingly, the object is to minimize sparks to the lowest possible value.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-8 Log #2636 NEC-P12 **Final Action: Reject**
(610.31(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-13
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:
"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.
The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-9 Log #2637 NEC-P12 **Final Action: Reject**
(610.32)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-14
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:
"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.
The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-10 Log #713 NEC-P12 **Final Action: Reject**
(610.51(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-15
Recommendation: Accept the proposal and revise as follows:
Where two or more motors operate a single hoist, carriage, or bridge, they shall be permitted to be controlled by a single controller that complies with Exceptions No. 1 and 2 for 430.87.
Substantiation: Proposal would be helpful to Code users and clarify 430.87 if not amended.
Panel Meeting Action: Reject
Panel Statement: This change is unnecessary. Chapter 4 is always applicable unless specifically excluded or modified. Therefore, 430.87 is already applicable by virtue of 90.3.
The panel does not agree that requirements for controllers are limited to Article 430 as there are requirements in other sections of the NEC that relate to the proper use of controllers such as 110.10.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 620 — ELEVATORS, DUMBWAITERS, ESCALATORS, MOVING WALKS, WHEELCHAIR LIFTS, AND STAIRWAY CHAIR LIFTS

12-11 Log #2702 NEC-P12 **Final Action: Reject**
(620.2.Power Safe Protector (PSP))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 12-17
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The submitter's comments are not persuasive. The NEC does not currently prohibit installation of these devices and insufficient substantiation has been provided to exclude other well established receptacle options.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
HITTEL, M.: UL researched advanced receptacles, but there is no product listing or certification requirements regarding these type of advanced receptacles.

12-12 Log #2638 NEC-P12 **Final Action: Reject**
(620.20(A)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-20
Recommendation: Accept the proposal in principle.

Do not delete 620.20(A)(1)(a). Do not create the exception as proposed. Instead, revise (d) by deleting (d)(1), (d)(2), and (d)(3) and making (d)(4) into the entirety of (d) as follows:

"(d) Flexible cords and cables, or conductors grouped together and taped or corded, shall be permitted to be installed without a raceway in lengths not to exceed 1.8 m (6 ft)."

Change the designation of the list items following from a., b., and c. to 1., 2., and 3.

Substantiation: This is a far simpler method to accomplish the intent of the proposal, for which there is no technical objection. Retaining 620.20(A)(1)(a) retains the flexible wiring methods, and nothing in Article 348 (or 350, or 356 for the "B" style) limits the allowable length of these flexible wiring methods, so a statement waiving a length limitation becomes unnecessary. when these wiring methods are removed from 620.20(A)(1)(d), which in turn leaves only the flexible cord provision. This then becomes the entirety of (d), with the 6-ft limitation added in order to avoid changing the requirement. The result is much simpler and meets all the objectives of the proposal submitter.
Panel Meeting Action: Reject
Panel Statement: The submitter's text would permit the use of unlimited lengths of FMC, LFMC and LFNMC anywhere in the hoistway. It is the intention to only continue to permit unlimited lengths of these wiring methods only between risers and limit switches, interlocks, operating devices and similar equipment.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-13 Log #712 NEC-P12 **Final Action: Reject**
(620.21(A)(1)(b))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-22
Recommendation: Accept the proposal and revise as follows:

(b) Cables of a jacketed and flame-retardant type used in Class 2 power-limited circuits shall be permitted to be installed between risers and signal equipment and operating devices if the cables are supported by approved means and protected where likely to be subject to physical damage.

Substantiation: Physical damage may not be a factor at time of installation or inspection, but may be likely. "Likely" is a term used many times in the NEC.
Panel Meeting Action: Reject
Panel Statement: The submitter has still provided no definitive substantiation that changes are necessary. This wiring is installed in a protected space that is accessible to only elevator personnel and no known problems have arisen that would warrant changing the existing wording.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-14 Log #907 NEC-P12 **Final Action: Reject**
(620.23)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-27
Recommendation: Accept the proposal.
Substantiation: "Minimum" is defined as the least possible, which is zero.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided definitive substantiation that the changes are necessary. The current wording is well understood and has withstood the test of time.

The definition of minimum is the least quantity assignable, admissible, or possible. Accordingly, the objective is to minimize the likelihood of damage.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-15 Log #2639 NEC-P12 **Final Action: Reject**
(620.51 Exception No. 1)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-28
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:

"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.

The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-16 Log #2640 NEC-P12 **Final Action: Reject**
(620.51(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-29
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:

"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.

The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-17 Log #2641 NEC-P12 **Final Action: Reject**
(620.51(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-30
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:

"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.

The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-18 Log #2642 NEC-P12 **Final Action: Reject**
(620.51(C)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-31
Recommendation: Accept (in the order the changes were proposed) the insertion of "lockable" (two locations), the deletion of the word "non-fused", and the insertion of "non-fused lockable". Reject the insertion of "disconnecting means", and the deletion of "motor circuit switch". Accept the deletion of "being capable of being locked in the open position". Reject the insertion of "motor circuit". Accept the deletion of the final paragraph.
Substantiation: The rejected language restores all provisions of the 2008 NEC, for which the panel correctly objected that no substantiation was offered. What remains is the lockable disconnect rule exactly as it is in the current NEC, except the characteristics of the disconnect are transferred to Article 110.

The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:

"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-19 Log #2643 NEC-P12 **Final Action: Reject**
(620.53)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-32
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:

"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.

The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-20 Log #2644 NEC-P12 **Final Action: Reject**
(620.54)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-34
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:

"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.

The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-21 Log #2645 NEC-P12 **Final Action: Reject**
(620.55)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-35
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:

"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.

The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-22 Log #1914 NEC-P12 **Final Action: Reject**
(620.62 Exception (New))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 12-38
Recommendation: Accept the proposal in principle, revising the exception as follows:

Exception: Where the elevator system electrical design is under the control of a licensed professional engineer engaged in the design or maintenance of electrical installations, the selection of overcurrent protective devices shall be permitted to coordinate to the ~~extent practicable~~ level required. The design shall be documented, stamped by the professional engineer, and made available for review by the authority having jurisdiction.
Substantiation: This proposal should be accepted in principle for a number of reasons:

1. A licensed engineer should be able to optimize protection and coordination as recommended in the various IEEE *Color Books* that address the issue of coordination and as is allowed in NFPA 110 and in the electrical codes in Phoenix, Wisconsin and Massachusetts.

2. The actions of the panel seem inconsistent. In rejecting both this proposal and 12-37 the panel is saying that licensed engineers cannot design coordination to the level required but unlicensed facility operators and elevator service personnel can defeat coordination at will while live work is performed, a time when the likelihood of a power disrupting incident occurring is probably at its highest.

3. The use of an incident energy reduction system (see ROP 12-37) requires engineering. A maintenance switch type system requires a second coordination study to determine if the system can still operate properly at the lower instantaneous trip setting. If it is acceptable for an engineer to coordinate the system to the level required under maintenance conditions, why is it not also permitted under normal operating conditions?

Finally, the panel should note that the text of this exception is similar to that in 240.86(A).
Panel Meeting Action: Reject
Panel Statement: The proposed language is unenforceable and reduces the safety of elevator systems by limiting the selectivity of overcurrent devices without providing any technical substantiation to support the request for the reduction in safety for these elevator circuits. An exception to the main rule including the wording "coordinate to the level required" is not needed since selective coordination for the full range of overcurrents is achievable. The proposed language "coordinate to the level required" does not provide sufficient specificity as to what constitutes an acceptable selectively coordinated installation and would permit systems to cascade overcurrent protective devices for any level of overcurrent for any reason, such as cost, effort, expertise, or space. Selective coordination for the full range of overcurrents is required and provides the desired level of system reliability necessary for elevator circuits.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-23 Log #2703 NEC-P12 **Final Action: Reject**
(620.85)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 12-39
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 12-11.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:

HITTEL, M.: UL researched advanced receptacles, but there is no product listing or certification requirements regarding these type of advanced receptacles.

ARTICLE 625 — ELECTRIC VEHICLE CHARGING SYSTEM EQUIPMENT

12-24 Log #1404 NEC-P12 **Final Action: Accept**
(625.2.Electric Vehicle)

TCC Action: The Technical Correlating Committee notes that only the legislative text changes were to be incorporated into this definition.
Submitter: Frank C. Lambert, Georgia Tech/NEETRAC / Rep. Plug-In Hybrid & Electric Vehicle Working Group
Comment on Proposal No: 12-44
Recommendation: Revise text to read as follows:
Electric Vehicle. An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. For the purpose of this article, ~~electric motorcycles and similar type vehicles and~~ off-road, self-propelled electric vehicles, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like, are not included.
Substantiation: Battery capacities of vehicles for on-road use are not covered under the scope of the NEC. EVs can be charged using 120 VAC, 15A receptacles as are electric motorcycles using similar EVSE. Several electric motorcycles currently on the market can be charged by either 120 or 240 VAC, 15A supply. Adopting similar requirements for electric motorcycles would allow them to use the same public infrastructure as EVs.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-25 Log #250 NEC-P12 **Final Action: Accept**
(625.2.Rechargeable Energy Storage System)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-50
Recommendation: The Technical Correlating Committee directs that the action on this proposal be rewritten to comply with 2.2.2 of the NEC Style Manual that states that definitions shall not contain the term being defined.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise Definition of Rechargeable Energy Storage System to read as follows:

Rechargeable Energy Storage System. Any power source that has the capability to be charged and discharged.

Informational Note: Batteries, capacitors, and electro mechanical flywheels are examples of rechargeable energy storage systems.
Panel Statement: The panel accepts the direction of the TCC to rewrite the proposal to comply with 2.2.2 of the NEC Style Manual.

The panel edits the definition and clarifies the text with an informational note.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-26 Log #2646 NEC-P12 **Final Action: Accept in Principle in Part**
(625.2 Electric Vehicle)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-43
Recommendation: Accept the proposal in principle.
Do not insert the sentence as written by CMP 12. Instead, revise the new definition of PHEVs (Proposal 12-42a) to read as follows:
A form of electric vehicle intended for on-road use with the ability to store and use off-vehicle electrical energy in the rechargeable energy storage system, and having a second source of motive power.
Substantiation: This approach improves both definitions by avoiding the statement of requirements and/or using the defined terms within the definitions, all as proscribed by 2.2.2 of the NEC Style Manual.
Panel Meeting Action: Accept in Principle in Part
Revise definition of Plug-in Hybrid Electric Vehicle (PHEV) to read as follows:
Plug-in Hybrid Electric Vehicle (PHEV). A type of electric vehicle intended for on-road use with the ability to store and use off-vehicle electrical energy in the rechargeable energy storage system, and having a second source of motive power.
Panel Statement: The panel accepts in principle the submitter's definition of PHEV as recommended in the comment and edits for clarity.
The panel does not accept the deletion of the text "Plug-in hybrid electric vehicles (PHEV) are considered electric vehicles." in Proposal 12-43. Removing this sentence would break the association between PHEVs and electric vehicles.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
MARCOVICI, S.: The term "off-vehicle" should be replaced with the term "off-board" which is used by the automotive industry. See sections 625.26 and 626.27, and the definition for Electrified Truck Parking Space under 626.2.

12-27 Log #1405 NEC-P12 **Final Action: Accept**
(625.13)

Submitter: Frank C. Lambert, Georgia Tech/NEETRAC / Rep. Plug-In Hybrid & Electric Vehicle Working Group
Comment on Proposal No: 12-54
Recommendation: We support the committee's action on this proposal.
Substantiation: EVSE meeting the requirements of 625.18, 625.19, and 625.29 can be cord-and-plug connected even when it is greater than 120 VAC.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-28 Log #2121 NEC-P12 **Final Action: Reject**
(625.13)

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facility Executives
Comment on Proposal No: 12-54
Recommendation: Accept in Principle. Modify 625.13 as written by the submitter, Mr. Lambert, as shown below:
Electric vehicle supply equipment rated at 125 volts, single phase, 15 or 20 amperes shall be permitted to be cord-and-plug-connected. EVSE rated greater than 20 amperes and not more than 250 volts and or a part of a system 625.18, 625.19, and 625.29 shall be permitted to be cord-and-plug-connected. All other electric vehicle supply equipment shall be permanently connected and fastened in place. This equipment shall have no exposed live parts.
Substantiation: This is an important proposal and I would not like to see its core concept lost because of a technicality. Equipment run at 250V and 20A is very common and concern over voltage and current charging platform should not impede development of this technology in households, schools, or elsewhere.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action on this proposal. An EVSE meeting the requirements of 625.18, 625.19, and 625.29 can be cord-and-plug connected even when the voltage is greater than 120 VAC.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-29 Log #1775 NEC-P12 **Final Action: Accept**
(625.14)

Submitter: Gery J. Kissel, General Motors Corporation / Rep. Chairman, SAE J1772, SAE Electric Vehicle Conductive
Charge Coupler
Comment on Proposal No: 12-56
Recommendation: No change to present wording.
Substantiation: We support the panel's action on this proposal. Charge levels are not within the scope of the NEC and are defined in SAE J1772.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-30 Log #1777 NEC-P12 **Final Action: Accept**
(625.14)

Submitter: Gery J. Kissel, General Motors Corporation / Rep. Chairman, SAE J1772, SAE Electric Vehicle Conductive
Charge Coupler
Comment on Proposal No: 12-57
Recommendation: No change to present wording.
Substantiation: We support the panel's action on this proposal. Charge levels are not within the scope of the NEC and are defined in SAE J1772.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-31 Log #2704 NEC-P12 **Final Action: Reject**
(625.22)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 12-60
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 12-11.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
HITTEL, M.: UL researched advanced receptacles, but there is no product listing or certification requirements regarding these type of advanced receptacles.

12-32 Log #906 NEC-P12 **Final Action: Reject**
(625.23)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-62
Recommendation: Accept the proposal with the following revisions:
The disconnecting means for vehicle supply equipment shall be readily accessible and provided with approved permanent means for locking in the open (off) position.
Substantiation: More than 60 amperes or 150 volts should not have any bearing on being readily accessible which present wording implies. "Open position" should be specifically "off"; open position can apply to the door or cover of the disconnnecting means.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that the requirements should be extended below 60 amps. The submitter has not provided any evidence of a problem.
The term "Open" with regard to disconnecting means is used throughout the Code and is widely understood.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-33 Log #2647 NEC-P12 **Final Action: Reject**
(625.23)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-61
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:

"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."

The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.

The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-34 Log #2405 NEC-P12 **Final Action: Accept**
(625.29(B))

Submitter: Brian E. Rock, Hubbell Inc.
Comment on Proposal No: 12-64
Recommendation: I support the panel action.
Substantiation: This Comment is provided to aid Panel 12 with regard to the accuracy of the Panel Statement for P12-84. As one of the co-authors (along with Tim Croushore, Greg Nieminski, Charlie Claar, Craig Toepfer, etc.) under EPRI IWC Task Force Chair Dave Brown of the original Article 625, I can provide insight as to the technical basis for the 18-inch lower height limit that the Submitter sought to change.

The primary purpose of the National Electrical Code® is to insure installations safe from the risk of fire and shock. To the extent that other mandates unrelated to this primary purpose (such as ADA), those were taken into account, as reflected by 4-foot upper height limit from ADA. Where those mandates for other purposes leava a "gap" in terms of electrically safe installations, the primary purpose must predominate.

For the lower limit, however, the use of electric vehicle charging equipment is highly likely in a mixed environment of electric-powered and gasoline-powered vehicles. This mixed usage environment includes refueling/recharing of gasoline- and electric-powered vehicles.

Section 625.28 requires that EVSE installed in Hazardous (Classified) Locations must comply with Articles 500 through 516, specifically Article 514 for Motor Fuel Dispensing Facilities. Table 514.3(B)(1) establishes an upper gasoline fume height limit of 18 inches, this was taken by the Task Force to establish the lower limit for nonhazardous (unclassified) ordinary locations so that there would be no "gray areas" with regard to this boundary between potential gasoline fume accumulation and where EVSE could be safely located in ordinary locations.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-35 Log #398 NEC-P12 **Final Action: Accept**
(Table 625.29(D)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-66
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "m^3/min" at the end of the line. This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.

The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-36 Log #399 NEC-P12 **Final Action: Accept**
(625.29(D)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-67
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "m^3/min" at the end of the lines describing metric measurements. This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.

The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-37 Log #400 NEC-P12 **Final Action: Accept**
(Table 625.29(D)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-68
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "m^3/min" at the end of the comparable line in the metric table. This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.

The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so.

Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-38 Log #401 NEC-P12 **Final Action: Accept**
(625.29(D)(3))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-69
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 626 — ELECTRIFIED TRUCK PARKING SPACES

12-39 Log #905 NEC-P12 **Final Action: Reject**
(626.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-70
Recommendation: Accept the proposal with the following revisions:
Separable Power Supply Cord or Cable Assembly. A flexible cord or cable assembly that complies with 400.3, containing an equipment grounding conductor, provided with a firmly attached grounding-type attachment plug and cord connector body, and all other fittings and devices designed and installed for supplying electric current to the truck or TRU flanged surface inlet.
Exception: Where the flexible cord or cable is permanently attached as part of a cable management system as specified in 626.23(A) an attachment plug shall not be provided.
Substantiation: The cord or cable should be noted to comply with 400.3, and contain an EGC. An attachment plug is not used where the cord or cable is permanently attached as part of a management system.
Panel Meeting Action: Reject
Panel Statement: The submitter's text does not comply with the NEC Style Manual, 3.2.1 because "firmly" is a vague term and 2.2.2 because the submitter's definition contains requirements.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-40 Log #904 NEC-P12 **Final Action: Accept in Principle in Part**
(626.4(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-71
Recommendation: Accept the proposal with the following revisions:
The provisions of this article do not apply to that portion of equipment on premises that requires electric power to load or unload cargo, operate conveyors, hoists, and other equipment used on the site or truck.
Substantiation: "Premises" includes all classifications, including governmental. The definition of device indicates it is an item that does not require power (watts) but carries electric current.
Panel Meeting Action: Accept in Principle in Part
Revise 626.4(A) to read as follows:
(A) Not Covered. The provisions of this article shall not apply to that portion of other equipment in residential, commercial,
or industrial facilities that require electric power used to load and unload cargo, operate conveyors and for other equipment used on the site or truck.
Panel Statement: The panel accepts in principle the submitter's comment as related to "device" and "devices" and changes to "equipment" and edits for clarity.
The panel does not accept the remainder of the comment.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-41 Log #402 NEC-P12 **Final Action: Accept**
(626.11(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-72
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-42 Log #911 NEC-P12 **Final Action: Accept in Principle in Part**
(626.22(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-77
Recommendation: Accept the proposal with the following revisions:
All electrical truck parking space equipment shall be readily accessible and provided with working space not less than 600 mm (2 ft) wide or the width of the equipment whichever is greater, and not less than 2.0 m (6 ft 6 in.) high or the height of the equipment, whichever is greater.
Substantiation: "Readily accessible" encompasses "unobstructed entrance or passageway", working space, not just the entrance. A limit to not more than 6 ft 6 in. high does not appear related to safety; what safety is diminished by a space height more than 6 ft 6 in.?
Panel Meeting Action: Accept in Principle in Part
Revise 626.22(C) to read as follows:
(C) Access to Working Space. All electrified truck parking space supply equipment shall be accessible by an unobstructed entrance or passageway not less than 600 mm (2 ft) wide and not less than 2.0 m (6 ft 6 in.) high.
Panel Statement: The panel accepts changing "more" to "less" in 626.22(C) as requested by the submitter in his comment. The panel also changes the title to "Access to Working Space" to clarify that (C) only pertains to access.
The panel does not accept the remainder of the comment because the proposed change does not reflect the actual allowable truck parking space equipment configuration.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
HITTEL, M.: Since the title has been changed to clarify that 626.22(C) applies only to access to the working space and not the working space itself, the change to "not less than 2.0 m (6 ft 6 in)" could impact many existing truck stop parking space equipment designs where there is not a defined working space within the equipment and the configuration is such that the area requiring access is reached thru an open panel has been removed for servicing. By requiring a minimum access height of 2 m (6 ft 6 in) the size and configuration of the equipment may have to be increased unnecessarily to meet this minimum dimension.

12-43 Log #910 NEC-P12 **Final Action: Reject**
(626.22(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-79
Recommendation: Accept the proposal with the following revisions:
The disconnecting means shall be readily accessible and have approved permanent provisions for locking in the open (off) position.
Substantiation: The first sentence already requires a disconnecting means to be provided. "Approved permanent means" eliminates unnecessary wordage. Open (off) should be specified, covers and doors can be locked open.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide definitive substantiation that a problem exists in the field or with this requirement. The existing wording is adequate.
The term "open" with regard to disconnecting means is used throughout the Code and is widely understood.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-44 Log #2648 NEC-P12 **Final Action: Reject**
(626.22(D))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-78
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:
"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.
The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-45 Log #1316 NEC-P12 **Final Action: Reject**
(626.24(B))

Submitter: Gregory C. Nieminski, Gregory C. Nieminski, LLC / Rep. Chairman, EPRI IWC Transportation Electrification Committees Code Task Force
Comment on Proposal No: 12-82
Recommendation: Revise as follows:
(B) Receptacle. All receptacles shall be listed and of the non-locking and grounding type. Every truck parking space with electrical supply shall be equipped with (B)(1) and (B)(2).
Substantiation: The use of a non-locking type receptacle in the truck parking space supply equipment is in the Fine Print Note but was not included in the requirement of the paragraph above addressing the receptacle construction. A Fine Print Note is not enforceable. A locking type receptacle would transfer forces to the receptacle should the cable be abruptly pulled, tugged on, or stressed, permanently damaging the receptacle and resulting in exposure of live parts.
Presently, all of the installed equipment employ non-locking type receptacles and have been used successfully without damage.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided definitive substantiation to justify the limitation to non-locking receptacles.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 11 Negative: 2
Explanation of Negative:
HITTEL, M.: This non-locking type receptacle requirement was inadvertently placed in the FPN during the initial development of this section. The reason that it is desirable to have a non-locking type is that driving off with the connection in place or someone tripping over the cords are a real possibility and this requirement would reduce the probability of damage to the receptacle which could result in exposing energized conductors inside the receptacle enclosure. The non-locking type plug and receptacle is more suitable for the specific application than the locking type. While it is not designed specifically for the purpose of performing the "break-away" function, it is certainly more probable to pull out without damaging the plug or receptacle than the locking type, which is very likely to damage the receptacle and expose energized parts when the plug is pulled out.
WARD, R.: This non-locking type receptacle requirement was inadvertently placed in the FPN during the initial development of this edition. The reason that it is desirable to have a non-locking type is that driving off with the connection in place or someone tripping over the cords are a real possibility and this requirement would avoid the damage to the receptacle which could result in exposing energized conductors inside the receptacle enclosure. The non-locking type plug and receptacle is more suitable for the specific application than the locking type. While it is not designed specifically for the purpose of performing the "break-away" function, it is certainly more probable to pull out without damaging the plug or receptacle than the locking type, which is very likely to expose energized parts when the receptacle is pulled out.

12-45a Log #CC1200 NEC-P12 **Final Action: Accept**
(626.24(B)(1))

Submitter: Code-Making Panel 12,
Comment on Proposal No: 12-84
Recommendation: Revise 626.24(B)(1) to read as follows:
A maximum of three receptacles, each 2-pole, 3-wire grounding type and rated 20 amperes,125 volts, and two of the three connected to two separate branch circuits.
Substantiation: The panel revises section 626.24(B)(1) by removing the word "duplex" to allow single or duplex receptacles and revises the language in order to match existing field conditions utilizing GFCI receptacles.
The revised text clarifies the intent of the current requirement.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-46 Log #1317 NEC-P12 **Final Action: Accept in Principle**
(626.24(B)(1))

Submitter: Gregory C. Nieminski, Gregory C. Nieminski, LLC / Rep. Chairman, EPRI IWC Transportation Electrification Committees Code Task Force
Comment on Proposal No: 12-84
Recommendation: Revise as follows:
Two single receptacles, two duplex receptacles or a combination thereof, not to exceed four outlets, each receptacle a 2-pole, 3-wire grounding type and rated 20 amperes, 125 volts, and each receptacle connected to an individual ~~separate~~ branch circuit ~~that shall have no other outlets~~.
Substantiation: The intent of the original article requiring two single receptacles was to minimize the number of connections from the truck parking space supply equipment to the truck or trucks in adjacent parking spaces. Each receptacle was intended to be connected to its own individual branch circuit.
The submitter recognizes that duplex receptacles are more commonly available and may be used as an alternative provided each duplex receptacle continues to be connected to a separate branch circuit. Ground fault circuit interrupter protection may still be provided in various forms as specified in 626.24(D). Using a duplex receptacle with GFCI protection is one option for providing protection for personnel.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on 12-45a.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
HITTEL, M.: This change appears to permit a total of 6 outlets for a electrified truck parking space supply which potentially creates a cord management problem for pedestal-type or raised concrete pad design styles as stated in the submitter's substantiation.

12-47 Log #2407 NEC-P12 **Final Action: Accept in Principle**
(626.24(B)(1))

Submitter: Brian E. Rock, Hubbell Inc.
Comment on Proposal No: 12-84
Recommendation: I support the Proposal but revise the proposed text to read as follows:

Three duplex receptacles, each 2-pole, 3-wire grounding type and rated 20 amperes,125 volts, and one of the three connected to a separate branch circuit that shall have no other outlets.

Substantiation: The respected Submitter of P12-84, as part of his Substantiation, cites "In addition, a widely circulated color photo of one of these umbilical assemblies clearly shows GFCI duplex receptacles." If the Submitter's and Panel's intent is in part to accommodate the installed base of electrified truck parking space equipment, the Panel should be aware that that umbilical assembly has a THIRD duplex receptacle connected "downstream" (same circuit) to one of the GFCI two duplex receptacles. Not visible in that widely circulated color photo mentioned by the Submitter, this third receptacle is accessible only from the portion of the umbilical EXTERNAL to the truck cab and serves to supply power to the supply cord of the engine block heater. Photos of THIRD duplex receptacle on the umbilical external to the truck and of the FIRST and SECOND duplex (GFCI) receptacles on the umbilical used in the truck cab's interior accompany this Comment.

Note: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on 12-45a.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:

HITTEL, M.: The submitter mentions in his substantiation that the "umbilical cord style of truck supply equipment "has a THIRD duplex receptacle connected "downstream" (same circuit) to one of the GFCI two duplex receptacles." This is not entirely accurate. The third receptacle on the umbilical assembly accessible from outside of the cab of the truck is actually powered from BOTH of the GFCI's mounted inside. This receptacle has two outlets that are individually and separately supplied.

12-48 Log #2649 NEC-P12 **Final Action: Reject**
(626.24(B)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-86
Recommendation: Accept the proposal.
Substantiation: The entire point of the proposal is to permit exactly what the panel wants to permit, with simpler wording. Any receptacle with a rating that is within the listing parameters for servicing a 30 amp circuit taken from a three-phase wye distribution with a neutral and operating 120 volts to ground is acceptable. That could be a pin-and-sleeve receptacle or a conventional NEMA 14-30 straight blade device; which are used by the millions on these very circuits as demonstrated in the substantiation.
Panel Meeting Action: Reject
Panel Statement: The wording is adequate as it stands. The suggested language would preclude the use of a 125/250 NEMA receptacle on a 120/208 Y single phase circuit. It is inappropriate to move this allowance to the FPN where it is only explanatory. There is no NEMA 120/208 Y single phase receptacle configuration. This is why the 125/250 NEMA receptacle is permitted.

Furthermore, the NEC Style Manual, Table 3.2.1 deems the word "appropriate" as a vague and unenforceable term.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-49 Log #909 NEC-P12 **Final Action: Reject**
(626.24(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-88
Recommendation: Accept the proposal with the following revisions:

The electrified truck parking space supply equipment shall be provided with a switch or circuit breaker that simultaneously disconnects all ungrounded conductors of the power supply for the electrified truck parking space. This disconnecting means shall be readily accessible and have approved permanent means for locking in the open (off) position.

Substantiation: Simultaneous disconnection should be specified as is required in many other sections. The proposal eliminates unnecessary wording re: locking and specifies "open" to be "off" not the cover or door of the disconnecting means.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided definitive substantiation to justify the removal of the detailed requirements for the disconnect locking means.

The proposed change does not reflect the actual allowable truck parking space equipment configuration.

The term "Open" with regard to disconnecting means is used throughout the Code and is widely understood.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-50 Log #914 NEC-P12 **Final Action: Reject**
(626.25)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-89
Recommendation: Accept the proposal with the following revisions:

Separable Power Supply Cable Assembly. A flexible cord or cable with a cord connector body, and attachment plug intended for connection with a truck flanged surface inlet. The power supply cord or cable assembly shall be one of the types and ratings specified in 625.25(A) and (B). Flexible cords and cables with adapters, pigtail ends, or extension cords and similar items shall not be used.

(A) Ratings.

(1) Twenty-Ampere Power Supply Cable Assembly. Assemblies supplied by receptacles specified in 626.24(B)(1) shall be rated 20 amperes.

(2) Thirty Ampere Power Supply Cable Assembly. Assemblies supplied by receptacles specified in 626.24(B)(2) shall be rated 30-amperes.

(B) Power Supply Flexible Cord or Cable. The power supply assembly flexible cord or cable shall be an extra-hard usage type that complies with 400.3, containing an equipment grounding conductor and with a securely attached grounding-type plug and cord connector body. The exposed length of the flexible cord or cable shall not exceed 7.5 m (25 ft) unless part of a cord or cable management system or take-up system. A right-angle plug shall not be used unless the orientation of the supply receptacle permits the cord or cable to hang freely downward without a bend.

Substantiation: The exceptions permit a 15 ampere assembly which, if connected to a single receptacle on an individual circuit per 626.24(B) rated 20 amperes is a violation of 240.5(A). 400.3 requires flexible cords and cables to be suitable for the use, which imposes a requirement to be sunlight resistant, suitable for wet locations, and other conditions where they are a factor. All cords and cables are not suitable, e.g., electric vehicle cables and those without a W designation for wet locations and sunlight resistance. The orientation of the receptacle determines if the cord hangs straight down. Extra-hard usage cords of Table 400.4 are rated 600 volts. Attachment plugs are already require to be listed by 406.2(A)
Panel Meeting Action: Reject
Panel Statement: The panel does not accept the submitter's substantiation. The rating of the cord set is determined by the flexible cord rating and also by the plug rating and/or the connector rating on the other end (the rating of the assembly is the lower of the rating of the individual components making up the assembly).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-51 Log #1778 NEC-P12 **Final Action: Accept**
(626.25(A)(1) Exception)

Submitter: Gery J. Kissel, General Motors Corporation / Rep. Chairman, SAE J1772, SAE Electric Vehicle Conductive
Charge Coupler
Comment on Proposal No: 12-91
Recommendation: Revise as follows:
Exception: It shall be permitted to use a listed separable power-supply cable assembly, either hard service or extra-hard service and rated 15 amperes, 125 volts for connection to an engine block heater for ~~existing~~ legacy vehicles.
Substantiation: The comment on the affirmative was correct in that the reference was intended to refer to these legacy vehicles.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-52 Log #1318 NEC-P12 **Final Action: Accept**
(626.26)

Submitter: Gregory C. Nieminski, Gregory C. Nieminski, LLC / Rep. Chairman, EPRI IWC Transportation Electrification Committees Code Task Force
Comment on Proposal No: 12-99
Recommendation: No change to original wording.
Substantiation: The submitter agrees with the comment made as an explanation of the negative vote. The means for preventing back-feed or the use of equipment intended for interactive systems are undergoing continual changes in development as new forms of communications between the utility and end-user equipment are being developed. Therefore, the means to provide this function in "identified" equipment may change as new forms of communications and control systems are developed.
Panel Meeting Action: Accept
Revise text to read as follows:
626.26 Loss of Primary Power.
Means shall be provided such that, upon loss of voltage from the utility or other electric supply system(s), energy cannot be back-fed through the truck and the truck supply equipment to the electrified truck parking space wiring system unless permitted by 626.27.
Panel Statement: The panel understands the intent of the submitter is to Reject Proposal 12-99.
The panel understands the submitter's intent is to revert back to the 2008 text.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-53 Log #1927 NEC-P12 **Final Action: Reject**
(626.28 (New))

Submitter: Greg Ward, IdleAire Inc.
Comment on Proposal No: 12-100
Recommendation: Add new text to read as follows:
626.28 Means to Prevent Connection or Disconnection Under Load. Each 30 ampere receptacle required by 626.24(B)(2) shall meet one of the following requirements:
(A) Include an interlocked receptacle with an associated switching device of an interlocking type,
(B) Be provided with a switch rated receptacle-plug combination, or
(C) Be provided with a comparable means identified and listed for the purpose to prevent connection or disconnection under load.
The means to prevent connection or disconnection under load shall prevent user access to live parts.
Substantiation: The original proposal's substantiation was based upon the use of interlock devices in port staging areas (primarily for TRUs - transport refrigerated units) as well as the reduction of injuries by the use of such interlocked devices. However, in discussions with operators, even at staging areas with interlock devices and users specifically trained to use/operate them, there were still accounts of serious injuries where the interlock failed.
Further review of OSHA and NFPA 70E documents revealed that there is a requirement to identify all possible electrical hazards, mitigation of these hazards, and the training of employees and issuance of protective equipment for them. In our experience, most of the truck drivers do not have protective equipment and most do not appear to be trained in the handling of high voltage equipment. We find many of them messing with standard electrical plugs (120v 20 ampere) while standing in the rain. These higher voltage connections (30 ampere) have serious potential for arc flash or shock if not properly connected or disconnected.
There are real dangers around the use of this type of equipment. Lack of training and proper equipment further compound that danger. Truck drivers are tired from driving all day and often are looking for a short cut. They just want to eat, shower and go to bed. The best case would be to require the receptacle connection to be a type of interlocking mechanism that would allow the plug to become energized only after the locking mechanism is engaged. This would greatly reduce the potential danger for the truck driver.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its position that there is insufficient technical substantiation to justify the limitation to interlocking type, switch-rated receptacles or with a comparable means identified and listed to prevent connection or disconnection under load. The current requirement does not restrict the use of these type of devices if desired.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 9 Negative: 4
Explanation of Negative:
HITTEL, M.: The appropriate action should be Accept in Principle. The options proposed are an effective means to manage the hazards and risks unique to the specific application's typical use and foreseeable misuse. A proactive approach is necessary given that this is a developing and proliferating type of construction. While formal, documented cases have not been presented indicating that these hazards have occured, it is my opinion that they are likely to occur. The companies that are building and installing these systems are best suited to assess the conditions of use and service and the associated risk factors.
It remains questionable whether the UL Standards which evaluate plugs and receptacles on their ability to "rupture" (break) current effectively, address the specific application's typical use and foreseeable misuse under both normal and fault conditions. Further, the EPRI-IWC working group did perform some research and found some incidents of injury to an operator involving a similar application that did occur in which this change could have prevented. Regretfully, the source of these incidents did not agree to be quoted or go on record, but it did confirm our concerns. Further, the proposal does not give a proprietary advantage to any one manufacturer as options for accomplishing this feature are given.
KOVACIK, J.: See my Explanation of Negative Vote and substantiation on Comment 12-54.
MARCOVICI, S.: In order to increase the safety of the wiring system at the electrified truck parking space, an interlocking mechanism is mandatory. A requirement similar to those found in sections 625.18 and 625.19 must be introduced. As a result, the proposal should be accepted.
WARD, R.: The appropriate action should be Accept in Principle. The options proposed are an effective means to manage the hazards and risks unique to the specific application's typical use and foreseeable misuse. A proactive approach is necessary given that this is a developing and proliferating type of construction. While formal, documented cases have not been presented indicating that these hazards have occurred, it is our opinion that they are likely to occur. The companies that are building and installing these systems are best suited to asses the conditions of use and service and associated risk factors. It remains questionable whether UL 498 and 1682, which evaluate plugs and receptacles on their ability to "rupture" (break) current effectively, address the specific application's typical use and foreseeable misuse. Further, in the rejection to Proposal 12-100, the committee used the statement "There is insufficient technical substantiation to justify the limitation…" As a result, the EPRI working group did perform some research and found some incidents involving a similar application that did occur in which this change could have prevented (in Comment 12-59 Substantiation). Regretfully, the source of these incidents did not agree to be quoted or go on record, but it did confirm our concerns. Further, the proposal does not give a proprietary advantage to any one manufacturer as options for accomplishing this feature are given.

12-54 Log #2152 NEC-P12 **Final Action: Reject**
(626.28)

Submitter: John R. Kovacik, Underwriters Laboratories Inc.
Comment on Proposal No: 12-100
Recommendation: Modify the original proposal as follows and place the revised text directly after the FPN for 626.24(B)(2):
~~626.28 Means to Prevent Connection or Disconnection Under Load. Each~~ The 30 ampere receptacle required by 626.24(B) shall ~~meet~~ be one of the following ~~requirements~~ constructions:
(A) Include a An interlocked receptacle with disconnect ~~an associated switching device of an interlocking type~~.
(B) ~~Be provided with a~~ A switch rated receptacle-plug combination, or
(C) ~~Be provided with a~~ A comparable means identified and listed ~~for the purpose~~ to prevent connection or disconnection under load. The means to prevent connection or disconnection under load shall prevent user access to live parts.
Substantiation: For Proposal 12-100, the Panel Action should have been Accept in Principle. The Submitter, representing the EPRI National Electric Transportation Infrastructure Working Council, proposed to add to Article 626 an additional safeguard that likely would reduce potential hazards involved with electrical loads and associated components being disconnected under load (potentially up to 30 amps). The Submitter provided realistic and likely scenarios that substantiate such an additional safeguard. Also, generally, electrical components should be designed/rated for the intended application, including typical use and foreseeable misuse, and the options proposed by the Submitter for demonstrating compliance are compatible with this principle. Finally, since Electrified Truck Parking Spaces covered by Article 626 are a relatively new form of construction, it should not be expected that the Submitter would have to provide specific field incidents as principal technical substantiation. We support an Accept in Principle committee action since we agree with the intent of the Submitter, but believe relocation of the proposed requirement in 626.24(B) and slightly modified wording is more appropriate. The revised wording in part (A) more accurately describes the type of devices on the market, and the phrase "for the purpose" in part (C) is not needed since the purpose of the comparable means is stated.
Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its position that there is insufficient technical substantiation to justify the limitation to interlocking type, switch-rated receptacles or with a comparable means identified and listed to prevent connection or disconnection under load. The current requirement does not restrict the use of these type of devices if desired.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 10 Negative: 3
Explanation of Negative:

HITTEL, M.: The appropriate action should be Accept in Principle. The options proposed are an effective means to manage the hazards and risks unique to the specific application's typical use and foreseeable misuse. A proactive approach is necessary given that this is a developing and proliferating type of construction. While formal, documented cases have not been presented indicating that these hazards have occurred, it is my opinion that they are likely to occur. The companies that are building and installing these systems are best suited to assess the conditions of use and service and the associated risk factors.

It remains questionable whether the UL Standards which evaluate plugs and receptacles on their ability to "rupture" (break) current effectively, address the specific application's typical use and foreseeable misuse under both normal and fault conditions. Further, the EPRI-IWC working group did perform some research and found some incidents of injury to an operator involving a similar application that did occur in which this change could have prevented. Regretfully, the source of these incidents did not agree to be quoted or go on record, but it did confirm our concerns. Further, the proposal does not give a proprietary advantage to any one manufacturer as options for accomplishing this feature are given.

KOVACIK, J.: The submitter of Proposal 12-100 provided realistic and likely scenarios that substantiate the need for an additional safeguard that would reduce potential hazards involved with electrical loads and associated components being disconnected under load. Electrical components should be designed/rated for the intended application, including typical use and foreseeable misuse, and the options proposed by the submitter for demonstrating compliance are compatible with this principle.

Panel members representing the Electrified Truck Parking Spaces Industry described field incidents where injuries occurred as a result of components being disconnected under load. Lacking any attention to this problem, there is clear evidence that hazards and potential harm will continue to exist for users of this equipment.

WARD, R.: The appropriate action should be Accept in Principle. The options proposed are an effective means to manage the hazards and risks unique to the specific application's typical use and foreseeable misuse. A proactive approach is necessary given that this is a developing and proliferating type of construction. While formal, documented cases have not been presented indicating that these hazards have occurred, it is our opinion that they are likely to occur. The companies that are building and installing these systems are best suited to asses the conditions of use and service and associated risk factors. It remains questionable whether UL 498 and 1682, which evaluate plugs and receptacles on their ability to "rupture" (break) current effectively, address the specific application's typical use and foreseeable misuse. Further, in the rejection to Proposal 12-100, the committee used the statement "There is insufficient technical substantiation to justify the limitation…" As a result, the EPRI working group did perform some research and found some incidents involving a similar application that did occur in which this change could have prevented (in Comment 12-59 Substantiation). Regretfully, the source of these incidents did not agree to be quoted or go on record, but it did confirm our concerns. Further, the proposal does not give a proprietary advantage to any one manufacturer as options for accomplishing this feature are given.

12-55 Log #251 NEC-P12 **Final Action: Accept**
(626.30(A))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-101
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on the proposal as it relates to "or 480-volt, 3-phase" in 626.30(A).

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 626.30 (A) to read as follows:

(A) Branch Circuits. TRU spaces shall be supplied from 208-volt, 3-phase or 480-volt, 3-phase branch circuits and with an equipment grounding conductor ~~in accordance with 250.118~~.
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.

The submitter omitted the 480-volt, 3-phase rating without substantiation. The 480-volt, 3-phase rating should remain in the text as it is commonly used. The panel clarified the text.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-56 Log #1319 NEC-P12 **Final Action: Accept in Principle**
(626.30(A))

Submitter: Gregory C. Nieminski, Gregory C. Nieminski, LLC / Rep. Chairman, EPRI IWC Transportation Electrification Committees Code Task Force
Comment on Proposal No: 12-101
Recommendation: Revise as follows:

(A) Branch Circuits. TRUS spaces shall be supplied from 208-volt, 3-phase or 480-volt, 3-phase branch circuits and with an equipment grounding conductor ~~in accordance with 250.118~~.
Substantiation: The proposer omitted the 480-volt, 3-phase rating without substantiation. The 480-volt, 3-phase rating should remain in the text as it is commonly used.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 12-55.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-57 Log #913 NEC-P12 **Final Action: Reject**
(626.31(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-102
Recommendation: Accept the proposal with the following revisions:

(A) An approved disconnecting means shall be provided to simultaneously disconnect all ungrounded conductor of each branch circuit supplying a refrigerated unit. The disconnecting means shall be readily accessible, within sight and not more than 750 mm (30 in.) from the receptacles specified in 626.24(B)(2), and provided with approved permanent means for locking in the open (off) position. Circuit breakers or switches located in power outlets complying with this section shall be permitted as the disconnecting means.

Delete (B).
Substantiation: The second sentence requirement to provide a disconnecting means is redundant, already required by the first sentence. "Receptacles required by 626.24(B)(2)" is more specific than "the receptacle it controls." Locking means should specify an "off" position; doors and covers can be locked. open.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided definitive substantiation to justify the removal of the detailed requirements for the disconnect locking means.

The term "Open" with regard to disconnecting means is used throughout the Code and is widely understood.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-58 Log #912 NEC-P12 **Final Action: Reject**
(626.32)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-104
Recommendation: Accept the proposal with the following revisions:

Separable Power Supply Cable Assembly. A separable power supply cable assembly shall be one of the types and ratings specified in 626.32(A,) (B), and (C). Cords with adapters, pigtail ends, extension cords, and similar items shall not be used.

(A) Ratings. The power supply cable assembly shall be rated in accordance with (1) or (2):

(1) 30-ampere 480-volts 3-phase

(2) 60-ampere 208-volts 3-phase

(B) Cord. The flexible cord or cable shall contain four conductors, one of which shall be an equipment grounding conductor. Cords shall be an extra-hard usage type that complies with 400.3.
Substantiation: A redescription of what constitutes a power supply assembly is superfluous and redundant; the definition in 626.2 provides the definition. All extra-hard usage type flexible cords and cables may not be suitable such as those without a W designation for wet locations and sunlight resistance; 400.3 covers that. Extra-hard usage types are rated 600 volts. "Shall be permitted" is not a requirement per 90.5(B) and, therefore, not enforceable.
Panel Meeting Action: Reject
Panel Statement: The comment removes language that protects against the use of "home made" cord and cable assemblies and extension cords. This is important language to retain. The panel does not consider this information to be superfluous and redundant.

Further, references to material such as described in 400.3 are contained within the first four chapters of the NEC and are discussed in 90.3.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-59 Log #1320 NEC-P12 **Final Action: Reject**
(626.33 (New))

Submitter: Gregory C. Nieminski, Gregory C. Nieminski, LLC / Rep. Chairman, EPRI IWC Transportation Electrification Committees Code Task Force
Comment on Proposal No: 12-105
Recommendation: Revise as follows:

626.33 Means to Prevent Connection or Disconnection Under Load Each receptacle provided by the electrified truck parking space supply equipment shall meet one of the following requirements:
(A) Include an interlocked receptacle with an associated switching device of an interlocking type,
(B) Be provided with a switch rated receptacle-plug combination, or
(C) Be provided with a comparable means identified and listed for the purpose to prevent connection or disconnection under load.
The means to prevent connection or disconnection under load shall prevent user access to live parts.

Substantiation: The substantiation for the original proposal was based on the use of interlocked equipment used in staging areas for transport refrigerated units (TRUs) in ports and the significant reduction of electric shock and injuries prevented by the use of "interlocked" mechanisms. Even with properly protected equipment and users that are trained and qualified to operate such equipment, recent reports at these locations indicate that where a failure of the interlock occurred, one operator was injured resulting in the loss of some fingers due to electrical burns. Another operator at a different location suffered severe burns to the hands.

OSHA and NFPA 70E require the identification of any and all possible electrical hazards, the reduction or elimination of these hazards, the training and qualification of employees, and the provision of personal protective equipment (PPE) of sufficient quality to protect them from all hazards. The truck operator, on the other hand, cannot be assumed to be specifically trained or qualified to connect and disconnect a "live" connection that may be under load at voltages where a shock or arc flash hazard can occur, nor will the truck operator be provided with PPE necessary to protect him. Furthermore, these connections will be made outdoors, in the rain, and with standing ground water in some parking areas.

The dangers surrounding this type of electrical equipment, even among trained personnel at the ports, are serious. Working with energized equipment without the proper protection in place at the truck parking sites can be extremely dangerous. When the truck operator is plugging into an energized receptacle, there is a chance for serious hazards to occur. This needs to be addressed in the design of the plug-receptacle connection. An interlocking mechanism that would only allow the plug to be energized once interlocked would significantly reduce the dangers addressed above for the truck operator. An interlocking mechanism or its equivalent, as proposed, would help in preventing dangers associated with connecting to equipment that is energized.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its position that there is insufficient technical substantiation to justify the limitation to inter-locking type, switch-rated receptacles or with a comparable means identified and listed to prevent connection or disconnection under load. The current requirement does not restrict the use of these type of devices if desired.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 9 Negative: 4
Explanation of Negative:

HITTEL, M.: The appropriate action should be Accept in Principle. The options proposed are an effective means to manage the hazards and risks unique to the specific application's typical use and foreseeable misuse. A proactive approach is necessary given that this is a developing and proliferating type of construction. While formal, documented cases have not been presented indicating that these hazards have occurred, it is my opinion that they are likely to occur. The companies that are building and installing these systems are best suited to assess the conditions of use and service and the associated risk factors.

It remains questionable whether the UL Standards which evaluate plugs and receptacles on their ability to "rupture" (break) current effectively, address the specific application's typical use and foreseeable misuse under both normal and fault conditions. Further, the EPRI-IWC working group did perform some research and found some incidents of injury to an operator involving a similar application that did occur in which this change could have prevented. Regretfully, the source of these incidents did not agree to be quoted or go on record, but it did confirm our concerns. Further, the proposal does not give a proprietary advantage to any one manufacturer as options for accomplishing this feature are given.

KOVACIK, J.: See my Explanation of Negative Vote and substantiation on Comment 12-54.

MARCOVICI, S.: See my negative comment on 12-53.

WARD, R.: The appropriate action should be Accept in Principle. The options proposed are an effective means to manage the hazards and risks unique to the specific application's typical use and foreseeable misuse. A proactive approach is necessary given that this is a developing and proliferating type of construction. While formal, documented cases have not been presented indicating that these hazards have occurred, it is our opinion that they are likely to occur. The companies that are building and installing these systems are best suited to asses the conditions of use and service and associated risk factors. It remains questionable whether UL 498 and 1682, which evaluate plugs and receptacles on their ability to "rupture" (break) current effectively, address the specific application's typical use and foreseeable misuse. Further, in the rejection to Proposal 12-100, the committee used the statement "There is insufficient technical substantiation to justify the limitation…" As a result, the EPRI working group did perform some research and found some incidents involving a similar application that did occur in which this change could have prevented (in Comment 12-59 Substantiation). Regretfully, the source of these incidents did not agree to be quoted or go on record, but it did confirm our concerns. Further, the proposal does not give a proprietary advantage to any one manufacturer as options for accomplishing this feature are given.

ARTICLE 630 — ELECTRIC WELDERS

12-60 Log #403 NEC-P12 **Final Action: Accept**
(630.31(B), FPN No. 3)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-108
Recommendation: The proposal should be rejected.
Substantiation: The use of the word "per" in this context does not violate the NEC Style Manual, and the use of the slash mark within normal text that is not describing a formula of some sort is confusing. It would only be appropriate in a context such as where the other units are abbreviated, such as "VA/ft^2". This kind of change should not be made until a policy decision regarding style has been made. The TCC referred a similar proposed change (3-66, rejected by CMP 3) to the NFPA Glossary of Terms Advisory Committee for information.

The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-61 Log #1687 NEC-P12 **Final Action: Accept in Principle**
(630.32(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-109
Recommendation: Accept the proposal.
Substantiation: This provision relates to an overcurrent device,which is rated in amperes; conductor rating to correlate with the ampere rating of an overcurrent device is ampacity, not other ratings such as voltage or insulation temperature rating. See NEC Style Manual 3.2.5.1.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-62.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-62 Log #2153 NEC-P12 **Final Action: Accept**
(630.32(B))

Submitter: John R. Kovacik, Underwriters Laboratories Inc.
Comment on Proposal No: 12-109
Recommendation: Accept the proposal.
Substantiation: The Submitter proposed to replace the existing term conductor "rating" with conductor "ampacity." "Ampacity'" is defined in Article 100. "Rating" is a general term that is not defined. Also, conductors typically are only individually `rated' for Voltage and Temperature. The text of 630.32(B) applies to conductor ampacity, not conductor voltage or temperature While the term "rating" is correct in the context of 630.32 (Overcurrent Protection), it is not in 630.22(B) (For Conductors), and the term "rating" should be changed to "ampacity." It is noted that for most other uses of the term "conductor rating" in the NEC (e.g., 400.5(A), 610.14(B)), the term is used in conjunction with supplementary information that clarifies the context of the use of the term. The use of the term `conductor rating' in 630.32(B) does not provide this supplementary context.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 640 — AUDIO SIGNAL PROCESSING, AMPLIFICATION, AND REPRODUCTION EQUIPMENT

12-63 Log #36 NEC-P12 **Final Action: Accept**
(640.2 and 645.2)

Submitter: Stanley Kaufman, CableSafe Inc. / Rep. The Society of the Plastics Industry
Comment on Proposal No: 12-110
Recommendation: Continue to reject these proposals.
Substantiation: The current definitions abandoned cables are based on proposals and comments submitted for the 2002 and 2008 NEC. The table below shows the definitions of abandoned cables currently in the NEC and their genesis.

See Genesis of Abandoned Cable Definitions Table on Page 449

A single definition of "abandoned cable" is inappropriate to cover signaling, fire alarm, optical fiber, communications, CATV and network-powered broadband because each of these cable types has its own installation practices that must be accommodated in the definition of "abandoned cable" to avoid inappropriate and unnecessary removal.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-64 Log #2650 NEC-P12 **Final Action: Accept in Principle**
(640.3(M))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-112
Recommendation: Accept the proposal in principle.
Change "should be per Article 650" to "shall be in accordance with 650.4 through 650.8."
Substantiation: There are two violations of the NEC Style Manual in the accepted proposal, namely, the whole-article reference problem and the lack of mandatory language (4.1.1 and 3.1.1). This comment corrects both.
Panel Meeting Action: Accept in Principle
Change (M) to read as follows:
(M) Organ Pipes. Additions of pipe organ pipes to an electronic organ shall be in accordance with 650.4 through 650.8.
Panel Statement: The panel agrees with the submitter to reference 650.4 through 650.8. The panel notes that the submitter did not quote the correct text by using the word "should".
The panel added a title as required by the NEC Style Manual.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-65 Log #633 NEC-P12 **Final Action: Accept**
(640.6(C))

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 12-114
Recommendation: Continue to reject this proposal.
Substantiation: Panel 1 rejected similar Proposals 1-139 and 1-146 with the statement "The submitter has not substantiated that a problem exists, or that the problem would be alleviated by removing abandoned cables and equipment neatly. Rather, the panel concludes, that in some cases, abandoned cables and equipment are best left abandoned. The proposed text is unnecessary as the section more appropriately applies to "Requirements for Electrical Installations" and "Mechanical Execution of Work.""
Panel 12 rejected similar Proposals 12-114, 12-146 with the statement. "The requirement is unenforceable. Disposition of removed materials is not a code responsibility. The remaining installation is required to be in accordance with 110.3, which is enforceable."
Panel 16 rejected similar Proposals 16-24, 16-122, 16-241 and 16-305 with the statement. "This is an unenforceable requirement. Removing abandoned cable involves pulling unused cable and wiring from conduit, raceways, ducts, shafts and drop ceilings. The objective of the original text is directed at the final installation, that it be "neat and workmanlike", not necessarily the installation (in this case, removal) process. The submitter has provided no substantiation for additional requirements during the removal process."
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-66 Log #1691 NEC-P12 **Final Action: Reject**
(640.6(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-113
Recommendation: Accept the proposal and revise as follows: The accessible (as applied to wiring methods) of audio distribution cables not on raceways shall be removed.
Substantiation: Accessible (as applied to wiring methods) requires cables in raceways to be removed which does not seem warranted due to any hazard.
Panel Meeting Action: Reject
Panel Statement: The submitter's text does not provide a clear specific recommendation as required by 4.4.5(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-67 Log #752 NEC-P12 **Final Action: Reject**
(640.8)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 12-115
Recommendation: The Proposal should be Accepted.
Substantiation: The revised wording still permits the conductors to be "physically tied, wrapped, taped, or bound together" but it also permits the conductors to be installed in the same raceway or other enclosure without that requirement.
The existing text that states "…to be in close physical contact with each other…" does not necessarily require that they be "physically tied, wrapped, taped, or bound together".
Panel Meeting Action: Reject
Panel Statement: The term "bundled" is clear. It is a well established term and is consistent with other uses of the term in several places throughout the Code and is appropriate in this application. The word "installed" adds no additional clarity to the Code.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-68 Log #1692 NEC-P12 **Final Action: Reject**
(640.45)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-120
Recommendation: Delete or revise as follows: Extra-hard usage type flexible cords and cables that comply with 400.3 shall be permitted to be direct-buried in the earth if:
(1) The minimum cover above the top of the flexible cords and cables is not less than 152 mm (6 in.)
(2) The flexible cords and cables are not installed under buildings or other structures
(3) The flexible cords and cables are not likely to be subject to physical damage
(4) The direct buried portion is continuous, and
(5) The flexible cords and cables are removed when no longer utilized.
Substantiation: Direct buried includes a concrete or asphalt slab. This wiring method is not suitable for direct burial and begs the question why not be permitted for other venues? Table 300.5, Column 1 has cover requirements for 0 volts conductors which includes grounding electrode conductors and equipment grounding and bonding conductors. not under a building which vary from 18 to 24 inches. Presumably, flexible cords and cables will operate with an unspecified voltage that may be as high as the cord or cable rating (600 volts for extra hard usage types). Cords and cables may continue to be energized during periods of non-use and a burial depth of $^{1}/_{4}$ in. is an invitation to hazard and subject to damage. Installation underground can be in a raceway.
Panel Meeting Action: Reject
Panel Statement: Extensive burial instructions are not required. Protection suitable for the conditions and acceptable to the AHJ is sufficient.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

Genesis of Abandoned Cable Definitions

Article	Definition	Comment	Proposal
640	**Abandoned Audio Distribution Cable.** Installed audio distribution cable that is not terminated at equipment and not identified for future use with a tag.	2002 NEC Comment 16-3 by Carson	2002 NEC Proposal 16-1a by CMP 16
645	**Abandoned Supply Circuits and Interconnecting Cables.** Installed supply circuits and interconnecting cables that are not terminated at equipment and not identified for future use with a tag.		2008 NEC Proposal 12-106 by Trout
725	**Abandoned Class 2, Class 3, and PLTC Cable.** Installed Class 2, Class 3, and PLTC cable that is not terminated at equipment and not identified for future use with a tag.	2002 NEC Comment 16-21 by Jensen	2002 NEC Proposal 16-32 by Jensen
760	**Abandoned Fire Alarm Cable.** Installed fire alarm cable that is not terminated at equipment **other than a connector** and not identified for future use with a tag.	2002 NEC Comment 16-131 by Jensen	2002 NEC Proposal 16-109 by Jensen
770	**Abandoned Optical Fiber Cable.** Installed optical fiber cable that is not terminated at equipment **other than a connector** and not identified for future use with a tag.	2002 NEC Comment 16-190 by Jensen	2002 NEC Proposal 16-154 by Jensen
800	**Abandoned Communications Cable.** Installed communications cable that is not terminated **at both ends at a connector or other equipment** and not identified for future use with a tag.	2002 NEC Comment 16-247 by Jensen	2002 NEC Proposal 16-189 by Jensen
820	**Abandoned Coaxial Cable.** Installed coaxial cable that is not terminated at equipment **other than a coaxial connector** and not identified for future use with a tag.	2002 NEC Comment 16-314 by Jensen	2002 NEC Proposal 16-273 by Jensen
830	**Abandoned Network-Powered Broadband Communications Cable.** Installed network-powered broadband communications cable that is not terminated at equipment **other than a connector** and not identified for future use with a tag.	2002 NEC Comment 16-370a by Kaufman	2002 NEC Proposal 16-364 by Hirschler

ARTICLE 645 — INFORMATION TECHNOLOGY EQUIPMENT

12-69 Log #2651 NEC-P12 **Final Action: Reject**
(645.Long-Time Rating (X-Ray Equipment) and Momentary Rating (X-Ray Equipment))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-122
Recommendation: Accept the proposal in principle.

In addition to addressing the TCC note (not part of this comment), make the following eleven changes it the accepted text:

I. In 645.3(B), change the opening from "Sections" to "The provisions of"

II. In 645.3(E), change "Article 708" to "708.2."

III. In 645.3(F), revise to read as follows: "Fire alarm systems equipment installed in an information technology equipment room shall comply with Part I of Article 760."

IV. In 645.3(G), change the first sentence to read: "Communications equipment installed in an information technology equipment room shall comply with Part I, Part III, Part IV, and 800.170 of Article 800." Change the second sentence to read: This article applies to the powering of communications equipment in an information technology room, subject to the provisions of 800.170.

V. In 645.3(H), change the first sentence to read: "Community antenna television and radio distribution systems equipment installed in an information technology equipment room shall comply with Parts I, III, and IV of Article 820." Change the second sentence to read: This article applies to the powering of communications equipment in an information technology room.

VI. In 645.4 Informational Note, delete the word "Article". Add correlating power-limited cabling references so as to read as follows "… and 725.154(A), 760.154(A), 770.154(A), 800.154(A), and 820.154(A) for power-limited wiring …"

VII. In 645.5(E)(2) Exception, change "when" to "where".

VIII. In 645.5(E)(3), revise to read "The length and arrangement for physical protection of supply cords for listed information technology equipment comply with 645.5(B)."

IX. Delete the Informational Note in 645.6.

X. In 645.10, revise the new final sentence to read as follows: "The disconnecting means shall comply with (A) unless the conditions of (B) are met.

XI. In 645.25, replace the proposal language with that accepted by CMP 12 under Proposal 12-148.

Substantiation: These changes are editorial and most reflect requirements in the NEC Style Manual (NECSM):

I. Sections are to be referred to by the numbers only (NECSM at 4.1.2).

II. Whole-article references are not permitted (NECSM at 4.1.1).

III. Whole-article references are not permitted (NECSM at 4.1.1). Since this provision only mentions "equipment" the wiring, as covered in Parts II, III, and IV of Article 760, is presumably not intended to be considered here. If it is intended, it would still be covered through the operation on 460.35 in Part I, but Part IV on cable listings would need to be added. Note that 760.154(A), in Part III, contains the same cabling instruction as 725.154(A) does for signaling circuits, and in accordance with the information conveyed in the Informational Note in 645.4 it appears that the intent is to waive compliance with Part III.

IV. Whole-article references are not permitted (NECSM at 4.1.1). Since this provision only mentions "equipment" the wiring, as covered in Parts V and VI of Article 800, is presumably not intended to be considered here. If it is intended, Parts V and VI would need to be added in lieu of the simple reference to 800.170. Alternatively, the entire reference could be deleted since the article automatically applies in its entirety unless an amendment is made, and none seem to be offered. For equipment in the room, the reference to 800.170, which requires listing for such equipment, must remain in effect unless the TCC generates some provision that results in an exception to this Chapter 8 requirement.

V. Whole-article references are not permitted (NECSM at 4.1.1). Since this provision only mentions "equipment" the wiring, as covered in Parts V and VI of Article 800, is presumably not intended to be considered here. If it is intended, Parts V and VI would need to be added.

VI. Only the numerical reference is permitted [as in "and 725.154(A) for signaling …"] (NECSM at 4.1.2). The revision adds the appropriate references to the other power-limited plenum applications.

VII. When is a condition of time, and not place. (NECSM at 3.3.4)

VIII. This wording was accepted in principle under Proposal 12-144 with the statement referencing Proposal 12-139, but the change was not made. As worded in the panel action to date, this item occurs in a list of conditions, but fails to state a condition. A verb is required for this to be worded correctly, and Proposal 12-144 supplies appropriate wording.

IX. This note contains a laundry list of whole-article reference violations (NECSM at 4.1.1). Since it adds nothing to the requirements in this article, it can be deleted. Since cabling outside the IT room must meet the conventional rules of the Code, all the referenced articles necessarily apply without amendment.

X. A disconnecting means is not implemented, but it can certainly be either in or out of compliance. No NEC provision for disconnects yet written is "implemented" but the wording in this comment is commonplace and well familiar to code users.

XI. The wording of Proposal 12-148 is much more polished and easier on users. The requirement of a PE for these calculations is excessive. The Proposal 12-148 result strikes the correct balance. Although this was presumably CMP 12's intention, there is no indication in the panel statement in either location as to which wording has preference.

Panel Meeting Action: Reject
Panel Statement: This comment contains modifications to the substantiation section of the proposal and not the recommendation.

The panel accepted different language than appeared in the substantiation to Proposal 12-122.

The panel is unsure of the title of Comment 12-69, "Long-Time Rating (X-Ray Equipment) and Momentary Rating (X-Ray Equipment))".

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-70 Log #252 NEC-P12 **Final Action: Accept**
(645.1, FPN)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-122
Recommendation: The Technical Correlating Committee directs that the panel reconsider its action on this proposal to comply with the 3.1.3 of the NEC Style Manual with respect to mandatory requirements in Fine Print Notes.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider its action on this proposal.

See panel action on Comment 12-71.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-71 Log #1406 NEC-P12 **Final Action: Accept**
(645.1, FPN)

Submitter: Robert E. Johnson, ITE Safety
Comment on Proposal No: 12-122
Recommendation: Revise proposed text as follows:

FPN: ~~Use of the requirements in Article 645 is based on the assumption that construction of the information technology equipment room complies with NFPA75.~~ For further information, see *NFPA 75-2009, Standard for the Protection of Information Technology Equipment*, that covers the requirements for the protection of information technology equipment and information technology equipment areas.

Substantiation: The revised FPN complies with the *NEC Style Manual* Section 3.1.3.

This is one of a group of comments by the CMP-12 Article 645 Task Group.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

MARCOVICI, S.: The added text is not necessary as the title of the referenced standard speaks for itself. In addition, the NEC Style Manual does not require that a standard be described when referenced in a FPN.

As a result, the proposal should be rejected.

12-72 Log #1039 NEC-P12 **Final Action: Accept in Principle in Part**
(645.2)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 12-126
Recommendation: The Proposal should continue to be Accepted in Principle and the FPN added by the Panel should be revised as follows:
~~FPN~~ Informational Note: Refer to UL 60950-1 ~~includes listing requirements~~ for additional information on both information technology equipment and communications equipment.

The last phrase in the definition should also be revised as follows: "…and ~~do~~ does not include ~~process~~ communications circuits as defined in 800.2."

Substantiation: 3.1.3 of the NEC Style Manual states "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The proposed revision still provides the user with a reference on where to find additional information while not implying that the UL standard is a requirement. The revised note complies with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Revising the last phrase provides additional clarity to the definition and eliminates possible confusion regarding what is meant by "and do not process communications circuits".
Panel Meeting Action: Accept in Principle in Part
The panel accepts in principle the submitter's text regarding the fine print note. The panel does not accept the revision to the definition because it confuses equipment with circuits.
Panel Statement: See panel action and statement on Comment 12-74.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-73 Log #253 NEC-P12 **Final Action: Accept**
(645.2.Information Technology Equipment (ITE))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-126
Recommendation: The Technical Correlating Committee directs that the panel reconsider its action on this proposal to comply with 2.2.2 and 3.1.3 of the NEC Style Manual with respect to mandatory requirements in Fine Print Notes.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider its action on this proposal.
See panel action and statement on Comment 12-74.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-74 Log #1408 NEC-P12 **Final Action: Accept in Principle**
(645.2.Information Technology Equipment (ITE))

Submitter: Robert E. Johnson, ITE Safety
Comment on Proposal No: 12-126
Recommendation: Revise proposed text as follows:
FPN: ~~UL 60950-1 includes~~ For information on listing requirements for both information technology equipment and communications equipment, see *UL 60950-1, Information Technology Equipment - Safety - Part 1: General Requirements.*
Substantiation: The revised wording complies with the *NEC Style Manual* Sections 2.2.2 and 3.1.3.
This is one of a group of comments by the CMP-12 Article 645 Task Group.
Panel Meeting Action: Accept in Principle
Revise Informational Note to read as follows:
Informational Note: ~~UL 60950-1 includes~~ For information on listing requirements for both information technology equipment and communications equipment, see *UL 60950-1, Safety of Information Technology Equipment - Safety - Part 1: General Requirements.*
Modify text in Annex A to read as follows:
UL 60950-1, Safety of Information Technology Equipment - Safety - Part 1: General Requirements.
Panel Statement: The panel notes that the referenced standard's title needs to be revised in the recommendation and Annex A to read as follows: *UL 60950-1, Safety of Information Technology Equipment - Safety - Part 1: General Requirements.*
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-75 Log #254 NEC-P12 **Final Action: Accept**
(645.2.Information Technology Equipment Room)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-127
Recommendation: The Technical Correlating Committee directs that the action on this proposal be rewritten to locate the reference to NFPA 75:3.3.9 in a FPN and include the document title.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider its action on this proposal.
See panel action on Comment 12-76.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-76 Log #1409 NEC-P12 **Final Action: Accept**
(645.2.Information Technology Equipment Room)

Submitter: Robert E. Johnson, ITE Safety
Comment on Proposal No: 12-127
Recommendation: Revise proposed text as follows:
Information Technology Equipment Room. A room within the information technology equipment area that contains the information technology equipment. [75:3.3.9].
FPN: Rules that are followed by a reference in brackets contain text that has been extracted from *NFPA 75-2009 Standard for the protection of Information Technology Equipment*. Only editorial changes were made to the extracted text to make it consistent with this code.
Substantiation: The definition and extract reference to 75:3.3.9 is retained to follow other extracts. See 90.5(C) and *NEC Style Manual* 4.3.2.3. The FPN refers to NFPA 75.
This is one of a group of comments by the CMP-12 Article 645 Task Group.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-77 Log #1410 NEC-P12 **Final Action: Accept in Principle**
(645.3)

Submitter: Robert E. Johnson, ITE Safety
Comment on Proposal No: 12-131
Recommendation: Revise propsoed text of article 645.3 (E), (F) and (G) to read as follows:
(E) Fire Alarm Equipment. Parts I, II & III of Article 760 shall apply to fire alarm systems equipment installed in an information technology equipment room.
(F) Communications Equipment. Parts I, III, IV & V of Article 800 shall apply to communications equipment installed in an information technology equipment room. Article 645 shall apply to the powering of communications equipment in an information technology equipment room.
FPN ~~No. 1~~: See Part I of Article 100, Definitions, for a definition of communications equipment.
~~FPN No. 2: See 90.3, Code Arrangement~~.
(G) Community Antenna Television and Radio Distribution Systems Equipment. Parts I, III, IV & V of Article 820 shall apply to community antenna television and radio distribution systems equipment installed in an information technology equipment room. Article 645 shall apply to the powering of community antenna television and radio distribution systems equipment installed in an information technology equipment room.~~FPN: See 90.3, Code Arrangement.~~
Substantiation: Both FPNs are deleted and 645.3(E), (F) and (G) are revised to comply with the TCC directive. This comment is identical to our comment on ROP 12-132.
This is one of a group of comments by the CMP-12 Article 645 Task Group.
Panel Meeting Action: Accept in Principle
Revise proposed text of article 645.3 (E), (F) and (G) to read as follows:
(E) Fire Alarm Equipment. Parts I, II & III of Article 760 shall apply to fire alarm systems equipment installed in an information technology equipment room.
(F) Communications Equipment. Parts I, II, III, IV & V of Article 800 shall apply to communications equipment installed in an information technology equipment room. Article 645 shall apply to the powering of communications equipment in an information technology equipment room.
FPN ~~No. 1~~: See Part I of Article 100, Definitions, for a definition of communications equipment.
~~FPN No. 2: See 90.3, Code Arrangement~~.
(G) Community Antenna Television and Radio Distribution Systems Equipment. Parts I, II, III, IV & V of Article 820 shall apply to community antenna television and radio distribution systems equipment installed in an information technology equipment room. Article 645 shall apply to the powering of community antenna television and radio distribution systems equipment installed in an information technology equipment room.
~~FPN: See 90.3, Code Arrangement.~~
Panel Statement: The panel accepts the submitter's text and adds Part II to F and G because Part II applies in both cases.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-78 Log #255 NEC-P12 **Final Action: Accept**
(645.3, 645.6, and 645.7 (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-131
Recommendation: The Technical Correlating Committee directs that the panel delete FPN No. 2 in 645.3(F) and the FPN in 645.3(G) since compliance with 90.3 is already required and revise the references in (E), (F), and (G) from entire Articles to specific parts or sections to comply with 2.5 and 4.1.1 of the NEC Style Manual.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to delete FPN No. 2 in 645.3(F) and the FPN in 645.3(G).

See panel action on Comment 12-77.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-79 Log #1411 NEC-P12 **Final Action: Accept in Principle**
(645.3. 645.6, and 645.7)

Submitter: Robert E. Johnson, ITE Safety
Comment on Proposal No: 12-132
Recommendation: Reviseproposedthe text of article 645.3 (E), (F) and (G) to read as follows:

(E) Fire Alarm Equipment. Parts I, II & III of Article 760 shall apply to fire alarm systems equipment installed in an information technology equipment room.

(F) Communications Equipment. Parts I, III, IV & V of Article 800 shall apply to communications equipment installed in an information technology equipment room. Article 645 shall apply to the powering of communications equipment in an information technology equipment room.

FPN ~~No. 1~~: See Part I of Article 100, Definitions, for a definition of communications equipment.
~~FPN No. 2: See 90.3, Code Arrangement~~.

(G) Community Antenna Television and Radio Distribution Systems Equipment. Parts I, III, IV & V of Article 820 shall apply to community antenna television and radio distribution systems equipment installed in an information technology equipment room. Article 645 shall apply to the powering of community antenna television and radio distribution systems equipment installed in an information technology equipment room. ~~FPN: See 90.3, Code Arrangement.~~
Substantiation: Both FPNs are deleted and 645.3(E), (F) and (G) are revised to comply with the TCC directive.

This is one of a group of comments by the CMP-12 Article 645 Task Group.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 12-77 which meets the intent of the submitter.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-80 Log #256 NEC-P12 **Final Action: Accept**
(645.3, 645.6, and 645.7 (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-132
Recommendation: The Technical Correlating Committee directs that the panel delete FPN No. 2 in 645.3(F) and the FPN in 645.3(G) since compliance with 90.3 is already required and revise the references in (E), (F), and (G) from entire Articles to specific parts or sections to comply with 2.5 and 4.1.1 of the NEC Style Manual.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to delete FPN No. 2 in 645.3(F) and the FPN in 645.3(G).

See panel action and statement on Comment 12-77.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-81 Log #37 NEC-P12 **Final Action: Accept**
(645.3(B) and 645.3(C))

Submitter: Stanley Kaufman, CableSafe Inc. / Rep. The Society of the Plastics Industry
Comment on Proposal No: 12-132
Recommendation: Accept this proposal in principle by revising the text as shown:
(B) Plenums. Sections 300.22(C)(1), 725.154(A), 760.53(B)(2), 760.154(A), 770.113(C), & ~~770.154~~(A)~~,~~ 800.113(C), ~~800.154~~(A)~~,~~ and 820.113(C) &~~820.154~~(A) and Tables 770.154(A), 800.154(A) and 820.154(A) shall apply to wiring and cabling in a plenum (other space used for environmental air) above an information technology equipment room.
(C) Grounding. The non-current-carrying conductive members of optical fiber cables in an information technology equipment room shall be grounded in accordance with 770.101 770.114.
Substantiation: Panel 16 actions on Proposals 16-48, 56, 160 and 172 moved the installation requirements for cables in "other space used for environmental air". The requirements that are in Sections 770.154(A), 800.154(A) and 820.154(A) in the 2008 NEC will be in Sections 770.113(C), 800.113(C) and 820.113(C) and Tables 770.154(A), 800.154(A) and 820.154(A) in the 2011 NEC.

Panel 3 rejected companion proposals 3-192 and 3-198 to move the installation requirements from 725.154(A) to 725.133. If that action is changed in the ROC stage, the reference to 725.154(A) will need to be revised.

Panel 16 action on Proposal 16-41 relocated 770.101 to 770.114.
Panel Meeting Action: Accept
Panel Statement: The panel understands that these changes are intended to correlate with actions by CMP 16.

The panel understands that CMP 3 did not change its actions on Proposals 3-192 and 3-198.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-82 Log #257 NEC-P12 **Final Action: Accept**
(645.4)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-134
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by removing the mandatory text in the first Fine Print Note under the 645.4 text.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal.

See panel action and statement on Comment 12-83.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-83 Log #1412 NEC-P12 **Final Action: Accept in Principle**
(645.4)

Submitter: Robert E. Johnson, ITE Safety
Comment on Proposal No: 12-134
Recommendation: Revise proposed text as follows:

645.4 Special Requirements for Information Technology Equipment Room. This article shall be permitted to ~~apply, provided~~ provide alternate wiring methods to the provisions of chapters 1 through 4 for power wiring and 725.154 and 770.113(C) and Table 770.154(A) for signaling wirng and optical fiber cabling when all of the following conditions are met:
~~FPN: This article provides alternate wiring methods to the provisions of chapters 1 through 4 for power wiring, and 725.154(A) and 770.154(A) for signaling wiring and optical fiber cabling, for information technology equipment rooms constructed in compliance with NFPA 75-2009, *Standard for the Protection of Information Technology Equipment*.~~
(1) Disconnecting...".
Substantiation: The text clarifies the intent of the task group by editing the leading paragraph to 645.4. The FPN is deleted to comply with the TCC directive. The information that was previously in NEC 2008, 770.154(A) was relocated to 770.113(C) and Table 770.154(A) by CMP-16 action on Proposals 16-48 and 16-56.

This is one of a group of comments by the CMP-12 Article 645 Task Group.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:

645.4 Special Requirements for Information Technology Equipment Room. This article shall be permitted to ~~apply, provided~~ provide alternate wiring methods to the provisions of Chapters 1 through 4 for power wiring,

725.154 for signaling wiring, and 770.113(C) and Table 770.154(A) for optical fiber cabling, when all of the following conditions are met:

~~FPN: This article provides alternate wiring methods to the provisions of chapters 1 through 4 for power wiring, and 725.154(A) and 770.154(A) for signaling wiring and optical fiber cabling, for information technology equipment rooms constructed in compliance with NFPA 75-2009, *Standard for the Protection of Information Technology Equipment*.~~

(1) Disconnecting...".

Panel Statement: The panel accepts the submitter's text and revises for clarity.

The panel understands that the changes to the references to Article 770 are intended to correlate with actions by CMP 16.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

12-84 Log #258 NEC-P12 **Final Action: Accept**
(645.5)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-139

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal relative to the word "suitable".

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal.

See panel action and statement on Comment 12-89.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

12-85 Log #1057 NEC-P12 **Final Action: Reject**
(645.5)

Submitter: Stephen McCluer, APC by Schneider Electric
Comment on Proposal No: 12-137

Recommendation: Revise the text of the renumbered 645.5(E)(2) *Exception*

Exception: Compliance with 300.11(A) shall not be required ~~when raceway is supported by the floor of the building under the raised floor.~~ for flexible metal conduit, liquidtight flexible metal conduit, flexible nonmetallic conduit, Type MI cable, Type MC cable, or Type AC cable, when such raceway meets both of the following conditions:

(a) The raceway is supported by the floor of the building under the raised floor; and

(b) The raceway is one continuous run with no splices or junctions.

Substantiation: See comment on Proposal 12-139. The Panel's action on this proposal was to accept in principle, for justification it said to see panel action and statement on Proposal 12-139.

The intent of the Article 645 Task Group's original proposal, as stated by the Task Group Chair's substantiation, was to fix the Code to reflect what has been a recognized industry best practice for many decades. The reason people use Article 645 is to take advantage of the leniency that allows cables to be installed in a manner to allow rapid and frequent addition, removal, or relocation – a major characteristic of Information Technology Equipment rooms. Most of the time this is done with cable installed in flexible liquidtight conduit, although other methods can also include flexible metal conduit, flexible nonmetallic conduit, Type MI cable, Type MC cable or Type AC cable. As stated by the Task Group Chair, no data has been submitted to suggest that the standard practice does not work. The existing language seems to prohibit such practice.

The main concern seems to be that if raceway is not secured to the floor it could become damaged and possibly break at junction points. Such damage could occur during activities such as cable addition, removal, or relocation, or simply by accidental bumping or kicking. The cables proposed in this "amendment to the exception" would not be prone to such damage, unless they have been spliced at some point (presumably to extend the length). This would be an unusual practice, but it is conceivable. The amended language requires that two conditions must be met:

(1) The raceway or cable must be supported by the floor of the building under the raised floor; and

(2) The raceway or cable must be one continuous run with no splices or junctions.

In all other conditions, the requirements of 300.11 shall apply.

By rejecting the proposal, the panel has effectively deleted the number 1 purpose for having Article 645 in the first place. By accepting this comment, the panel will acknowledge what has been recognized as a "best practice" for decades, and will remove an ambiguity from the Code.

Panel Meeting Action: Reject

Panel Statement: Each of the wiring methods of 645.5(E)(2) require securing and supporting in accordance with Chapter 3. In addition, 300.11(A) requires raceways, cable assemblies, boxes, cabinets, and fittings to be securely fastened in place. The submitter has not provided any substantiation to validate a claim of non-abuse or substantiation to relax these requirements. The relaxed rules in Article 645 help to facilitate the frequent ease of interchange of IT equipment. Therefore, it is not uncommon for these under-floor areas to see a lot of traffic, some of which may be by nonelectricians or IT technicians, that are under the floor running data cabling. This leads to the possible abuse of power raceway systems. Flexible wiring methods are not as robust as nonflexible raceways, thus would be subject to the same abuse.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

12-86 Log #1058 NEC-P12 **Final Action: Reject**
(645.5)

Submitter: Stephen McCluer, APC by Schneider Electric
Comment on Proposal No: 12-139

Recommendation: Keep the proposed new and renumbered 645.5(E)(2) *Exception* [formerly 645.5(D)(2)] and reword it as follows:

Exception: Compliance with 300.11(A) shall not be required ~~when raceway is supported by the floor of the building under the raised floor.~~ for flexible metal conduit, liquidtight flexible metal conduit, flexible nonmetallic conduit, Type MI cable, Type MC cable, or Type AC cable, when such raceway meets both of the following conditions:

(a) The raceway or cable is supported by the floor of the building under the raised floor; and

(b) The raceway or cable is one continuous run with no splices or junctions.

Substantiation: The panel's action was to reject a proposed exception to the requirement for supply conductors to be installed in accordance with the requirements of 300.11. The latter requires cables and conduits to be secured to the floor.

The intent of the Article 645 Task Group's original proposal, as stated by the Task Group Chair's substantiation, was to fix an ambiguity in the Code to reflect what has been a recognized industry best practice for many decades. The reason people use Article 645 is to take advantage of the leniency that allows cables to be installed in a manner to allow rapid and frequent addition, removal, or relocation – a major characteristic of Information Technology Equipment rooms. Most of the time, this is done with cable installed in flexible liquidtight conduit, although other methods can also include flexible metal conduit, flexible nonmetallic conduit, Type MI cable, Type MC cable or Type AC cable. As stated by the Task Group Chair, no data has been submitted to suggest that the standard practice does not work. The existing language seems to prohibit such practice.

The unstated concern seems to be that if raceway is not secured to the floor it could become damaged and possibly break at junction points. Such damage could occur during activities such as cable addition, removal, or relocation, or simply by accidental bumping or kicking. The cables proposed in this "amendment to the exception" would not be prone to such damage unless they have been spliced at some point (presumably to extend the length). This would be an unusual practice, but it is conceivable. The amended language requires that two conditions must be met:

(1) The raceway must be supported by the floor of the building under the raised floor; and

(2) The raceway must be one continuous run with no splices or junctions.

In all other conditions, the requirements of 300.11 shall apply.

By rejecting the proposal, the panel has effectively deleted the number 1 purpose for having Article 645 in the first place. By accepting this comment, the panel will acknowledge what has been recognized as a "best practice" for decades and will remove an ambiguity from the Code.

Panel Meeting Action: Reject

Panel Statement: See panel action on Comment 12-85.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

12-87 Log #1211 NEC-P12 **Final Action: Hold**
(645.5)

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 12-139

Recommendation: This Proposal should continue to be Accept in Principle and Part. Proposed section 645.5(E)(2) should be revised to read as follows:

(2) The branch-circuit supply conductors to receptacles or field-wired equipment are in rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, electrical metallic tubing, electrical nonmetallic tubing, metal wireway, nonmetallic wireway, surface metal raceway with metal cover, nonmetallic surface raceway, flexible metal conduit, liquidtight flexible metal conduit, or liquidtight flexible nonmetallic conduit, Type MI cable, Type MC cable, or Type AC cable and associated metallic and nonmetallic boxes or enclosures. These supply conductors shall be installed in accordance with the requirements of 300.11. Flexible cord or flexible cable shall be permitted when used with Power Distribution Units as defined in 645.17.

Substantiation: This comment addresses Flexible cords and flexible cables, as defined in Article 400, used in Raised Floors with Power Distribution Units. Smaller Power Distribution Units (as shown) are used in raise floor application when special permission is granted. The distribution centers allows for a single power source to be separated into multiple lower current service outlets. Flexible cord or cables are used with these units.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Hold

Panel Statement: The submitter is introducing a new concept of flexible cord or flexible cable when used with power distribution units.

It introduces a concept that has not had public review.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

12-88 Log #2154 NEC-P12 **Final Action: Accept in Principle**
(645.5(B))

Submitter: John R. Kovacik, Underwriters Laboratories Inc.

Comment on Proposal No: 12-139

Recommendation: In 645.5(B), FPN, the correct designation of the Standard should be "UL 60950-1, Standard for Information Technology Equipment - Safety - Part 1".

Substantiation: This standard title is consistent with the current information in (and proposed clarifications to made to) Annex A (Product Safety Standards).

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 12-89 which meets the intent of the submitter.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

12-89 Log #1407 NEC-P12 **Final Action: Accept in Principle**
(645.5(B)(2))

Submitter: Robert E. Johnson, ITE Safety

Comment on Proposal No: 12-139

Recommendation: Revise proposed text as follows:

645.5(B)(2) Power cords shall be ~~listed as suitable for~~ a type permitted for use on listed information technology equipment or shall be constructed of listed flexible cord and listed attachment plugs and cord connectors of a type permitted for information technology equipment.

FPN: One method of determining cords are ~~suitable for the purpose is found in~~ of a type permitted for the purpose is found in UL 60950 *Standard for Information Technology Equipment – Safety – Part 1*

645.5(E)

(1) The raised floor is of ~~suitable~~ approved construction, and the area under the floor is accessible.

Substantiation: Two subsections have been revised at TCC directive to remove the word suitable.

The FPN of 645.5(B)(2) was inadvertently dropped from the draft and is to be retained.

This is one of a group of comments by the CMP-12 Article 645 Task Group.

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

645.5(B)(2) Power cords shall be listed and ~~as suitable for~~ a type permitted for use on listed information technology equipment or shall be constructed of listed flexible cord and listed attachment plugs and cord connectors of a type permitted for information technology equipment.

FPN: One method of determining if cords are ~~suitable for the purpose is found in~~ of a type permitted for the purpose is found in *UL 60950-1, Safety of Information Technology Equipment - Safety - Part 1: General Requirements.*

Revise 645.5(E)(1) to read as follows:

(1) The raised floor is of ~~suitable~~ approved construction, and the area under the floor is accessible.

Panel Statement: The panel accepts the submitter's text and retains the cord listing requirement. The change meets the submitter's intent. The panel corrects the reference to UL 60950-1.

The panel clarifies the location of the text of 645.5(E)(1).

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

12-90 Log #1059 NEC-P12 **Final Action: Reject**
(645.5(D)(2))

Submitter: Stephen McCluer, APC by Schneider Electric

Comment on Proposal No: 12-141

Recommendation: Revise the text of the proposed new exception:

Exception: Compliance with 300.11(A) shall not be required ~~when raceway is supported by the floor of the building under the raised floor.~~ for flexible metal conduit, liquidtight flexible metal conduit, flexible nonmetallic conduit, Type MI cable, Type MC cable, or Type AC cable, when such raceway meets both of the following conditions:

(a) The raceway or cable is supported by the floor of the building under the raised floor; and

(b) The raceway or cable is one continuous run with no splices or junctions.

Substantiation: The intent of the Article 645 Task Group's original proposal, as stated by the Task Group Chair's substantiation, was to fix the Code to reflect what has been a recognized industry best practice for many decades. The reason people use Article 645 is to take advantage of the leniency that allows cables to be installed in a manner to allow rapid and frequent addition, removal, or relocation – a major characteristic of Information Technology Equipment rooms. Most of the time this is done with cable installed in flexible liquidtight conduit, although other methods can also include flexible metal conduit, flexible nonmetallic conduit, Type MI cable, Type MC cable or Type AC cable. As stated by the Task Group Chair, no data has been submitted to suggest that the standard practice does not work. The existing language seems to prohibit such practice.

The main concern seems to be that if raceway is not secured to the floor it could become damaged and possibly break at junction points. Such damage could occur during activities such as cable addition, removal, or relocation, or simply by accidental bumping or kicking. The cables proposed in this "amendment to the exception" would not be prone to such damage unless they have been spliced at some point (presumably to extend the length). This would be an unusual practice, but it is conceivable. The amended language requires that two conditions must be met:

(1) The raceway must be supported by the floor of the building under the raised floor; and

(2) The raceway must be one continuous run with no splices or junctions.

In all other conditions the requirements of 300.11 shall apply.

By rejecting the proposal, the panel has effectively deleted the number 1 purpose for having Article 645 in the first place. By accepting this comment, the panel will acknowledge what has been recognized as a "best practice" for decades and will remove an ambiguity from the Code.

Panel Meeting Action: Reject

Panel Statement: See panel action on Comment 12-85.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

12-91 Log #1060 NEC-P12 **Final Action: Reject**
(645.5(D)(2))

Submitter: Stephen McCluer, APC by Schneider Electric

Comment on Proposal No: 12-142

Recommendation: Revise the text of the proposed new exception:

Exception: Flexible metal conduit, liquidtight flexible metal conduit, flexible nonmetallic conduit, Type MI cable, Type MC cable, or Type AC cable, ~~Raceways and cables~~ shall not be required to be securely fastened in place when ~~the raceways and cables are supported by the floor of the building under the raised floor.~~ raceway or cable meets both of the following conditions:

(a) The raceway is supported by the floor of the building under the raised floor; and

(b) The raceway is one continuous run with no splices or junctions.

Substantiation: The intent of the Article 645 Task Group's original proposal, as stated by the proposer (and by the Chair – see Comment on Proposal 12-141), was to fix the Code to reflect what has been a recognized industry best practice for many decades. The reason people use Article 645 is to take advantage of the leniency that allows cables to be installed in a manner to allow rapid and frequent addition, removal, or relocation – a major characteristic of Information Technology Equipment rooms. Most of the time, this is done with cable installed in flexible liquidtight conduit, although other methods can also include flexible metal conduit, flexible nonmetallic conduit, Type MI cable, Type MC cable or Type AC cable. As stated by the Task Group Chair, no data has been submitted to suggest that the standard practice is unsafe.. The existing language seems to prohibit such practice.

The unstated main concern seems to be that if raceway is not secured to the floor it could become damaged and possibly break at junction points. Such damage could occur during activities such as cable addition, removal, or relocation, or simply by accidental bumping or kicking. The cables proposed in this "amendment to the exception" would not be prone to such damage unless they have been spliced at some point (presumably to extend the length). This would be an unusual practice, but it is conceivable. The amended language requires that two conditions must be met

(1) The raceway or cable must be supported by the floor of the building under the raised floor; and

(2) The raceway or cable must be one continuous run with no splices or junctions.

In all other conditions, the requirements of 300.11 shall apply.

The full text would read as follows:

"Exception: Flexible metal conduit, liquidtight flexible metal conduit, flexible nonmetallic conduit, Type MI cable, Type MC cable, or Type AC cable shall not be required to be securely fastened in place when raceway or cable meets both of the following conditions:

(a) The raceway is supported by the floor of the building under the raised floor; and

(b) The raceway is one continuous run with no splices or junctions

By rejecting the proposal, the panel has effectively deleted the number 1 purpose for having Article 645 in the first place. By accepting this comment, the panel will acknowledge what has been recognized as a "best practice" for decades and will remove an ambiguity from the Code.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 12-85.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-92 Log #35 NEC-P12 **Final Action: Accept**
(645.10(B)(5))

Submitter: Stanley Kaufman, CableSafe Inc. / Rep. The Society of the Plastics Industry
Comment on Proposal No: 12-129
Recommendation: Accept this proposal in principle by revising the text as shown:
Cables installed under a raised floor, other than branch circuit wiring and power cords installed in compliance with 645.5(D)(2) or (3), or ~~are~~ in compliance with 300.22(C), 725.154(A), 770.113(C) and Table 770.154(A), ~~or~~ 800.113(C) and Table 800.154(A), or 820.113(C) and Table 820.154(A).
Substantiation: Panel 16 actions on proposals 16-48, 56, 160 & 172 moved the installation requirements for cables in "other space used for environmental air". The requirements that are in sections 770.154(A), 800.154(A) and 820.154(A) in the 2008 NEC will be in sections 770.113(C), 800.113(C) and 820.113(C) and tables 770.154(A), 800.154(A) and 820.154(A) in the 2011 NEC.
Panel 3 rejected companion proposals 3-192 & 3-198 to move the installation requirements from 725.154(A) to 725.133. If that action is changed in the ROC stage, the reference to 725.154(A) will need to be revised.
Reference to Article 820 was added for completeness. The word "are" is replaced by "or" to correct an error.
Panel Meeting Action: Accept
Panel Statement: The panel understands that these changes are intended to correlate with actions by CMP 16.
The panel understands that CMP 3 did not change its actions on Proposals 3-192 and 3-198.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

12-93 Log #259 NEC-P12 **Final Action: Accept**
(645.25)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-148
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 2 for correlating action in Table 220.3.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts that the TCC referred this proposal to CMP 2 for correlation with Table 220.3.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 647 — SENSITIVE ELECTRONIC EQUIPMENT

12-94 Log #1685 NEC-P12 **Final Action: Reject**
(647.4(A), (B), and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-150
Recommendation: Accept the proposal with the following revisions:
(A) Distribution Equipment and Overcurrent Protection. Use of standard single-phase panelboards and other distribution equipment with a higher voltage rating shall be permitted. Distribution equipment shall be clearly and durable marked to identify the system. Disconnecting means shall simultaneously disconnect all ungrounded conductors of the circuit they control.
(B) Enclosure Identification. All box covers and other enclosures and outlets shall be clearly and durably marked to indicate the system voltage and source of power.
(C) Conductor Identification. All conductors covered by this article shall be identified as to system at all splices and terminations by color that is not used for wiring elsewhere on the premises, approved marking, tagging, or other approved means. The means of identification shall be posted where the circuit originates and at the disconnecting means for the building or other premises.
Substantiation: Circuit breakers and fused switches for use at the system voltage are covered by the first sentence. Enclosures other than "junction" boxes should be covered by (B) such as switches, circuit breakers, outlets. Equipment other than panelboards are not prohibited, such as individual enclosed circuit breakers and fused switches. As referenced in (A), color identification for conductors should be unique and not used for other systems.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide definitive substantiation that a problem exists in the field or with this requirement. The existing wording is adequate.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-95 Log #1686 NEC-P12 **Final Action: Reject**
(647.4(A), (B), and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-150
Recommendation: Accept the proposal.
Substantiation: Circuits can be derived from equipment which is not a panel or panelboard such as individual enclosed circuit breakers and fused switches. Covers of pull boxes and cabinets in addition to "junction" boxes should also be marked.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide definitive substantiation that a problem exists in the field or with this requirement. The existing wording is adequate.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-96 Log #861 NEC-P12 **Final Action: Reject**
(647.6(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-151
Recommendation: Accept the proposal and revise text as follows:
Utilization equipment, receptacles, and flush surface outlets shall be grounded by a separate wire-type equipment grounding conductor run with the circuit conductors and connected to a grounding terminal(s) or bus(es) durably marked "Mechanical Equipment Ground" in the distribution equipment. Other grounding methods authorized elsewhere in this Code shall be permitted where the independence of the ground-return path does not exceed the impedence of equipment grounding conductors sized in accordance with this article.
FPN No. 1 and 2: No charge
Substantiation: A separate wire type EGC is apparently intended. Branch circuits are not specified to originate from a panelboard. The NEC Style Manual states: "do not use a reference if the requirement is covered by 90.3."
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide definitive substantiation that a problem exists in the field or with this requirement. The existing wording is adequate.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-97 Log #757 NEC-P12 **Final Action: Reject**
(647.7(A)(4))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-152
Recommendation: Accept the proposal.
Substantiation: Devices other than receptacles should have a configuration that cannot be used on other systems. A T-slot receptacle, cord connector body, or flanged surface outlet is "unique" (different from straight slot or circular devices), but parallel blade attachment plugs are compatible. These may also be used on other systems.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide definitive substantiation that a problem exists in the field or with this requirement. The existing wording is adequate.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-98 Log #860 NEC-P12 **Final Action: Reject**
(647.7(A)(4))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-153
Recommendation: Accept the proposal and revise as follows:
All 125-volt receptacles, attachment plugs, cord connector bodies, and flanged surface devices shall have a configuration that is not compatible with such devices connected to other systems on the premises.
Exception: Such devices of other systems that are compatible shall be permitted in areas that are restricted to authorized personnel and contain no such devices supplied by sensitive electronic equipment power sources.
Substantiation: All configurations are unique to some class and rating. Attachment plugs, cord connector bodies, and flanged surface devices should be included. Authorized personnel such as supervision and security should be specified; they may not be "qualified".
Panel Meeting Action: Reject
Panel Statement: Proposal 12-153 requires that, in order to be eligible for the exception, the limited areas prescribed therein must only be accessible by "qualified personnel," not "authorized personnel" as the submitter suggests. The comment does not provide adequate substantiation in accordance with 4.4.5(d) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-99 Log #2652 NEC-P12 **Final Action: Reject**
(647.8)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-154
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:
"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.
The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 650 — PIPE ORGANS

12-100 Log #260 NEC-P12 **Final Action: Accept**
(650.3(B) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-156
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by complying with 4.1.1 of the NEC Style Manual relating to references to an entire article.
The Technical Correlating Committee further directs that the action on this proposal be rewritten to comply with the NEC Style Manual 2.1.5.2 related to titles for the first level subdivisions.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 650.3 to read as follows:
650.3 Other Articles.
(A) Electronic Organ Equipment. Installations of digital/analog sampled sound production technology and associated audio signal processing, amplification, reproduction equipment, and wiring installed as part of a pipe organ shall be in accordance with Article 640.
(B) Optical Fiber Cable. Installations of optical fiber cables shall be in accordance with Parts I and V of Article 770.
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.
The panel recognizes the reference to the entire Article 640 in the proposed text of 650.3(A) and points out that such installations of equipment and wiring discussed in (A) would be covered under the provisions of the entire article. While the NEC Style Manual does not permit such references, this reference in this case, would be applicable and correct for the types of installations discussed because they are described within the Scope of Article 640. Confusion in the pipe organ industry related to the installation of electronic organ equipment and other digital/analog sound production, signal processing, amplification and other sound reproduction technology as part of a pipe organ would indeed be subject to the provisions of Article 640. The intent of the panel is that such equipment is addressed and adequately covered within the NEC without duplication of identical material in Article 640.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-101 Log #261 NEC-P12 **Final Action: Accept**
(650.3(C) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-157
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by complying with 4.1.1 of the NEC Style Manual relating to references to an entire article.
The Technical Correlating Committee further directs that the action on this proposal be rewritten to comply with the NEC Style Manual 2.1.5.2 related to titles for the first level subdivisions.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.
See panel action and statement on Comment 12-100.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 660 — X-RAY EQUIPMENT

12-102 Log #2653 NEC-P12 **Final Action: Accept**
(660.2)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-159
Recommendation: Reject the proposal.
Substantiation: Although it is true that the terms arise in two different articles, it does not necessarily follow that the definition must be moved to Article 100, although it is an essential qualification for such a placement. In this case the nature of the X-ray equipment covered in this article is so radically different from that in health care facilities it is appropriate to leave these terms where they are now. No code user reading about industrial X-ray equipment is going to think of going elsewhere for these definitions.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-187 Log #262 NEC-P15 **Final Action: Accept**
(660.2.Long-Time Rating (X-Ray Equipment) and Momentary Rating (X-Ray Equipment) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 12-159
Recommendation: The Technical Correlating Committee directs that this proposal be referred to Code-Making Panel 15 for correlating action in Article 517.
This action will be considered by Code-Making Panel 15 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC tor correlating action in Article 517.

The panel reaffirms its position as provided in the panel statement on Proposal 15-14.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-103 Log #865 NEC-P12 **Final Action: Reject**
(660.4(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-160
Recommendation: Accept the proposal and revise as follows:
Fixed and stationary X-ray equipment shall be connected to the power supply by an approved wiring method of Chapter 3.
Substantiation: "General" requirements are covered in Article 110 which does not specifically cover wiring methods. All wiring methods are not suitable.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide definitive substantiation that a problem exists in the field or with this requirement. The existing wording is adequate. The requirements proposed are covered in 90.3.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-104 Log #2654 NEC-P12 **Final Action: Accept**
(660.23(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-163
Recommendation: Accept the proposal in principle.
Change "live current-carrying parts" to "uninsulated live parts."
Substantiation: Refer to the definition of live parts in Article 100. Any energized part is live. However, the danger addressed in this section is to parts that constitute a shock hazard, that is, uninsulated. At one time the live parts definition only applied to uninsulated parts that presented a shock hazard, but as of the 2002 NEC the definition changed. Like many NEC provisions that mention live parts, this one was never correlated with that major change in the 2002 NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 665 — INDUCTION AND DIELECTIC HEATING EQUIPMENT

12-105 Log #859 NEC-P12 **Final Action: Reject**
(665.4)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-167
Recommendation: Accept the proposal.
Substantiation: 500.1 indicates Articles 500 through 504 apply to Class I, II, and III locations for equipment in those locations. Some equipment permitted in those locations are not specifically designed for hazardous (classified) locations, e.g., nonincendive equipment.
Panel Meeting Action: Reject
Panel Statement: The reference to the location of the definition of Hazardous (Classified) Locations is in Article 500 and is appropriate.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-106 Log #2655 NEC-P12 **Final Action: Reject**
(665.12)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-168
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:
"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
The submitter of this comment, the senior member of CMP 9, absolutely agrees with CMP 12 that every panel must have the ability to customize this rule to meet the actual context as necessary. CMP 9 has done exactly that in 490.46 and this wording carefully preserves the ability of a panel to craft such language. It is also true, however, that in the great majority of cases the simple requirement to be placed in Article 110 will work and avoid endless repetition of similar text.
Panel Meeting Action: Reject
Panel Statement: The panel is not obligated to accept a comment that is contingent on another panel accepting it.
The panel continues its opposition to establishing one global requirement for "disconnecting means, lockable" as each individual chapter and article has special considerations that need to be considered. A global requirement will not be able to cover all these considerations.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-107 Log #864 NEC-P12 **Final Action: Reject**
(668.15)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-170
Recommendation: Accept the proposal and revise as follows:
All equipment, apparatus, and components that are grounded shall comply with applicable provisions of Article 250 except that a metal water pipe or tubing shall not be required to be used. Grounding electrodes shall comply with 250.52
Substantiation: Equipment that is grounded, whether or not required by Article 668 should comply with Article 250. "Permitting" electrodes of 250.52 does not impose a requirement per 90.5 (B) and thus is optional.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide definitive substantiation that a problem exists in the field or with this requirement. The existing wording is adequate.
Section 668.15 requires the provisions of Article 250 to apply where equipment, apparatus, and structural components are required by provisions of 668 to be grounded. This section allows the use or combination of any of the electrodes prescribed by 250.52 with the exception of water piping to demonstrate compliance with this section and is not a permissive rule whether or not to ground.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 668 — ELECTROLYTIC CELLS

12-108 Log #863 NEC-P12 **Final Action: Reject**
(668.21(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-171
Recommendation: Accept the proposal and revise as follows:
Receptacles, attachment plugs, cord connector bodies, and flanged surface devices for ungrounded equipment shall be non-grounding types.
Substantiation: Cord connector bodies and flanged surface devices should be included. The configuration of a non-grounding type attachment plug, cord connector body, or flanged surface device cannot prevent its use for equipment that is required to be grounded, but not actually grounded.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide definitive substantiation that a problem exists in the field or with this requirement. The existing wording is adequate.
This change would eliminate the use of some standard devices or equipment within the cell line working zone. Most of the cell line apparatus is ungrounded and is at cell potential.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 669 — ELECTROPLATING

12-109 Log #862 NEC-P12 **Final Action: Reject**
(669.6(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-174
Recommendation: Accept the proposal and revise as follows:
(A) Open individual insulated conductors shall be permitted to be run without insulated support provided they are securely supported and protected from physical damage by location or approved means. Bare open individual conductors shall be permitted where securely supported on insulators.
(B) Open individual insulated conductors shall be permitted to be supported by approved insulated supports and guarded by elevation or other approved means against accidental contact up to the point of termination in accordance with 110.27.

Substantiation: Supports should be specifically approved; elevation is one means of protection.
Panel Meeting Action: Reject
Panel Statement: The existing wording is adequate.
The proposed change does not reflect the actual electroplating, anodizing, electro-polishing, and electro-stripping equipment configuration.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 670 — INDUSTRIAL MACHINERY

12-110 Log #858 NEC-P12 **Final Action: Reject**
(670.4(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-176
Recommendation: Accept the proposal and revise as follows:
A machine shall be considered as an individual unit and shall be provided with an approved readily accessible disconnecting means within sight of the machine and with approved integral means for locking in the open (off) position. The disconnecting means shall be supplied by a circuit protected by fuses or a circuit breaker. The machine disconnecting means shall not be required to incorporate overcurrent protection unless required by the manufacturer or other provisions in this Code.
Substantiation: The machine disconnecting means should be readily accessible and within sight, and provided with approved permanent means for locking in the open (off) position, since the machine disconnecting means may be the single disconnecting means permitted by the Exception for 430.112. Exception No. 2 for 430.102 permits a single disconnecting means for a machine with more than one motor and 430.102(A) requires the disconnecting means in sight from the motor controller(s).
Panel Meeting Action: Reject
Panel Statement: The submitter's recommendation would establish a conflict between Article 670 and NFPA 79 regarding the requirements for the disconnecting means.
The submitter did not provide any substantiation for removal of the term "branch circuits" in the recommendation.
The submitter did not provide definitive substantiation that a problem exists in the field or with this requirement. The existing wording is adequate.
The term "open" with regard to disconnecting means is used throughout the Code and is widely understood.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-111 Log #2536 NEC-P12 **Final Action: Reject**
(670.5)

TCC Action: The Technical Correlating Committee directs the text of Proposal 12-177 be revised to read as follows since the proposal would have required industrial machinery at all locations where short-circuit current was not exceeded:
"670.5 Short-Circuit Current Rating. Industrial machinery shall not be installed where the available fault current exceeds its short-circuit current rating as marked in accordance with 670.3(A)(4)."
Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 12-177
Recommendation: Revise text to read as follows:
670.5 Short Circuit Current Rating. Industrial machinery shall be marked in accordance of 670.3(A)(4) and ~~shall be~~ installed where the available fault current does not exceed ~~it's~~ the marked short circuit current rating ~~as marked in accordance with 670.3(A)(4).~~
Substantiation: Suggesting the above rewording because first, the equipment marking needs to be known and will be on the equipment prior to the equipment installation. Secondly, the other change was to remove the words "its" for clarity of the language to "assure the available fault current does not exceed the industrial machinery short circuit rating." "Its" is difficult to enforce because of different interpretations on what "its" is intended to describe.
Panel Meeting Action: Reject
Panel Statement: The current wording is adequate and clear. The rewording does not provide any additional clarity.
The submitter has not proved any technical substantiation for the revision.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 675 — ELECTRICALLY DRIVEN OR CONTROLLED IRRIGATION MACHINES

19-216 Log #756 NEC-P19 **Final Action: Reject**
(675.8(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-306
Recommendation: Accept as revised:
"Shall be readily accessible and have approved permanent means for locking in the open (off) position.
Substantiation: "Capable" is not specific; the open position should be specified (OFF), not an open door or cover.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action to Reject Proposal 19-306.
The submitter has not provided any technical substantiation to support the proposed revision.
The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-217 Log #2656 NEC-P19 **Final Action: Hold**
(675.8(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-305
Recommendation: Accept the proposal, contingent on the companion comment to this being accepted by CMP 1.
Substantiation: The concept of a central location for the characteristics of a locking disconnect is sound, although the original proposal to place the wording in Article 100 failed because rules were included in a definition. The companion comment will place the following requirement in Article 110:
"**Disconnecting Means, Lockable.** Where a disconnecting means with provisions for being locked in the open position is required by a provision in the NEC, unless otherwise modified by that provision, the disconnecting function shall be accomplished by either a keyed or combination lockout device in which the provision for applying the lockout device remains in place on the disconnecting means and the disconnecting means remains operable until the lockout device is applied."
Panel Meeting Action: Hold
Panel Statement: The panel acknowledges that this is a companion comment to one submitted to Panel 1 (Comment 1-49) and the action taken by Panel 1 on Comment 1-49 was "Hold." Panel 19 also requests that the Technical Correlating Committee appoint a task group to review the use of the term "Disconnecting means, lockable" throughout the code.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-218 Log #857 NEC-P19 **Final Action: Reject**
(675.8(B) and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-307
Recommendation: Accept the proposal and revise as follows:
(B) Main Disconnecting Means. An approved readily accessible main disconnecting that incorporates overcurrent protection shall be provided for the machine at the point of connection of supply conductors at the machine or it shall be within sight of and not more than 15 m (50 ft) from the machine, readily accessible, and provided with approved permanent means for locking in the open (off) position. Switches used as the disconnecting means shall have a horsepower and current rating not less than required for the main controller or group of controllers.
Delete Exceptions No. 1 and 2.
(C) Disconnecting Means for Motors and Controllers. An approved disconnecting means shall be provided to simultaneously disconnect all ungrounded conductors supplying each motor(s) and controller(s) it controls and shall be located as required by Article 430, Part IX, but shall not be required to be readily accessible.
Substantiation: A disconnecting means provides for disconnection; overcurrent protection may be incorporated. The present wording requires the disconnecting means to be visible, but not necessarily within sight of the machine. The proposed revision for the last sentence removes the need for the Exception. More than one motor and controller may be supplied by one circuit per 430.24, and 430.53, and one controller can serve more than one motor per 430.87.
Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action to reject Proposal 19-307.

The panel disagrees with the substantiation provided. The present text requires over current protection by the main disconnecting means and requires it to be visible, located within 50 ft and readily accessible.

The submitter's failure to use legislative format, i.e., use of underscore to denote wording to be inserted and strike-through to denote wording to be deleted, makes it difficult, and sometimes impossible, for the code-making panel to determine exactly what is being proposed and how the substantiation supports the proposed change(s) or revision(s).

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

ARTICLE 680 — SWIMMING POOLS, FOUNDATIONS, AND SIMILAR INSTALLATIONS

17-33 Log #2712 NEC-P17 **Final Action: Reject**
(680.2.Power Safe Protector (PSP))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 17-92
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: This new definition is not required since the proposed code changes requiring PSP devices in Article 680 were rejected.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-34 Log #263 NEC-P17 **Final Action: Accept**
(680.3)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-96
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal to identify what was not accepted and the reason it was not accepted.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC.

The panel has retained 680.3 as revised because it directs the user to important requirements for underwater speakers and to Article 640 as detailed in the portions of the table that were retained.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-35 Log #2278 NEC-P17 **Final Action: Reject**
(680.3)

Submitter: Brian Myers, IBEW Local Union 98
Comment on Proposal No: 17-96
Recommendation: The panel should reconsider the action on this proposal and reject.
Substantiation: The revision or removal of this table may cause misinterpretation of the installation requirements required in Article 680. In the 2005 cycle, panel 17 incorporated changes in Table 680.3 to account for the use of rigid polyvinyl chloride conduit and reinforced thermosetting resin conduit and also correlated changes for the terminology throughout Article 680. Simply leaving this table intact adds clarity for the user.
Panel Meeting Action: Reject
Panel Statement: The panel chooses to maintain the action on Proposal 17-96. See panel statement on Comment 17-34.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-36 Log #856 NEC-P17 **Final Action: Reject**
(680.4)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-98
Recommendation: Accept the proposal and revise as follows:

All electrical equipment in the water, walls, or decks of pools and permanently installed fountains or directly associated with such installations shall comply with applicable provisions of this article.
Substantiation: This article contains provisions for equipment that is associated with pools but not in the water, walls, or decks, e.g., 680.8, 680.9, 680.10, 680.21, 680.22(A and(C), and680.23(A)(2).
Panel Meeting Action: Reject
Panel Statement: The submitter's substantiation is incorrect, this section is for "All electrical equipment installed in the water, walls, or decks of pools, fountains, and similar installations …" per the 2008 NEC. The complete article covers items that may not be in these areas, but this section only address the approval of equipment in those areas. No substantiation has been provided to make this change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-37 Log #26 NEC-P17 **Final Action: Accept**
(680.8(B))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 17-102
Recommendation: Accept the proposal
Substantiation: Accepting this proposal will make the text of 680.8(B) correlate with Article 800. Throughout Article 800, cables are referred to as "communications cables" not "communication cables". See, for example, 800.179
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:

ROCK, B.: Annex B, "Standard Terms", of the NEC® Style Manual indicates on Page 24 explicitly for "communication" to be avoided and to use "communications" as being the sanctioned standard term.

17-38 Log #45 NEC-P17 **Final Action: Accept**
(680.10)

Submitter: Paul W. Abernathy, Electrical Service Specialists & The Electrical Guru
Comment on Proposal No: 17-103
Recommendation: Revise text as follows:

Table 680.10 Minimum Cover Depths

	Minimum Cover	
Wiring Method	**mm**	**in.**
Rigid metal conduit	150	6
Intermediate metal conduit	150	6
Nonmetallic raceways listed for direct burial under minimum of 102 mm (4 in.) thick concrete exterior slab and extending not less than 162 mm (6 in.) beyond the underground installation.	150	6
Nonmetallic raceways listed for direct burial without concrete encasement	450	18
Other approved raceways*	450	18

*Raceways approved for burial only where concrete encased shall require a concrete envelope not less than 50 mm (2 in.) thick.

Substantiation: The CMP misunderstood the application of my proposal. There is no technical data that I am aware of that would support the increased depth around the outside perimeter of the pool in general directed by the current verbiage of 680.10. The proposal was to allow for a reduction of depth for circuits directly related to the pool such as wet niche luminaries and so on. The intent of the proposal, as stated, was in regards to the table itself. If the conduit is under 4 inches of concrete, in RNC Conduit and conductors rated for a wet location, I do not see the technical need to be 18 inches in depth. The CMP did not understand that the intent was to allow RNC to have a reduced depth within the 5 foot area around the pool, not under the pool. This would allow pool associated wiring to be installed without maintaining an 18 inch depth while still being afforded the protection of a 4 inch slab around the outside edge of the pool.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-39 Log #852 NEC-P17 **Final Action: Reject**
(680.12 Exception (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-105
Recommendation: Accept the proposal and revise as follows:
Approved disconnecting means shall be provided to simultaneously disconnect all ungrounded conductors of each branch circuit supplying fixed utilization equipment associated with the pool, other than lighting.
Each means shall be readily accessible and within sight of the equipment controlled and shall be located at least 1.5 m (5 ft) horizontally from the nearest pool water.
Substantiation: I believe this maintenance disconnecting means was intended for pools, not spas or hot tubs, due to drowning by suction caused by draining of a pool by a pump; “from the inside walls of a pool” doesn’t literally require a location outside of the pool
Panel Meeting Action: Reject
Panel Statement: CMP 17 rejects the submitters substantiation. This required disconnect is intended for pools, spas and hot tubs as specified in this section. The proposed text does not add clarity and in fact deletes the allowance for the shortest path measurement. The submitter has not provided additional documentation to justify this revision.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-40 Log #264 NEC-P17 **Final Action: Accept**
(680.13)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-106
Recommendation: The Technical Correlating Committee directs that the action on this proposal be rewritten to comply with 3.1.3 of the NEC Style Manual regarding mandatory language in Fine Print Notes.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. The panel has relocated the material as a definition 680.2. See panel action and statement on Comment 17-41.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-41 Log #1963 NEC-P17 **Final Action: Accept in Principle in Part**
(680.13)

Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-106
Recommendation: Revise text to read as follows:
(New to Section 680.2 Definitions)
Wet Contact Voltage Limit
A voltage value providing acceptable protection from electric shock where there may be wet (not immersed) contact. The value is:
(1) 15 volts for sinusoidal ac,
(2) 21.2 volts peak for nonsinusoidal ac,
(3) 30 volts for continuous dc, and
(4) 12.4 volts peak for dc that is interrupted at a rate of 10 to 200 Hz.
FPN: The values are obtained from Chapter 9, Tables 11(A) and 11(B).
Substantiation: The text of proposed new 680.13 is not a requirement but a definition that is to be used elsewhere in Article 680. Modifying it editorially and moving it to the Definitions section will allow it to be referenced later in the Article. This will streamline the text of a number of other proposals relating to the use of this limit (see my comments on 17-139, 17-142, 17-159, 17-195, 17-196 and 17-215). The FPN is proposed so that the intent to correlate with the referenced Table values is clear.
Panel Meeting Action: Accept in Principle in Part
Add a new 680.2 definition (in place of the language proposed for 680.13 in Proposal 17-106) to read as follows:
Low Voltage Contact Limit
A voltage not exceeding the following values:
(1) 15 volts (RMS) for sinusoidal ac
(2) 21.2 volts peak for nonsinusoidal ac
(3) 30 volts for continuous dc
(4) 12.4 volts peak for dc that is interrupted at a rate of 10 to 200 Hz.
Panel Statement: The panel rejects the FPN because it is not needed for clarity. The panel accepts in principle the remainder. The panel has changed the term “wet contact voltage limit” to “low voltage contact limit” in order to avoid potential confusion that might occur over the use of the term “wet contact.” The panel has also modified the lead-in text for the same reason.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:
MALDONADO, J.: I am voting Negative to the panels action on the expansion of low voltage lighting with no provisions for grounding, GFCI protection or the use of an isolated winding type transformer that has a metal barrier between the primary and secondary windings. As currently required in section 680.23(A)(2). It is presented that increasing these voltages are justified based on the voltage limitations obtained from Chapter 9, Tables 11(A) and 11(B). These tables are for limitations for class 2 and 3 Power Sources. These tables apply to voltages that are not approved for wet contact or immersion contact per note 2. The combination of removing or not requiring GFCI protection or shielded Isolation transformers along with increasing to higher voltages could cause a problem when a power supply shorts our or a low voltage transformer shorts across the windings. This increase has not been justified or substantiated for these locations. Many of these fixtures are also being exempted from grounding if a listed assembly.

17-42 Log #2657 NEC-P17 **Final Action: Accept in Principle**
(680.13 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-106
Recommendation: Accept the proposal in principle and revise to read as follows:
680.13. Voltages for Wet Contact. Where a requirement in this article uses a voltage limitation of 15 volts, the limitation shall be applied to sinusoidal ac. If the operating voltage is other than sinusoidal ac, the equipment shall be listed for application in the context of wet contact conditions.
Informational Note: Tables 11(A) and 11(B) in Chapter 9 provide the required power source limitations for the use of qualified testing laboratories in evaluating equipment, including equipment that will be applied in the context of wet-contact conditions.
Substantiation: The problem with this proposal is not the mandatory language in the informational note; the problem is that the entire section is really an informational note. The new section is a restatement of the wet contact rules in Tables 11(A) and 11(B). It has been long established that these tables are policy parameters for testing laboratories and not for field application. Creating this new section partially unwinds that principle.
This comment integrates the issues raised in the proposal with the appropriate application of Tables 11(A) and 11(B). It does so without the need of any additional changes throughout the body of Article 680, or the addition of any more informational notes. If non-sinusoidal voltages exist, go straight to a qualified testing laboratory for a listing. This comment uses the phrasing “in the context of wet location conditions” in order to properly cover equipment that supplies voltage but may be in a dry location. For example, suppose a manufacturer sought a listing for a pool power supply for indoor pools with the power supply to be mounted in a dry location (very unlikely, but theoretically possible). Such a power supply would not present a wet contact issue with respect to its enclosure, but its output to any pool light would need to be evaluated for wet contact conditions.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel agrees that the material in Proposal 17-106 was written in non-mandatory language and has chosen to resolve this by using a definition. See the action taken on Comment 17-41.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:
MALDONADO, J.: I am voting Negative to the panels action on the expansion of low voltage lighting with no provisions for grounding, GFCI protection or the use of an isolated winding type transformer that has a metal barrier between the primary and secondary windings. As currently required in section 680.23(A)(2). It is presented that increasing these voltages are justified based on the voltage limitations obtained from Chapter 9, Tables 11(A) and 11(B). These tables are for limitations for class 2 and 3 Power Sources. These tables apply to voltages that are not approved for wet contact or immersion contact per note 2. The combination of removing or not requiring GFCI protection or shielded Isolation transformers along with increasing to higher voltages could cause a problem when a power supply shorts our or a low voltage transformer shorts across the windings. This increase has not been justified or substantiated for these locations. Many of these fixtures are also being exempted from grounding if a listed assembly.

17-43 Log #265 NEC-P17 **Final Action: Accept**
(680.20(C) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-107
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal as the proposal does comply with the NFPA Regulations Governing Committee Projects.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accept the direction of the TCC. See the action on Comment 17-45.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-44 Log #440 NEC-P17 **Final Action: Reject**
(680.21(A)(5) and 680.7(B))

Submitter: Gary Line, Crystall Lake, IL
Comment on Proposal No: 17-108
Recommendation: Revise text to read as follows:
680.21(A)(5) Cord-and-Plug Connections. Pool-associated motors shall be permitted to employ cord-and-plug connections. The flexible cord shall not exceed 900 mm (3 ft) in length. The flexible cord shall include a copper equipment grounding conductor sized in accordance with 250.122 but not smaller than 12 AWG. The cord shall terminate in a grounding and locking-type attachment plug. [ROP 17-108].
680.7(B) [should contain the same change in order to remain consistent].
(B) Equipment Grounding. The flexible cord shall have a copper equipment grounding conductor sized in accordance with 250.122 but not smaller than 12 AWG. The cord shall terminate in a grounding and locking-type attachment plug.
Substantiation: The words "and locking" should be added to these sections to remain consistent with the UL Standard 1081 and with the wording of Section 2.6 Pumps, of the UL *Swimming Pool Equipment, Spas, Fountains and Hydromassage Bathtubs Marking Guide/ as contained in the UL White Book, 2009 Edition.*
Panel Meeting Action: Reject
Panel Statement: The adding of the words "Locking Type" when used for receptacles is based upon their proximity to the pool. If they are to be installed close to the pool then they need to be of the locking type, but if located enough distance away they would not have to be.
UL 1081 only requires locking type attachment plugs for pumps intended to be installed less than 10 ft from the walls of the pool. This proposed text is also not necessary in this section as the requirements for locking or non-locking receptacles are already detailed in section 680.22(A)(1).
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-45 Log #2279 NEC-P17 **Final Action: Accept in Principle**
(680.21(C) (New))

Submitter: Brian Myers, IBEW Local Union 98
Comment on Proposal No: 17-107
Recommendation: This proposal should have been accepted.
Substantiation: The submitter clearly meant 680.21(C). Accepting this proposal relocates requirements for swimming pool pump motors to the section that actually covers the motors described in the rule and adds clarity to part 2 of Article 680.
Panel Meeting Action: Accept in Principle
See action on Comment 17-46.
Panel Statement: See statement on Comment 17-46.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-46 Log #2658 NEC-P17 **Final Action: Accept in Principle**
(680.21(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-107
Recommendation: Accept the proposal, located as Section 680.21(C) instead of 680.20(C).
Substantiation: The submitter apologizes for the typo in the section field of the proposal form that sent this to where it could not go. The point of the proposal is to relocate the requirement from 680.22, which has nothing to do with swimming pool pump motors, to 680.21 which does cover these motors. The current Article 680 section numbers were carefully drawn at the time of the 2002 NEC rewrite to rigorously organize the content. The proposal does comply with the Regulations.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
Delete 680.22(B) and add 680.21(C) to read as follows:
680.21(C) GFCI Protection. Outlets supplying pool pump motors connected to single-phase 120 volt through 240 volt branch circuits rated 15 or 20 amperes, whether by receptacle or by direct connection, shall be provided with ground-fault circuit-interrupter protection for personnel.
Panel Statement: The panel has revised the requirement for clarity. Note that "208 volt" is not shown but is included in "120 volt through 240 volt" provision. The panel removed the text referring to short circuit and ground fault protection because it is inclusive in the circuit rating.
The panel has deleted 680.22(B) and replaced it with 680.21(C) in accordance with the recommendation of Proposal 17-107 as indicated in the recommendation of this comment.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-47 Log #2659 NEC-P17 **Final Action: Reject**
(680.22)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-109a
Recommendation: Reject the proposal.
Substantiation: Removing the word "Area" from the title makes the problem far worse. An underwater luminaire is not area lighting, and there is no evidence of confusion. As the panel said in its substantiation, "this section clearly does not cover underwater luminaires." Area lighting is a well known concept. In addition, removing this word leaves no modifier on the other words in the title, possibly leading to the conclusion that underwater lighting, and other unintended loads are covered here. Compare this title with that for 680.23, "Underwater Luminaires". If that title is compared with "Lighting, Receptacles, and Equipment" it looks much more overlapping than if one says "Area Lighting" and the other says "Underwater Luminaires. These titles were carefully vetted during the 2002 rewrite of the article.
Panel Meeting Action: Reject
Panel Statement: The term "area" lighting was only used in the title of this section and is not found in the text of any of its subsections, its use is not necessary.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-48 Log #706 NEC-P17 **Final Action: Reject**
(680.22(1) and (2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-116
Recommendation: Accept the proposal and revise as follows:
(1) Circulation and sanitation system, location. Receptacles, cord connector bodies, and flanged surface outlets that supply power for water pump motors or other loads directly related to the circulation and sanitation systems shall be located not less than 3.0 m (10 ft) horizontally from the pool water or not less than 1.8 m (6 ft) horizontally from the pool water if they meet all of the following conditions: (remainder unchanged).
(2) Other locations. Other receptacles, cord connector bodies, and flanged surface outlets shall be not less than 1.8 m (6 ft) horizontally from the pool water.
Substantiation: Other device that supply plug-connected loads should be included. "Horizontally" makes it clear the location cannot be in or on a structure in a pool that is 10 ft from the inside wall.
Panel Meeting Action: Reject
Panel Statement: The submitter did not clearly indicate changes. Use of "cord connector bodies" is inappropriate as these are cord-mounted devices and would be supplied on the pump. Their use would also pose a risk of electric shock should the power supply cord become detached at the pump and the cord connector body rests in standing water. The use of the term "flanged surface outlet" is unnecessary as the term "receptacle," as defined in Article 100 is inclusive of such constructions. If cord-mounted, its use poses the same potential risk of electric shock as the use of cord connector bodies.

The panel disagrees with adding "horizontally" as it is less representative than current Code text for how a power supply cord can be routed. The submitter did not provide substantiation for changing from where the measurement is to be made ("inside walls" changed to "pool water") from nor for the change in distance ("1.83" m to "1.8" m).
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-49 Log #2713 NEC-P17 **Final Action: Reject**
(680.22(A) and (B))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 17-113
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any additional documentation to show that this product has been listed. The companion proposals for neither 680.2 [Proposal 17-92], 680.32 [Proposal 17-193], nor the associated Article 100 Power Safe Protector definition [Proposal 2-27] do not establish limiting safe values for any protection parameters. Any device with a current-interrupting feature and red and green indicator lights could purport to provide power safe protector protection. As such, the proposed requirement is unenforceable.

The additional documentation does not provide sufficient data to show the PSP device will add any greater level of safety in regards to mitigating electrocution hazards than the currently required GFCI devices provide. The UL Research Report clearly states that its scope was to "assess the ability of the Energy Safe Technologies Power Safe Protector (PSP) receptacle design to prevent overheating and thereby mitigate the likelihood of ignition of the electrical wiring system." The requirement for using GFCI protection in this code section is to prevent electrocution where electricity is being used in wet locations. The report clearly states that "An evaluation of this "Power Off" paradigm was not included in this research investigation".

The submitter has not addressed prohibited use of a proprietary trademarked name in mandatory Code requirements (Annex A.14, Guide for Officers of Technical Committees and Technical Correlating Committees of the NFPA). U.S. Patent & Trademark Office shows a live application [USPTO Serial Number 77633351] for registration of "POWERSAFE" by the submitter's corporation Energy Safe Technologies Inc.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-50 Log #1786 NEC-P17 **Final Action: Reject**
(680.22(A)(1))

Submitter: Thomas Valeo, Town of North Arlington, NJ
Comment on Proposal No: 17-116
Recommendation: Revise as follows:
Circulation and Sanitation System, Location. Receptacles that provide power... not less than 6 ft from the inside walls of the pool if they meet all of the following:
~~(1) consist of single receptacles.~~
~~(2) employ a locking configuration.~~
(3) Are of the grounding type.
(4) Have GFCI protection.
Substantiation: Now that the 2008 code permits "all other receptacles" to be not less than 6' from the pool and the pump motor receptacles were pushed from 5 ft to 6ft, there is no reason why the pump motor receptacles should have to comply with (1) and (2) of 680.22(A)(1) since other receptacles are now permitted at the same location.
Panel Meeting Action: Reject
Panel Statement: Sanitation system receptacles are not general use receptacles and may be a higher voltage than 125 volts.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-51 Log #1870 NEC-P17 **Final Action: Reject**
(680.22(B))

Submitter: Larry Brown, Mid Florida Pools
Comment on Proposal No: 17-130
Recommendation: Delete text.
~~**680.22(B) Outlets** supplying pool pump motors from branch circuits with short-circuit and ground-fault protection rated 15 or 20 amperes, 125 volt or 240 volt, single-phase, whether by receptacle or direct connection shall be provided with ground-fault circuit-interrupter protection for personnel.~~
Substantiation: Proposal 17-130 (Log #4401) went too far, but had the right idea. My experience wiring more that 8000 pools in Central Florida in the past 21 years has shown me that requiring GFCI protection for hard wired pool pumps would be a disaster for health and economic reasons. Nuisance trips in our area will be immense in number and green (algae ridden) pools will become commonplace. This code for 2008 should never have been allowed. The injuries reported and conclusions drawn thereby were dubious at best.

The proposed change should have been: 680.22(B) ~~Outlets~~ Receptacles supplying pool pump motors from branch circuits with short-circuit and ground-fault protection rated 15 amperes through 20 amperes, 125 volt through 240 volt, single phase, ~~whether by receptacle or direct connection~~ shall be provided with ground-fault circuit-interrupter protection for personnel.

This would prevent the imminent nuisance trips caused by such minor things as distant lightning strikes, grasses, weeds, blowing rain and insect presence in these motors. (All common occurrences in Florida). Filtration and purification systems will be disabled by these situations on a regular basis in our environment. (I know this from personal experiences.) Due to the transient nature of pool owners in Florida, green pools and sickness will be common and untold millions of dollars will be spent due to this unnecessary code. In addition, thousands of tons of CO2 will spew from our service vehicles while trying to chase down these nuisance trips.

I stand by my testimony given to the Florida Building Commission June, 2009. "I have personally wired over 8000 pools in Florida (without Section 680.22(B) in 2008 NEC) and never had a report of a customer or service worker even being tingled. If non-GFCI circuits for pool pumps are such a hazard, then people would have been dropping like flies in Florida with over 1 million pools in our state alone and up until now 99% of these motors were wired without GFCI protection." The FBC must have believed all who showed up to contest this ill conceived code because they, for the first time ever, chose to delete something from the NEC and that was 680.22(B).

Please don't make Florida become "The Green State" because of all the green pools that would result from this poorly advised code.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided substantiation to justify the elimination of this safety device. There have been documented incidences of hard wired motors creating an electrocution hazard with at least one being a fatality. CMP 17 rejects the submitters substantiation since the NEC provides for minimum requirements for electrical safety not for pool maintenance.

Also see the panel action and statement on Comment 17-46.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-52 Log #2299 NEC-P17 **Final Action: Reject**
(680.22(B))

Submitter: Dana Anderson, Anderson Poolworks, The Anderson Group, Inc.
Comment on Proposal No: 17-130
Recommendation: Revise to read as follows:
(B) GFCI Protection. Receptacles ~~Outlets~~ supplying pool pump motors from branch circuits with short-circuit and ground fault protection rated 15 or 20 amperes, 125 volt or 240 volt, single phase, ~~whether by receptacle or direct connection~~, shall be provided with ground-fault circuit-interrupter protection for personnel.
Substantiation: The GFCI protection required on pool and spa circulation and water feature pumps cause nuisance tripping, leading to expensive and potentially dangerous piping failures. This happens when a variable frequency pump drive loses power due to a GFCI circuit event, multi-level pool-spa combinations equalize their water levels, and the pump loses it prime. If the GFCI is simply re-set without regard for the water-level and priming issues, the pump will run "dry" without water, potentially causing high-temperature situations leading to piping system leaks with potentially catastrophic damages. Additionally, pools and spas without circulation and filtration can become unsafe for bathers in a short period of time.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-51.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-53 Log #2461 NEC-P17 **Final Action: Reject**
(680.22(B))

Submitter: Jennifer Hatfield, Florida Swimming Pool Assn.
Comment on Proposal No: 17-130
Recommendation: Revise text to read as follows:
(B) GFCI Protection. Receptacles ~~Outlets~~ supplying pool pump motors from branch circuits with short-circuit and ground fault protection rated 15 or 20 amperes, 125 volt or 240 volt, single phase, ~~whether by receptacle or direct connection~~, shall be provided with ground-fault circuit-interrupter protection for personnel.
Substantiation: This revised text clarifies that only the removal of the GFCI requirement on direct connection pump motors should occur; retaining the GFCI protection on receptacle pump motors. In Florida, there is no evidence that injury has occurred on a direct connection pump motor that is properly bonded and grounded; therefore, requiring a GFCI in this case does not create a safer environment. In fact, adding a GFCI will only cause harm due to the nuisance trips that have been known to occur. These nuisance trips can stem from lightning strikes, grass, weed and insect presence, etc during normal motor start-up. This will result in unsanitary conditions in a few short days, due to the termination of the pool systems; causing health and safety concerns, in addition to resulting in an increase in cost to the consumer to get the pool back up and running. In Florida, the large transient community and warm weather exasperates these concerns – resulting in a longer time for the nuisance trip to be found and fixed, and a greater health and safety risk. Many other sunbelt states will have these same problems. The Florida Building Commission recognized all these points and voted to adopt the 2008 NEC with the exception of this GFCI requirement on direct connection pump motors.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-51.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-54 Log #2541 NEC-P17 **Final Action: Reject**
(680.22(B))

Submitter: Carvin DiGiovanni, Association of Pool & Spa Professionals
Comment on Proposal No: 17-130
Recommendation: Revise text to read as follows:
(B) GFCI Protection. Receptacles ~~Outlets~~ supplying pool pump motors from branch circuits with short-circuit and ground fault protection rated 15 or 20 amperes, 125 volt or 240 volt, single phase, ~~whether by receptacle or direct connection~~, shall be provided with ground-fault circuit-interrupter protection for personnel.
Substantiation: The original proposal was submitted incorrectly, this revised text clarifies the intention of the original proposal, which was to remove the GFCI requirement on direct connection pump motors, but retain GFCI protection on receptacle pump motors. Evidence is lacking that any cases of injury have occurred on a properly bonded and grounded hardwired pump motor; therefore, requiring a GFCI in this case does not create a safer environment. Rather, it provides an opportunity for other hazards due to nuisance trips that have and will occur. This nuisance trips can stem from distant lightning strikes, grass, weed and insect presence, etc during normal motor start-up. This will result in termination of the pool filtration and purification systems causing an unsanitary pool in a few short days, especially in warmer weather. An additional factor is that in many parts of the country the transient nature of its residents (snow birds) will allow nuisance tripping to go undetected, in many cases long enough to cause consumer health problems. The unhealthy water can also create an increase in mosquitoes, as well as an inability to see the bottom of the pool clearly, causing additional safety concerns. The cost of repairing such damaged pools will also be an increased burden on consumers with no clear increase in safety resulting from a GFCI requirement on direct connection pool pump motors.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-51.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-55 Log #2660 NEC-P17 **Final Action: Reject**
(680.22(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-126
Recommendation: Convert the panel action to an "accept in principle." Take the action suggested in the companion comment to this, on Proposal 17-107, instead.
Substantiation: Proposal 17-107 includes the changes accepted in this proposal. This is a housekeeping comment to correlate the Final Action on the two proposals.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-46.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-56 Log #1964 NEC-P17 **Final Action: Accept**
(680.23)

TCC Action: The Technical Correlating Committee revises the panel's action in 680.23(B)(3) to comply with 2.6 and 3.1.4 of the NEC Style Manual regarding exceptions and directs that the text be revised to read as follows:
"Other than listed low-voltage lighting systems not requiring grounding...".
Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-136
Recommendation: Revise text to read as follows:
(3) Equipment Grounding Provisions for Cords. Except for listed low-voltage lighting systems not requiring grounding, ~~W~~wet-niche luminaires that are supplied by a flexible cord or cable shall have all exposed non-current-carrying metal parts grounded by an insulated copper equipment grounding conductor that is an integral part of the cord or cable. This grounding conductor shall be connected to a grounding terminal in the supply junction box, transformer enclosure, or other enclosure. The grounding conductor shall not be smaller than the supply conductors and not smaller than 16 AWG.
(4) Luminaire (Fixture) Grounding Terminations. The end of the flexible-cord jacket and the flexible-cord conductor terminations within a luminaire (fixture) shall be covered with, or encapsulated in, a suitable potting compound to prevent the entry of water into the luminaire (fixture) through the cord or its conductors. ~~In addition~~ If present, the grounding connection within a luminaire (fixture) shall be similarly treated to protect such connection from the deteriorating effect of the pool water in the event of water entry into the luminaire (fixture).
Substantiation: When the Panel rejected the proposal addressing line-voltage systems, it also effectively rejected a part of the proposal addressing low-voltage systems not requiring grounding. Such systems are already acknowledged in the Forming Shell and Wiring Extending Directly to the Forming Shell requirements in 680.23(B)(1) and (2). The requested changes extend the same exceptions to the grounding requirements of 680.23(B)(3). The requested change to 680.23(B)(4) is editorial only.
Panel Meeting Action: Accept
Panel Statement: The panel notes that the submitter's recommendation is to 680.23(B)(3) and (4). The panel accepts only those changes noted in legislative text. The word "fixture" is not intended and was not identified by legislative text.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-57 Log #266 NEC-P17 **Final Action: Accept**
(680.23(A)(3))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-139
Recommendation: The Technical Correlating Committee directs that the panel comply with the NEC Style Manual 3.1.1 and 3.1.3 and clarify the panel action and panel statement on this proposal to identify what was not accepted and the reason it was not accepted.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. The panel has reverted to the original code text as modified by the action on Proposal 17-58.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-58 Log #1965 NEC-P17 **Final Action: Accept in Principle**
(680.23(A)(3))

Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-139
Recommendation: Revise text to read as follows:
(3) GFCI Protection, Relamping. A ground-fault circuit interrupter shall be installed in the branch circuit supplying luminaires operating at more than the Wet Contact Voltage Limit ~~15 volts~~ such that there is no shock hazard during relamping. The installation of the ground-fault circuit interrupter shall be such that there is no shock hazard with any likely fault-condition combination that involves a person in a conductive path from any ungrounded part of the branch circuit or the luminaire to ground.
Substantiation: Comments were made by CMP members that the proposed changes to this Section made this requirement cumbersome to implement, requiring referencing a complex table in Chapter 9. It would be make this Article easier to implement in the field if the necessary voltage limits were in Article 680. No specific voltage limits are needed here. If the text from my comment to 17-106 is adopted, all you need to do here is reference the new definition.

Panel Meeting Action: Accept in Principle

Reject Proposal 17-139 and revise the submitter's recommendation, changing the term "wet contact voltage limit " to "low voltage contact limit."

Panel Statement: The panel changed the term "wet contact voltage limit " to "low voltage contact limit" in the action on Comment 17-41. The panel accepts the submitter's recommendation to revert to the original code text and modify it.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

MALDONADO, J.: I am voting Negative to the panels action on the expansion of low voltage lighting with no provisions for grounding, GFCI protection or the use of an isolated winding type transformer that has a metal barrier between the primary and secondary windings. As currently required in section 680.23(A)(2). It is presented that increasing these voltages are justified based on the voltage limitations obtained from Chapter 9, Tables 11(A) and 11(B). These tables are for limitations for class 2 and 3 Power Sources. These tables apply to voltages that are not approved for wet contact or immersion contact per note 2. The combination of removing or not requiring GFCI protection or shielded Isolation transformers along with increasing to higher voltages could cause a problem when a power supply shorts our or a low voltage transformer shorts across the windings. This increase has not been justified or substantiated for these locations. Many of these fixtures are also being exempted from grounding if a listed assembly.

17-59 Log #2661 NEC-P17 **Final Action: Accept**
(680.23(A)(3))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-139
Recommendation: Reject the proposal.
Substantiation: This is a companion comment to one submitted on the new 680.13 (Proposal 17-106) that addresses the issues raised in a better way and that does not require these modifications throughout Article 680.
Panel Meeting Action: Accept
Panel Statement: See the panel action on Comment 17-58.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-60 Log #1966 NEC-P17 **Final Action: Accept in Principle**
(680.23(A)(8))

Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-142
Recommendation: Revise text to read as follows:
(8) Compliance. Compliance with these requirements shall be obtained by the use of a listed underwater luminaire and by installation of a listed ground-fault circuit interrupter in the branch circuit or a listed transformer for luminaires operating at not more than the Wet Contact Voltage Limit ~~15 volts~~.
Substantiation: Comments were made by CMP members that the proposed changes to this Section made this requirement cumbersome to implement, requiring referencing a complex table in Chapter 9. It would be make this Article easier to implement in the field if the necessary voltage limits were in Article 680. No specific voltage limits are needed here. If the text from my comment to 17-106 is adopted, all you need to do here is reference the new definition.
Panel Meeting Action: Accept in Principle

Revise 680.23(A)(8) to read as follows:

(8) Compliance. Compliance with these requirements shall be obtained by the use of a listed underwater luminaire and by installation of a listed ground-fault circuit interrupter in the branch circuit or a listed transformer or power supply for luminaires operating at not more than the low voltage contact limit.

Panel Statement: The panel changed the term "wet contact voltage limit " to "low voltage contact limit" in the action on Comment 17-41. The panel accepts the submitter's recommendation to revert to the original code text and modify it except that the added words "or power supply" have been retained to include power supplies.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

MALDONADO, J.: I am voting Negative to the panels action on the expansion of low voltage lighting with no provisions for grounding, GFCI protection or the use of an isolated winding type transformer that has a metal barrier between the primary and secondary windings. As currently required in section 680.23(A)(2). It is presented that increasing these voltages are justified based on the voltage limitations obtained from Chapter 9, Tables 11(A) and 11(B). These tables are for limitations for class 2 and 3 Power Sources. These tables apply to voltages that are not approved for wet contact or immersion contact per note 2. The combination of removing or not requiring GFCI protection or shielded Isolation transformers along with increasing to higher voltages could cause a problem when a power supply shorts our or a low voltage transformer shorts across the windings. This increase has not been justified or substantiated for these locations. Many of these fixtures are also being exempted from grounding if a listed assembly.

17-61 Log #2662 NEC-P17 **Final Action: Reject**
(680.23(A)(8))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" based on the panel's "Accept in Principle" action on Comment 17-60.
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-142
Recommendation: Reject the proposal.
Substantiation: This is a companion comment to one submitted on the new 680.13 (Proposal 17-106) that addresses the issues raised in a better way and that does not require these modifications throughout Article 680.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action and statement on Comment 17-60. The panel has rejected the majority of proposal but has retained "or power supply" as noted in Comment 17-60.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-62 Log #1967 NEC-P17 **Final Action: Accept**
(680.23(C)(1))

TCC Action: The Technical Correlating Committee revises the panel's action in 680.23(C)(1) to comply with 2.6 and 3.1.4 of the NEC Style Manual regarding exceptions and directs that the text read as follows:
"Other than listed low-voltage luminaires not requiring grounding...".
Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-146
Recommendation: Revise text to read as follows:

(C) Dry-Niche Luminaires.

(1) Construction. A dry-niche luminaire shall ~~be provided with a~~ have provision for drainage of water. Except for listed low voltage luminaires not requiring grounding, ~~and~~ a dry-niche luminaire shall have means for accommodating one equipment grounding conductor for each conduit entry.

Substantiation: When the Panel rejected the proposal addressing line-voltage systems, it also effectively rejected a part of the proposal addressing low-voltage systems not requiring grounding. The present text anticipates only line voltage luminaires. It does not authorize listed low-voltage luminaires not requiring grounding as are covered in other Sections of the Article.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-63 Log #267 NEC-P17 **Final Action: Accept**
(680.23(F)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-151
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal as the proposal does comply with the NFPA Regulations Governing Committee Projects.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. See panel statement on Comment 17-65.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-64 Log #268 NEC-P17 **Final Action: Accept**
(680.23(F)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-152
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal as the proposal does comply with the NFPA Regulations Governing Committee Projects.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. Refer to the panel statement on Comment 17-66.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-65 Log #711 NEC-P17 **Final Action: Reject**
(680.23(F)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-151
Recommendation: Accept the proposal.
Substantiation: The TCC determined the proposal complies with NFPA Regulations.
Panel Meeting Action: Reject
Panel Statement: MI cable has not been identified for pool use.
The wiring methods as described in the submitter's substantiation have not been evaluated for the environment.
CMP 17 refers the submitter to Proposal 17-104 and Comment 17-84 of the last cycle.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-66 Log #770 NEC-P17 **Final Action: Reject**
(680.23(F)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-152
Recommendation: Reconsider and accept the proposal.
Substantiation: See the substantiation submitted with the proposal.
Panel Meeting Action: Reject
Panel Statement: MI cable has not been identified for pool use.
The wiring methods as described in the submitter's substantiation have not been evaluated for the environment.
CMP 17 refers the submitter to Proposal 17-104 and Comment 17-84 of the last cycle.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-67 Log #269 NEC-P17 **Final Action: Accept**
(680.23(F)(1) and Exception)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-153
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action and statement on this proposal as the proposal does comply with the NFPA Regulations Governing Committee Projects.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. See the panel statement on Comment 17-68.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-68 Log #710 NEC-P17 **Final Action: Reject**
(680.23(F)(1) and Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-153
Recommendation: Accept the proposal.
Substantiation: The TCC determined the proposal complies with NFPA Regulations.
Panel Meeting Action: Reject
Panel Statement: MI cable has not been identified for pool use.
The wiring methods as described in the submitter's substantiation have not been evaluated for the environment.
CMP 17 refers the submitter to Proposal 17-104 and Comment 17-84 of the last cycle.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-69 Log #1968 NEC-P17 **Final Action: Accept**
(680.23(F)(2))

TCC Action: The Technical Correlating Committee revises the panel's action in 680.23(F)(2) to comply with 2.6 and 3.1.4 of the NEC Style Manual regarding exceptions and directs that the text will read as follows: "Other than listed low-voltage luminaires not requiring grounding, all...".
Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-155
Recommendation: Revise text to read as follows:
(2) Equipment Grounding. With the exception of listed low-voltage luminaires not requiring grounding, all ~~T~~through-wall lighting assemblies, wet-niche, dry-niche, or no-niche luminaires shall be connected to an insulated copper equipment grounding conductor installed with the circuit conductors. The equipment grounding conductor shall be installed without joint or splice except as permitted in (F)(2)(a) and (F)(2)(b). The equipment grounding conductor shall be sized in accordance with Table 250.122 but shall not be smaller than 12 AWG.
Substantiation: When the Panel rejected the proposal addressing line-voltage systems, it also effectively rejected a part of the proposal addressing low-voltage systems not requiring grounding. The proposed change reflects similar exceptions for ungrounded low-voltage systems in Section 680.23. These are established technologies with proven field histories.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-70 Log #1969 NEC-P17 **Final Action: Accept in Principle**
(680.24(A)(2))

Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-159
Recommendation: Revise text to read as follows:
(2) Installation. Where the luminaire operates over the Wet Contact Voltage Limit ~~15 volts~~, the junction box location shall comply with (A)(2)(a) and (A)(2)(b). Where the luminaire operates at the Wet Contact Voltage Limit ~~15 volts~~ or less, the junction box location shall be permitted to comply with (A)(2)(c).
Substantiation: Comments were made by CMP members that the proposed changes to this Section made this requirement cumbersome to implement, requiring referencing a complex table in Chapter 9. It would be make this Article easier to implement in the field if the necessary voltage limits were in Article 680. No specific voltage limits are needed here. If the text from my comment to 17-106 is adopted, all you need to do here is reference the new definition.
Panel Meeting Action: Accept in Principle
Reject Proposal 17-159 and revise the submitter's recommendation, changing the term "wet contact voltage limit " to "low voltage contact limit."
In addition modify 680.24(A)(2)(c) to read as follows:
(c) Flush Deck Box. If used on a lighting system operating at the low voltage contact limit or less, a flush deck box shall be permitted if both of the following apply:
(1) An approved potting compound is used to fill the box to prevent the entrance of moisture.
(2) The flush deck box is located not less than 1.2 m (4 ft) from the inside wall of the pool.
Panel Statement: The panel changed the term "wet contact voltage limit " to "low voltage contact limit" in the action on Comment 17-41. The panel accepts the submitter's recommendation to revert to the original code text and modify it. The panel has also modified 680.24(A)(2)(c) to be consistent.
[The action of this comment does not affect other parts of 680.24(A)(2).]
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:
MALDONADO, J.: I am voting Negative to the panels action on the expansion of low voltage lighting with no provisions for grounding, GFCI protection or the use of an isolated winding type transformer that has a metal barrier between the primary and secondary windings. As currently required in section 680.23(A)(2). It is presented that increasing these voltages are justified based on the voltage limitations obtained from Chapter 9, Tables 11(A) and 11(B). These tables are for limitations for class 2 and 3 Power Sources. These tables apply to voltages that are not approved for wet contact or immersion contact per note 2. The combination of removing or not requiring GFCI protection or shielded Isolation transformers along with increasing to higher voltages could cause a problem when a power supply shorts our or a low voltage transformer shorts across the windings. This increase has not been justified or substantiated for these locations. Many of these fixtures are also being exempted from grounding if a listed assembly.

17-71 Log #2663 NEC-P17 **Final Action: Accept**
(680.24(A)(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-159
Recommendation: Reject the proposal.
Substantiation: This is a companion comment to one submitted on the new 680.13 (Proposal 17-106) that addresses the issues raised in a better way and that does not require these modifications throughout Article 680.
Panel Meeting Action: Accept
Panel Statement: See the panel action on Comment 17-70.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-72 Log #2225 NEC-P17 **Final Action: Hold**
(680.24(A)(2)(c))

Submitter: Douglas Burnham, Splas Lights, LLC
Comment on Proposal No: 17-159
Recommendation: Revise text to read as follows:
(C) Flush deck box, if used on a lighting system operating at 15 volts or less, a flush deck box shall be permitted of both the following apply:
(1) An approved potting compound is used to fill the box to prevent the entrance of moisture.
(2) The flush deck box is located not less than 1.2 m (4 ft) from the inside wall of the pool, unless separated from the pool by an approved water tight enclosure.
Substantiation: If a flush deck box were to be contained within and additional approved water tight enclosure, it would allow for a greater flexibility in the positioning and installation of a flush deck box, allowing locations less than 1.2 m (4 ft) without compromising safety from electrical shock. An additional primary water tight enclosure would afford a similar level of safety as with underwater luminaries or greater. It would not be rational to prohibit locations less than 1.2 m (4 ft) if an appropriate barrier can be achieved.
Panel Meeting Action: Hold
Panel Statement: The panel holds the comment in accordance with Section 4.4.6.2.2(a) and (c). In addition, the submitter has not provided adequate technical substantiation for the proposed change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-73 Log #768 NEC-P17 **Final Action: Reject**
(680.24(F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-163
Recommendation: Accept with the following revisions:
"...shall be connected to equipment grounding terminal(s) or bus(es) in the distribution equipment where the circuit originated."
Substantiation: All circuits do not originate from a panelboard; they may be supplied by a fused switch or an individually enclosed circuit breaker.
Panel Meeting Action: Reject
Panel Statement: The code does not contain the definition of the term "distribution equipment."
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:
ROCK, B.: "Distribution equipment" is used 42 times and "distribution and utilization equipment" is used 3 times throughout the Code. Given that much existing usage of the term without definition, rejection on that basis is weak at best. With the additional text revisions the submitter provided in the Comment to address the Panel's legitimate concerns regarding the original Proposal wording, NEMA believes this Comment now reflects appropriate grounding practice. NEMA agrees with the submitter's substantiation that circuits originate from fused switches or individually enclosed circuit breakers as well as from panelboards. Editorially, "originated" should be "originates".

17-74 Log #769 NEC-P17 **Final Action: Reject**
(680.25(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-164
Recommendation: Accept with the following revisions:
"Feeders shall be installed in approved rigid metal conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, liquidtight flexible metal conduit, Type PV conduit, Type RTRC conduit, or Type MI cable. Electrical metallic tubing shall be permitted where installed within a building or other structure, and nonmetallic tubing shall be permitted within a building.
Exception: In the interior of dwelling units and associated accessory buildings, any approved wiring method of Chapter 3 that includes a separate equipment conductor shall be permitted."
Substantiation: LTFMC is permitted as protection from liquids and vapors, and in 680.21(A)(3), 680.42(A)(1), and the Exception for 680.23(F)(1).
The present Exception has a retroactive aspect. Type MI cable is permitted underground, embedded in masonry, and the copper or stainless steel sheath is as resistant to corrosion as the bare copper grounding/bonding conductors in the pool area.
Panel Meeting Action: Reject
Panel Statement: MI cable has not been identified for pool use.
The wiring methods as described in the submitter's substantiation have not been evaluated for the environment.
CMP 17 refers the submitter to Proposal 17-104 and Comment 17-84 of the last cycle.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-75 Log #1864 NEC-P17 **Final Action: Accept in Principle in Part**
(680.25(A))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 17-166
Recommendation: Revise the text of the 2008 NEC as follows:
(A) Wiring Methods. Feeders shall be installed in rigid metal conduit or intermediate metal conduit, ~~liquidtight flexible nonmetallic conduit, rigid polyvinyl chloride conduit, or reinforced thermosetting resin conduit.~~ The following wiring methods shall be permitted if not subject to physical damage:
(1) liquidtight flexible nonmetallic conduit
(2) rigid polyvinyl chloride conduit
(3) reinforced thermosetting resin conduit
(4) electrical metallic tubing ~~shall be permitted~~ if ~~where~~ installed on or within a building, ~~and~~
(5) electrical nonmetallic tubing ~~shall be permitted~~ if ~~where~~ installed within a building
(6) Type MC cable.
Aluminum conduits shall not be permitted in the pool area where subject to corrosion.
Exception: An existing feeder between an existing remote panelboard and service equipment shall be permitted to run in flexible metal conduit or an approved cable assembly that includes an equipment grounding conductor within its outer sheath. The equipment grounding conductor shall comply with 250.24(A)(5).
Substantiation: The Panel's statement for rejecting the proposal which is "The use of Type MC cable is not permitted as per 330.12" seems to be inappropriate. All wiring methods are subject to physical damage. Specifiers, installers, owners and inspectors should be able to select from those wiring methods that are suitable for the task and environment.
Present 680.25(A) permits liquidtight flexible nonmetallic conduit (LFNC) to be used without limitation. Yet, 356.12(1) states it is not permitted "where subject to physical damage." Present 680.25(A) permits rigid polyvinyl chloride conduit (PVC) to be used without limitation. Yet, 352.12(C) states it is not permitted "where subject to physical damage unless identified for such use." Schedule 40 PVC is not identified for protection against physical damage and is permitted by 680.25(A) without limitation. Electrical nonmetallic tubing is permitted by 680.25(A) within a building and yet 362.12(10) states ENT is not permitted "Where subject to physical damage." Why are these wiring methods permitted for this application and the proposal to allow the use of Type MC cable is rejected? Type MC cable is much more robust than several of the wiring methods that is presently allowed.

Type MC cable provides excellent protection from physical damage in compliance with the UL Product Safety Standard. Specific tests the cable must pass that are related to protection against physical damage include:

Impact Test
Crushing Test – All Cable
Crushing Test – Cable Marked for Direct Burial

Type MC cable must also pass a Fault Current Test and an Overload Current Test.

Obviously, wire installed in conduit or tubing is not required to pass these tests. Type MC cable is a superior wiring method and is superbly suited for installation as a feeder for panelboards used for applications covered by this section.

Ordinary Type MC cable is suitable for a dry and damp location. Type MC cable is also produced with an impervious PVC outer jacket and is suitable for installation in wet locations, for direct earth burial and for installation in poured concrete.

In addition, Type MC cable contains an insulated equipment grounding conductor that is in compliance with Section 250.122. This ensures a reliable and low impedance ground fault current return path. As a result, Type MC cable is an excellent wiring method for feeders to panelboards for swimming pool equipment.

Accept this proposal so Type MC cable can be used as it is suitable for this application.

Panel Meeting Action: Accept in Principle in Part

Revise 680.25(A) to read as follows:

(A) Wiring Methods.

(1) Feeders shall be installed in rigid metal conduit or intermediate metal conduit. The following wiring methods shall be permitted if not subject to physical damage:

(a) liquidtight flexible nonmetallic conduit
(b) rigid polyvinyl chloride conduit
(c) reinforced thermosetting resin conduit
(d) electrical metallic tubing where installed on or within a building
(e) electrical nonmetallic tubing where installed within a building
(f) Type MC cable where installed within a building and if not subject to corrosive environment

Exception: An existing feeder between an existing remote panelboard and service equipment shall be permitted to run in flexible metal conduit or an approved cable assembly that includes an equipment grounding conductor within its outer sheath. The equipment grounding conductor shall comply with 250.24(A)(5).

(2) Aluminum conduits shall not be permitted in the pool area where subject to corrosion.

Panel Statement: The panel accepts in principle everything but the addition of MC cable without condition. MC cable is not listed for corrosive environment. Refer to 330.12(2)(b). The panel added within a building and not subject to corrosive environment to reflect this limitation.

The panel changed the word "if" to "where" for situations dealing with location.

Wiring methods should not be left to installers, owners and inspectors and needs to be applied per the NEC.

Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-76 Log #1865 NEC-P17 **Final Action: Reject**
(680.25(A))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 17-166
Recommendation: Accept the Proposal.
Substantiation: The Panel's statement for rejecting the proposal which is "The use of Type MC cable is not permitted as per 330.12" seems to be inappropriate. All wiring methods are subject to physical damage. Specifiers, installers, owners and inspectors should be able to select from those wiring methods that are suitable for the task and environment.

Present 680.25(A) permits liquidtight flexible nonmetallic conduit (LFNC) to be used without limitation. Yet, 356.12(1) states it is not permitted "where subject to physical damage." Present 680.25(A) permits rigid polyvinyl chloride conduit (PVC) to be used without limitation. Yet, 352.12(C) states it is not permitted "where subject to physical damage unless identified for such use." Schedule 40 PVC is not identified for protection against physical damage and is permitted by 680.25(A) without limitation. Electrical nonmetallic tubing is permitted by 680.25(A) within a building and yet 362.12(10) states ENT is not permitted "Where subject to physical damage." Why are these wiring methods permitted for this application and the proposal to allow the use of Type MC cable is rejected? Type MC cable is much more robust than several of the wiring methods that are presently allowed.

Type MC cable provides excellent protection from physical damage in compliance with the UL Product Safety Standard 1569. Specific tests the cable must pass that are related to protection against physical damage include:

Impact Test
Crushing Test – All Cable
Crushing Test – Cable Marked for Direct Burial

Type MC cable must also pass a Fault Current Test and an Overload Current Test.

Obviously, wire installed in conduit or tubing is not required to pass these tests. Type MC cable is a superior wiring method and is superbly suited for installation as a feeder for panelboards used for applications covered by this section.

Ordinary Type MC cable is suitable for a dry and damp location. Type MC cable is also produced with an impervious PVC outer jacket and is suitable for installation in wet locations, for direct earth burial and for installation in poured concrete.

In addition, Type MC cable contains an insulated equipment grounding conductor that is in compliance with Section 250.122. This ensures a reliable and low impedance ground fault current return path. As a result, Type MC cable is an excellent wiring method for feeders to panelboards for swimming pool equipment.

Accept this proposal so Type MC cable can be used as it is suitable for this application.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-75.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-77 Log #2740 NEC-P17 **Final Action: Reject**
(680.25(A))

Submitter: Christel K. Hunter, Alcan Cable
Comment on Proposal No: 17-166
Recommendation: Accept submitter's proposal as submitted.
Substantiation: The panel's statement did not address the submitter's proposal, and incorrectly stated that 330.12 did not permit MC cable in this application.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-75.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-78 Log #600 NEC-P17 **Final Action: Reject**
(680.25(A)(1))

Submitter: John W. Sheesley, Pinellas County Building Department
Comment on Proposal No: 17-167
Recommendation: Add text to read as follows:

680.25(A)(1) One-Family Dwellings. In the interior of dwelling units, or in the interior of accessory buildings associated with dwelling units, any of the wiring methods recognized in Chapter 3 of this code that comply with provisions of this section shall be permitted. Where run in cable assembly, the equipment grounding conductor shall be permitted to be uninsulated, but shall be enclosed within the outer sheath of a cable assembly.

Substantiation: The proposal simply wants the FEEDER to be treated the same as the branch circuit wiring in a dwelling unit which is already permitted by exception - so the exception neuters the rule. The panel statement does not address the proposer's concerns. If the panel is concerned about "corrosive effects" on feeders, should not those same "corrosive effects" also apply to branch circuits?

Panel Meeting Action: Reject
Panel Statement: The requirements of 680.25 are intended to address both commercial installations, multifamily and single family dwellings. The panel rejects the use of lesser wiring methods for feeders for swimming pools. The submitter is incorrect, the exception only applies to existing feeders not branch circuits.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-79 Log #602 NEC-P17 **Final Action: Reject**
(680.25(A)(1))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 17-167
Recommendation: Accept the proposal.
Substantiation: The proposer simply wants the FEEDER to be treated the same as BRANCH CIRCUIT wiring in a dwelling unit.

This is already permitted by exception - if the feeder is an existing one - so the exception effectively neuters the rule.

The feeder is simply installed and inspected in advance of the pool installation.

The panel statement does not address the proposal as there are no corrosion requirements in this section.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-78.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-80 Log #2008 NEC-P17 **Final Action: Reject**
(680.26(B)(1)(a))

Submitter: James Grant, Rochester, NH
Comment on Proposal No: 17-171
Recommendation: This proposal should have been accepted.
Substantiation: Welded wire mesh is not a requirement of concrete floors installed on grade. Most slabs on grade construction will only require reinforcing steel in the footings and/or walls of the foundations if any at all, none require welded wire mesh. By accepting this proposal, it would be in harmony with Article 547's requirement for the equipotential plane that is accomplishing the same electrical solution to reduce gradients. Having one article reference welded metal wire mesh and another that does not, only adds to the uncertainty to what is considered allowable. Accepting this proposal would give clear direction and would promote a uniformly enforced section.
Panel Meeting Action: Reject
Panel Statement: The welded wire allowed to be part of the equipotential bonding grid may not be required by the building code but can be provided to meet requirements for equipotential bonding.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-81 Log #270 NEC-P17 **Final Action: Accept**
(680.26(B)(2))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-175
Recommendation: The Technical Correlating Correlating directs that the action on this proposal be rewritten to comply with NEC Style Manual 3.1.1 regarding mandatory text "...will require...".
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. See panel action and statement on Comment 17-83.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-82 Log #1999 NEC-P17 **Final Action: Reject**
(680.26(B)(2))

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 17-176
Recommendation: Revise text to read as follows:
(2) Perimeter Surfaces. The perimeter surface shall extend for 1 m (3 ft) horizontally beyond the inside walls of the pool and shall include conductive unpaved surfaces with direct contact to the earth as well as poured concrete and other types of paving. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a) or (2)(b) and shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four (4) points uniformly spaced around the perimeter of the pool. For nonconductive pool shells, bonding at four points shall not be required.
Substantiation: If an installation is of nonconductive surfaces such a wood or plastic that is not contacting the earth such a wooden deck with a hot tub, raised plastic platform on a partly submerged in the earth pool. As an inspector I try to give the science on why the code provision is needed, a bonding conductor attached to the bottom of a wood deck or plastic platform is one I cannot explain.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any additional substantiation to make the proposed changes.
The 8 AWG bonding conductor can be installed in the paving material (i.e., in the concrete), or it can be buried in the material (subgrade) below the paving material. Where buried, the bonding conductor is to be not less than 4 in. and not more than 6 in. below the surface level of the subgrade. The subgrade is considered to be into the earth surface.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:
WEST, L.: As was discussed at the Meeting, some inspectors in the field are requiring stapling the bond ring to the bottom of a wood or non-conducting deck, where it performs no useful safety function. In addition, similar interpretations are being made by inspectors requiring the earth to be Bonded, sometimes one or more stories below elevated decks with pools. I agree that this language provides clarification necessary to allow for proper application of the Code.

17-83 Log #2280 NEC-P17 **Final Action: Accept in Principle**
(680.26(B)(2))

TCC Action: The Technical Correlating Committee directs that the word "permanent" be inserted in the second sentence of the panel action, before the first use of the word "wall", to correlate with the remainder of that sentence.
Submitter: Brian Myers, IBEW Local Union 98
Comment on Proposal No: 17-175
Recommendation: Revise text to read as follows:
680.26(B)(2) Perimeter Surfaces. The perimeter surface shall extend for 1 m (3 ft) horizontally beyond the inside walls of the pool and shall include unpaved surfaces as well as poured concrete surfaces and other types of paving. Perimeter surfaces less than 1 m (3 ft) separated by a wall or building 1.5 m (5 ft) in height or more shall require an equipment bonding grid on the pool side of the permanent wall or building.
Substantiation: Removing the words "will require" and replacing them with "shall require" complies with the NEC Style Manual, section 3.1.1 regarding mandatory rules and 3.3.1 writing style guidelines.
Panel Meeting Action: Accept in Principle
Revise 680.26(B)(2) to read as follows:
680.26(B)(2) Perimeter Surfaces. The perimeter surface shall extend for 1 m (3 ft) horizontally beyond the inside walls of the pool and shall include unpaved surfaces as well as poured concrete surfaces and other types of paving. Perimeter surfaces less than 1 m (3 ft) separated by a wall or building 1.5 m (5 ft) in height or more shall require equipotential bonding on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a) or (2)(b) and shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four (4) points uniformly spaced around the perimeter of the pool. For nonconductive pool shells, bonding at four points shall not be required.
The remaining text (a) through (b)(5) is unchanged.
Panel Statement: The recommendation of comment 17-83 inadvertently changed equipotential bonding to equipment bonding. The panel has revised the text to more clearly reflect the requirement. The revised text meets the intent of the submitter.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-84 Log #2009 NEC-P17 **Final Action: Reject**
(680.26(B)(2)(a))

Submitter: James Grant, Rochester, NH
Comment on Proposal No: 17-178
Recommendation: This proposal should have been accepted.
Substantiation: Welded wire mesh is not a requirement of concrete floors installed on grade. Most slabs on grade construction will only require reinforcing steel in the footings and/or walls of the foundations if any at all, none require welded wire mesh. By accepting this proposal, it would be in harmony with Article 547's requirement for the equipotential plane that is accomplishing the same electrical solution to reduce gradients. Having one article reference welded metal wire mesh and another that does not, only adds to the uncertainty to what is considered allowable. Accepting this proposal would give clear direction and would promote a uniformly enforced section.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 17-80.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-85 Log #1289 NEC-P17 **Final Action: Reject**
(680.26(B)(2)(b))

Submitter: Reuben E. Clark, Raleigh, NC
Comment on Proposal No: 17-179
Recommendation: Revise text to read as follows:
680.26(B)(2)(b). Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, a ~~copper conductor(s)~~ grid shall be utilized where the following requirements are met: (1) ~~At least one minimum 8 AWG bare solid copper conductor shall be provided~~ Copper Conductor Grid. A copper conductor grid shall be utilized and shall comply with (b)(1) through (b)(5). (2) ~~The conductors shall follow the contour of the perimeter surface~~. The copper grid shall follow the contour of the perimeter surface extending 1 m (3ft) horizontally beyond the inside walls of the pool. ~~(3) Only listed splices shall be permitted~~. (3) Only listed splices shall be permitted ~~(4) The required conductor shall be 450 to 600 mm (18 to 24 in.) from the inside walls of the pool~~. (4) The copper grid shall be constructed of 8 AWG solid bare copper and be arranged in accordance with 690.26(B)(1)(b)(3). ~~(5) The required conductor shall be secured within or under the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below the subgrade~~. (5) The copper grid shall be secured within or under the deck or unpaved surfaces no more than 150 mm (4 in. to 6 in.) from the underside of the deck.

Substantiation: The vote in Hilton Head, SC on Proposal 17-179 (Log #805) by NEC-P17 was prior to comments and vote on TIA Log 936. Additional documentation from NEETRAC, as well as several Utility Companies was presented to Code Making Panel 17, which substantiated the TIA 936. The NEETRAC test was performed on an actual pool installed in the backyard of a home, with power leak from an extension cord from the home itself, 15A 110V. Results were conclusive that at one section of the deck the single wire allowed over 10V just 6" from water to over 24V at outer edge of deck, where the Bonding Grid only allowed over 1V at 3' and further out. All around the pool the test demonstrated, and the report stated, that the single wire can NOT guarantee safety, but the grid does. Since traditional concrete decks with rebar grids inside have recently started to be replaced with both paver decks or fiber reinforced decks, both with no metal, it is critical to provide this traditional level of safety to pool owners. A single wire does not provide this standard level, and occurrences of stray voltage felt on the decks will increase as new construction methods become the norm across the country. After this additional information became available, CMP17 voted in the affirmative with a substantial margin of 6-3 for the technical merits of the TIA. While the one abstention caused the lack of enough majority to pass the TIA, this amount of support under this normal code development process, should cause it to be adopted into the code, and I request a new vote to adopt this proposal.

Also, one dissenter on the TIA pointed out that the word 'solid" should be inserted when describing the wire, "8 AWG solid bare copper" so that stranded could not be utilized in the construction. This is an accurate and relevant point, and I have changed the text accordingly, and request Mr. Robinson's proposal not only be adopted, but modified to reflect "8 AWG solid bare copper wire".

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 17-86.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-86 Log #1779 NEC-P17 **Final Action: Reject**
(680.26(B)(2)(b))

Submitter: Wayne H. Robinson, Lothian, MD

Comment on Proposal No: 17-179

Recommendation: Revise text to read as follows:

680.26(B)(2)(b) *Alternate Means.* Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, a copper ~~conductor(s)~~ grid shall be utilized where the following requirements are met:

~~(1) At least one minimum 8-AWG bare solid copper shall be provided.~~

(1) The copper grid shall be constructed of 8 AWG solid bare copper and be arranged meeting the requirements of 680.26(B)(1)(b)(3).

~~(2) The conductors shall follow the contour of the perimeter surface.~~

(2) The copper grid shall follow the contour of the perimeter surface extending 1 M (3 ft) horizontally beyond the inside walls of the pool.

(3) Only listed splices shall be permitted.

~~(4) The required conductor shall be 450 to 600 mm (18 to 24 in.) from the inside walls of the pool.~~

~~(5) The required conductor shall be secured with in or under the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below subgrade.~~

(4) Be secured within or under the deck or unpaved surfaces no more than 150 mm to 600 mm (4 in. to 6 in.) from the underside of the deck.

Substantiation: Corrections to TIA Log No. 936 were implemented at the advice and suggestion of Code-Making Panel 17 after a positive vote of 6-3 for the TIA.

~~Change the 8 AWG bare copper~~ to 8 AWG solid bare copper. The vote in Hilton Head, SC on Proposal 17-179, Log 805, NEC-P17 was prior to comments and vote on the TIA Log 936. The testing documentation from NEETRAC presented to Code-Making Panel 17 substantiated that the single conductor application may not provide adequate protection that a copper grid provides. A number of shock incidents in and around pools have been recorded and addressed by Georgia Power and Singing River Utility in Mississippi which supports the copper grid over a single conductor application. These shock incidents have forced utilities to implement more stringent rules (procedures) over the present 2008 NEC application, since the single conductor falls short on providing the necessary protection.

Panel Meeting Action: Reject

Panel Statement: The panel does not agree that the submitter's substantiation provides adequate justification to change the alternate means of perimeter equipotential bonding. The submitter has not documented that the existing alternate means results in unsafe voltage gradients.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-87 Log #2789 NEC-P17 **Final Action: Reject**
(680.26(B)(2)(b))

Submitter: Gary K. Weise, American Pool and Solar Supply

Comment on Proposal No: 17-179

Recommendation: Revise text to read as follows: 680.26(B)(2)(b) *Alternate Means*. Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, a copper ~~conductor(s)~~ grid shall be utilized where the following requirements are met: ~~(1) At least one minimum 8 AWG bare solid copper shall be provided~~. (1) The copper grid shall be constructed of 8 AWG bare copper and be arranged meeting the requirements of 680.26(B)(1)(b)(3).(2) ~~The conductors shall follow the contour of the perimeter surface.~~ (2) The copper grid shall follow the contour of the perimeter surface extending 1 m (3 ft) horizontally beyond the inside walls of the pool. (3) Only listed splices shall be permitted. ~~(4) The required conductor shall be 450 to 600 mm (18 to 24 in.) from the inside walls of the pool. (5) The required conductor shall be secured with in or under the perimeter surface 100mm to 150 mm (4 in. to 6 in.) below subgrade.~~ (4) Be secured within or under the deck or unpaved surfaces no more than 150 mm to 600 mm (4 in. to 6 in.) from the underside of the deck.

Substantiation: I ask for the above proposal be reconsidered and adopted, based on the results from the NEETRAC test. It was conducted in a "real world" situation, not theory, and proved the single wire does not provide adequate protection for pool decks. Builders are beginning to move away from the time-tested method of steel rebar reinforcing in a poured concrete deck, which has provided an equipotential bonding grid with adequate protection over the years. The NEETRAC test along with common sense and a small amount of electrical theory, should eliminate a single #8 wire from consideration, as a method of providing adequate protection of a 3'+ wide deck. Problems have begun occurring in the field, and the Pool industry cannot afford negative publicity associated with these kinds of problems. Also, having the Federal Government intervene like they did with the Virginia Graeme Baker Act on the plumbing issue, will give us another black eye. We need to demonstrate that we can govern ourselves with providing adequate protection for our industry.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 17-86.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-88 Log #2542 NEC-P17 **Final Action: Reject**
(680.26(B)(5))

Submitter: Carvin DiGiovanni, Association of Pool & Spa Professionals

Comment on Proposal No: 17-145

Recommendation: The original proposal and substantiation submitted contained a typographical error which referenced the incorrect section of the NEC, and was rejected by the Panel on that basis. The correct Section proposed to be amended is 680.26(B)(5), not 680.23(B)(5) as incorrectly cited in the original proposal. Reconsideration of this proposal referencing the correct Section, is respectfully requested. Proposed revised text is as follows:

(5) Metal Fittings. Metal fittings within or attached to the pool structure shall be bonded. Isolated parts that are not over 100 mm (4 in.) in any dimension and do not penetrate into the pool structure more than 25 mm (1 in.) shall not require bonding.

Exception: Metallic pool cover anchors intended for insertion in the deck surface, 25 mm (1 in.) or less in diameter and 51 mm (2 in.) or less in length shall not be required to be bonded.

Substantiation: Addition of this exception eliminates a requirement currently being imposed by some AHJs which cannot be met and which also addresses issues created by passage of the Virginia Graeme Baker (VGB) Act and resulting CPSC interpretive action of Section 1406 of VGB that now requires substantially expanded usage of pool covers to prevent accidental drowning. The proposed exception is clearly within the principles espoused by 680.26(B)(5). Typical pool cover anchors are approximately ¾" (19 mm) in diameter and 1-1/4" (32 mm) to 1-1/2" (38 mm) in length, substantially smaller in surface area and only slightly longer than the Section currently exempts. The anchor length cannot be reduced substantially and still withstand shear forces created by the cover. These anchors are generally installed 3-4 feet (0.9 - 1.2 m) away from the edge of the pool and are not mechanically capable of having a bond wire attached. Further, these anchors are, and are expected to be (in increasing numbers under VGB), installed in existing decks, and bonding, even if mechanically possible, would require expensive partial or total demolition of the deck with little or no increase in safety. The submitter knows of no shock or electrocution incidents involving these anchors. Further, as these anchors are installed in a deck that would already require incorporation of a bonding grid, they would be encompassed by the existing equipotential surface in the same fashion as rope anchors and other similar devices already exempt under this section, and which are allowed substantially larger exposed surfaces.

Panel Meeting Action: Reject

Panel Statement: The proposed exception is not needed since the main rule does not prohibit the allowance intended by the exception. The panel rejects the substantiation because it suggests a 2 in. penetration which has not been technically supported or justified as to why the deeper penetration would not require bonding.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:
WEST, L.: This technology that has been safely employed in the industry for a number of years with no adverse safety indications.

17-89 Log #1674 NEC-P17 **Final Action: Reject**
(680.26(B)(6)(a))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-182
Recommendation: Delete the Exception and (a).
Substantiation: 680.6(3), 680.21(A), and 680.62(D)(2) do not exempt double-insulated motors from grounding. Ungrounded double-insulated motors can have the frame energized by an ungrounded conductor in the terminal enclosure that contacts the metal housing. 680.21(B)(6) should apply whether or not double-insulated motors are involved.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided documentation to show that not equipotential bonding a double-insulated motor causes a dangerous situation. The submitter misinterprets the intent of this requirement. Double-insulated motors are required to be grounded. This section deals with connection to the equipotential bond. Equipotential bonding of the double-insulated pump is not required (prohibited actually) for double-insulated equipment as doing so would require the installer to make holes in the outer supplemental insulation barrier.
The 8 AWG conductor required by this section is to address the possibility of a double-insulated pump being later replaced by one that is not double-insulated and therefore needing to be connected to the equipotential bond.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-90 Log #705 NEC-P17 **Final Action: Accept in Principle in Part**
(680.26(B)(7))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-83
Recommendation: Accept proposal and revise as follows:
Metal covered cables, metal raceways, metal piping and tubing, and all fixed metal parts shall be bonded.
Exception No. 1: Parts separated by a permanent barrier that prevents contact by a person shall not be required to comply with this section.
Exception No. 2: Those parts greater than 1.5 m (5 ft) horizontally from the pool water shall not be required to comply with this section.
Exception No. 3: Those parts that comply with clearances specified for insulated cables 0-750 volts to ground in Table 680.8 shall not be required to comply with this section.
Substantiation: Present wording implies all metal covered cables have sheaths: Type AC does not have a "sheath". Metal tubing may not be deemed "piping." A permanent barrier should specifically prevent contact by a person in the pool.
Exception No. 2 should clearly indicate the 5 ft refers to outside the pool walls, and that bonding is the equipotential bonding of this section, not other bonding that is required. Separation by clearances in Table 680.8 is suitable for metal parts.
Panel Meeting Action: Accept in Principle in Part
Revise 680.26(B)(7) Exception No 1 to read as follows:
Exception No. 1: Those separated from the pool by a permanent barrier that prevents contact by a person shall not be required to be bonded.
Reject the remainder of the recommendation.
Panel Statement: The panel notes that the related proposal is 17-183.
The changes proposed for the main rule do not add clarity. The term "sheathed" is used consistently elsewhere in the code.
The panel has revised proposed Exception No 1 for clarity.
The proposed change to Exception No. 2 does not add clarity.
The proposed change to Exception No. 3 revises the clearances without any substantiation and does not add clarity.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-91 Log #2321 NEC-P17 **Final Action: Reject**
(680.26(B)(7))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 17-184
Recommendation: Revise the proposed text as follows:
(7) Fixed Metal Parts. All fixed metal parts shall be bonded, including but not limited to, metal sheathed cables and raceways, metal piping, ~~metal awnings~~, and metal fences~~, and metal door and window frames~~.
Exceptions remain unchanged.
Substantiation: Bonding a window frame that is completely isolated from anything conductive just doesn't make sense. The odds are very, very low that someone swimming in an electrified pool is going to touch a metal window frame. The same can be said for awnings and door frames.
Panel Meeting Action: Reject
Panel Statement: Bonding of these metal parts is not just because they can become energized but is to reduce voltage gradients in the pool area.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-92 Log #2664 NEC-P17 **Final Action: Accept in Part**
(680.26(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-188
Recommendation: Accept the proposal.
Substantiation: The proposal certainly did contain technical substantiation. Does anyone seriously doubt that a conductive object in constant contact with pool water must be evaluated for corrosion resistance under the conditions? This is why CMP 17 changed numerous instances of 8 AWG copper bonding conductors to 8 AWG solid copper conductors over several code cycles, due to the action of pool chemicals on fine strands. Does anyone seriously doubt that a conductive object just hanging in a pool could get kicked or otherwise dislodged and no longer perform its bonding function? It is irresponsible to fail to address these issues. There are now bonding plates that are listed accordingly, and then there is the old strategy of a bonded current collector in the form of a short length of bonded corrosion-resistant metal piping in the drain line, that also cannot be dislodged. The proposed requirement is just common sense, but it provides the inspection community with the tools to make it right. The proposal also addresses an obvious violation of 90.9(B); there is no credible basis for a soft conversion in this area.
Panel Meeting Action: Accept in Part
Revise "5806 mm² (9 in.²)" to "5800 mm² (9 in.²)".
Panel Statement: The panel accepts the submitter's clarification of substantiation directing the panel to 90.9(B) in Comment 17-92 rather than to 90.9(C) in Proposal 17-188 for metric conversion of 9 in.². The panel continues to reject the remainder of Proposal 17-188.
The proposed wording of Proposal 17-188 would permit pool water bonding to be implemented by connection to as few as one metal fitting per 680.26(B)(5) of a size just slightly larger than 100 mm (4 inches) in only one dimension but smaller in any other dimension, potentially far less than the existing requirement for 9 in.² of conductive surface to be in contact with pool water.
In neither Proposal 17-188 nor Comment 17-92 has the submitter provided technical substantiation to justify reduction of required conductive area in contact with pool water.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-93 Log #2714 NEC-P17 **Final Action: Reject**
(680.32)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 17-193
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any additional documentation to show that this product has been listed. The companion proposals for neither 680.2 [Proposal 17-92], 680.22(A) and (B) [Proposal 17-113], nor the associated Article 100 Power Safe Protector definition [Proposal 2-27], do not establish limiting safe values for any protection parameters. Any device with a current-interrupting feature and red and green indicator lights could purport to provide power safe protector protection. As such, the proposed requirement is unenforceable.

The additional documentation does not provide sufficient data to show the PSP device will add any greater level of safety in regards to mitigating electrocution hazards than the currently required GFCI devices provide. The UL Research Report clearly states that its scope was to "assess the ability of the Energy Safe Technologies Power Safe Protector (PSP) receptacle design to prevent overheating and thereby mitigate the likelihood of ignition of the electrical wiring system." The requirement for using GFCI protection in this code section is to prevent electrocution where electricity is being used in wet locations. The report clearly states that "An evaluation of this "Power Off" paradigm was not included in this research investigation".

The submitter has not addressed prohibited use of a proprietary trademarked name in mandatory Code requirements (Annex A.14, Guide for Officers of Technical Committees and Technical Correlating Committees of the NFPA). U.S. Patent & Trademark Office shows a live application [USPTO Serial Number 77633351] for registration of "POWERSAFE" by the submitter's corporation Energy Safe Technologies Inc.

Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-94 Log #1970 NEC-P17 **Final Action: Accept in Principle**
(680.33(A))

Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-195
Recommendation: Revise text to read as follows:

680.33 Luminaires. An underwater luminaire, if installed, shall be installed in or on the wall of the storable pool. It shall comply with either 680.33(A) or (B).

(A) Wet Contact Voltage Limit ~~15 Volts~~ or Less. A luminaire shall be part of a cord-and-plug-connected lighting assembly. This assembly shall be listed as an assembly for the purpose and have the following construction features:

(1) No exposed metal parts

(2) A luminaire lamp ~~that operates at 15 volts or less~~ suitable for the voltage supply

(3) An impact-resistant polymeric lens, luminaire body, and transformer enclosure

(4) A transformer or power supply meeting the requirements of 680.23(A)(2) with a primary rating not over 150 volts

Substantiation: To be consistent with the Panel Action on 680.13, the specified voltage needs to reflect other than sinusoidal ac. My comment on 17-106 proposed that the substance of 680.13 be made a definition in 680.2. If the text from my comment to 17-106 is adopted, all you need to do here is reference the new definition and drop the 15V references.
Panel Meeting Action: Accept in Principle

Revise 680.33(A) to read as follows:

(A) Within the Low Voltage Contact Limit. A luminaire shall be part of a cord-and-plug-connected lighting assembly. This assembly shall be listed as an assembly for the purpose and have the following construction features:

(1) No exposed metal parts

(2) A luminaire lamp that is suitable for use at the supplied voltage

(3) An impact-resistant polymeric lens, luminaire body, and transformer enclosure

(4) A transformer or power supply meeting the requirements of 680.23(A)(2) with a primary rating not over 150 volts.

Panel Statement: The panel has accepted the submitter's recommendation in principle by updating the "wet contact voltage limit" term in accordance with the change made in Comment 17-41. The panel has revised the phrase "suitable for the voltage supply" for clarity.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:

MALDONADO, J.: I am voting Negative to the panels action on the expansion of low voltage lighting with no provisions for grounding, GFCI protection or the use of an isolated winding type transformer that has a metal barrier between the primary and secondary windings. As currently required in section 680.23(A)(2). It is presented that increasing these voltages are justified based on the voltage limitations obtained from Chapter 9, Tables 11(A) and 11(B). These tables are for limitations for class 2 and 3 Power Sources. These tables apply to voltages that are not approved for wet contact or immersion contact per note 2. The combination of removing or not requiring GFCI protection or shielded Isolation transformers along with increasing to higher voltages could cause a problem when a power supply shorts our or a low voltage transformer shorts across the windings. This increase has not been justified or substantiated for these locations. Many of these fixtures are also being exempted from grounding if a listed assembly.

17-95 Log #2665 NEC-P17 **Final Action: Reject**
(680.33(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-195
Recommendation: Reject the proposal.
Substantiation: This is a companion comment to one submitted on the new 680.13 (Proposal 17-106) that addresses the issues raised in a better way and that does not require these modifications throughout Article 680.
Panel Meeting Action: Reject
Panel Statement: The panel has retained the changes made by the committee action on Proposal 17-195 and provided additional changes to correlate with the action on Comment 17-41. These changes better address requirements related to low voltage contact limit. See action on Comment 17-94.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-96 Log #1971 NEC-P17 **Final Action: Accept in Principle**
(680.33(B))

Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-196
Recommendation: Revise text to read as follows:

(B) Over the Wet Contact Voltage Limit ~~15 Volts~~ But Not over 150 Volts. A lighting assembly without a transformer and with the luminaire lamp(s) operating at not over 150 volts shall be permitted to be cord-and-plug-connected where the assembly is listed as an assembly for the purpose. The installation shall comply with 680.23(A)(5), and the assembly shall have the following construction features:

(No other changes)

Substantiation: To be consistent with the Panel Action on 680.13, the specified voltage needs to reflect other than sinusoidal ac. My comment on 17-106 proposed that the substance of 680.13 be made a definition in 680.2. If the text from my comment to 17-106 is adopted, all you need to do here is reference the new definition and drop the 15V references.
Panel Meeting Action: Accept in Principle

Revise 680.33(B) to read as follows:

(B) Over the Low Voltage Contact Limit But Not over 150 Volts. A lighting assembly without a transformer or power supply and with the luminaire lamp(s) operating at not over 150 volts shall be permitted to be cord-and-plug-connected where the assembly is listed as an assembly for the purpose. The installation shall comply with 680.23(A)(5), and the assembly shall have the following construction features:

(No other changes)

Panel Statement: The panel changed the term "wet contact voltage limit " to "low voltage contact limit" in the action on Comment 17-41. The panel added words "or power supply" to be consistent with the panel action on Proposal 17-196.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:

MALDONADO, J.: I am voting Negative to the panels action on the expansion of low voltage lighting with no provisions for grounding, GFCI protection or the use of an isolated winding type transformer that has a metal barrier between the primary and secondary windings. As currently required in section 680.23(A)(2). It is presented that increasing these voltages are justified based on the voltage limitations obtained from Chapter 9, Tables 11(A) and 11(B). These tables are for limitations for class 2 and 3 Power Sources. These tables apply to voltages that are not approved for wet contact or immersion contact per note 2. The combination of removing or not requiring GFCI protection or shielded Isolation transformers along with increasing to higher voltages could cause a problem when a power supply shorts our or a low voltage transformer shorts across the windings. This increase has not been justified or substantiated for these locations. Many of these fixtures are also being exempted from grounding if a listed assembly.

17-97 Log #2666 NEC-P17 **Final Action: Reject**
(680.33(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-196
Recommendation: Reject the proposal.
Substantiation: This is a companion comment to one submitted on the new 680.13 (Proposal 17-106) that addresses the issues raised in a better way and that does not require these modifications throughout Article 680.
Panel Meeting Action: Reject
Panel Statement: The panel has retained the changes made by the committee action on Proposal 17-196 and provided additional changes to correlate with the action on Comment 17-41. These changes better address requirements related to low voltage contact limit. See action on Comment 17-96.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-98 Log #2667 NEC-P17 **Final Action: Reject**
(680.34)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-199
Recommendation: Accept the proposal.
Substantiation: The proposal certainly is enforceable, by the testing laboratories. The procedure would be exactly as is followed for luminaires covered in 410.74(A), where the shipping carton must be marked if the luminaire requires supply conductors rated over 60°C. What is absolutely unenforceable is the present text. These pools are cord- and plug-connected appliances. Their location is no more enforceable than a code rule attempting to specify how close a vacuum cleaner could be positioned to a nearby receptacle. The best that can be hoped for is a notice in the installation directions that directs compliance with this location provision.
Panel Meeting Action: Reject
Panel Statement: The proposed text is not enforceable by the authority having jurisdiction.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-99 Log #1208 NEC-P17 **Final Action: Accept in Principle**
(680.42(A)(1))

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 17-201
Recommendation: Proposal 17-201 should be Accepted.
Substantiation: Currently, 680.42(A)(1) restricts the use of LFMC and LFNC in lengths longer than 6 feet. Articles 350 and 356 do not restrict the lengths of LFMC or LFNC when used according to the appropriate sections. The submitter is correct that LFMC and LFNC are commonly used in lengths longer than 6 feet for a liquidtight system where flexibility may or may not be required. This restriction should be removed for safer installations.
Panel Meeting Action: Accept in Principle
Revise 680.42(A)(1) to read as follows:
(1) Flexible Conduit. Liquidtight flexible metal conduit or liquidtight flexible nonmetallic conduit shall be permitted in lengths of not more than 1.8 m (6 ft) external to the spa or hot tub enclosure in addition to the length needed within the enclosure to make the electrical connection.
Panel Statement: The revised text will meet the submitter's intent.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-100 Log #2543 NEC-P17 **Final Action: Reject**
(680.42(B))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Carvin DiGiovanni, Association of Pool & Spa Professionals
Comment on Proposal No: 17-203
Recommendation: The Panel has provided no substantiation for its action in rejecting this proposal. No verified shock incidents have been reported dealing with any listed self-contained spa or hot tub on non-bonded perimeter surfaces. There is no similar requirement for storable pools installed outdoors, although the issues are identical. The author therefore respectfully requests reconsideration of the proposal, with language modified to reflect comments of the Panel and changes made to a companion proposal (17-207) regarding indoor spas and hot tubs that was accepted in principle in part in the ROP:
(B) Bonding. Bonding by metal-to-metal mounting on a common frame or base shall be permitted. The metal bands or hoops used to secure wooden staves shall not be required to be bonded as required in 680.26. The equipotential bonding requirements for perimeter surfaces in 680.26 (B)(2) shall not apply to a listed self-contained spa or hot tub when installed on or above the ground.
Substantiation: This proposal eliminates confusion regarding bonding of listed, packaged portable spas and hot tubs (defined in the NEC as "listed self-contained spas and hot tubs") located outdoors, and was submitted concurrent with a similar proposal to clarify language in 680.43 regarding listed self-contained spas and hot tubs installed indoors. Some AHJs recently have begun requiring existing patios, floors and other surfaces (including grass yards) to be torn up and rebuilt with an equipotential bonding grid, or have required the installation of rubber "insulating" mats of unknown quality and questionable dielectric standoff characteristics under and around the spa or hot tub when the property owner purchases and installs a listed self-contained spa or hot tub. This is being done on the premise that the reference to Part II in Article 680.42 requires such arrangements. The author has seen no evidence that the CMP ever intended that the surrounding perimeter surfaces associated with these portable devices be incorporated into the equipotential bonding grid or insulated, and there is no similar perimeter bonding requirement for storable pools installed outdoors, although the equipotential bonding issues are identical. Such a perimeter bonding requirement (indoors or outdoors) is impractical and cost-prohibitive for listed self-contained spas and hot tubs, as the whole point of a listed self-contained spa or hot tub (like a storable pool) is that it can readily be moved or relocated, and is integrally bonded, grounded and GFCI-protected under other sections of Article 680 and UL 1563. A perimeter surface bonding requirement requires demolition and rebuilding of any and all patio or yard area(s) where a listed self-contained spa or hot tub is located any time it is installed or moved within the yard, with no concurrent improvement in safety. There are no verified shock or electrocution incidents reported associated with step potentials or touch potentials associated with persons making contact with the listed self-contained spa or hot tub and the surrounding perimeter surface that could be attributed to failure to bond the perimeter surface.
Panel Meeting Action: Reject
Panel Statement: The submitter has not presented substantiation to demonstrate the need for the proposed allowance.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 6 Negative: 5
Explanation of Negative:
BLEWITT, T.: The Panel Statement does not acknowledge the information presented by a manufacturer to the Panel that substantiated the proposal. The occupant of a self-contained spa or hot tub is not typically in simultaneous contact with the water and the perimeter surface. Standing on the perimeter surface and putting hand(s) in the water is possible, but there would be little consequence from a startle-reaction in that case. Listed self-contained hot tubs and spas are factory wired and reliably bonded with a number of layers of protection against electric shock hazard. We were unable to locate data indicating that perimeter equipotential bonding was needed for such listed equipment installed on or above ground. It appears from the record of prior Panel Actions that pools, and not listed self-contained hot tubs and spas, were the basis for introducing the perimeter equipotential bonding requirement.
MALDONADO, J.: I am voting Negative to the panels action on the expansion of low voltage lighting with no provisions for grounding, GFCI protection or the use of an isolated winding type transformer that has a metal barrier between the primary and secondary windings. As currently required in section 680.23(A)(2). It is presented that increasing these voltages are justified based on the voltage limitations obtained from Chapter 9, Tables 11(A) and 11(B). These tables are for limitations for class 2 and 3 Power Sources. These tables apply to voltages that are not approved for wet contact or immersion contact per note 2. The combination of removing or not requiring GFCI protection or shielded Isolation transformers along with increasing to higher voltages could cause a problem when a power supply shorts our or a low voltage transformer shorts across the windings. This increase has not been justified or substantiated for these locations. Many of these fixtures are also being exempted from grounding if a listed assembly.
RAMIREZ, M.: After reviewing the research and data from the task group on ROC 17-100, I am not able to agree or justify that a manufactured and listed self-contained spa/hot tub installed above grade or on a wooden deck should be included in a perimeter equipotential bonding system. No field reports from CPSC, UL or any other agency have documentation of safety issues with these units, also keeping in mind that a listed unit must comply to UL 1563 that produce inherently safe spa/hot tub with multiple layers of protection.
I am voting to accept ROC 17-100 and against the Panel action to reject.
SCHAPP, R.: The panel rejected the proposal based on supposed previous substantiation furnished during the 2005 code cycle. Further investigation by Jim Maldonado failed to produce any documentation to substantiate the inclusion of above ground packaged spas and hot tubs in the requirement for having the walking surfaces around these units bonded per 680.26(B)(2). We know of no other safety problems that would require bonding to the perimeter surfaces. Acceptance of this proposal makes sense. It will clear up the problem that occurs when spas and hot tubs are installed on existing concrete slabs and wooden decks.

WEST, L.: As a result of lengthy discussion, the panel voted at the meeting to reject to Proposal, but the Panel Chairman convened a task group (of which I was a member) to address whether or not there were any documented incidents supporting a position that lack of perimeter grounding on a listed self-contained spa or hot tub installed outdoors on or above the ground resulted in a safety hazard by causing or contributing to either injury or death (as opposed to comfort issues involving "tingle voltages"). The task group reviewed both CPSC data as well as the original documentation submitted during the 2005 Code Cycle regarding this matter, and the panel had input in the meeting from both the spa industry and its own Panel members who have sat on spa-related standards committees for years, supporting the premise that no documented incidents involving this equipment existed. The result of the task group investigation was that there were no such documented incidents, a position that had been proffered to the Panel in the original proposal and comment submissions. Consequently, there was never a documented basis for the Panel's rejecting either the original proposal or comment. Further, as has been pointed out several times, there is no similar requirement for storable pools, even though the electrical bonding issues are identical and listed self-contained spas are required to be internally bonded and grounded by the UL1563 Standard, generally better than a storable pool. The evidence reviewed therefore does not support rejection of either the original proposal or comment, and the Panel action should be reversed and the original proposal should be accepted.

Comment on Affirmative:

HIRSCH, B.: Code Making Panel 17 understands the challenges this requirement presents as a result of the many installation scenarios for this equipment. The EEI/EL&P Group believes, however, that eliminating the equi-potential grid requirement for this equipment in all locations is the wrong way to go. The Panel is open to discussion of alternate solutions that might better meet some of the installation challenges sited but no alternatives were proposed by the submitter.

YASENCHAK, R.: I do beluive installers are having problems with this requirement, but the Comment does not distinguish between a spa/hot tub on a wooden/raiser or non-conductive surface versus on grade or ground. I would have no problem voting to change the requirement for this equipment installed on wooden or non-conductive surfaces.

17-101 Log #271 NEC-P17 **Final Action: Accept**
(680.43)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 17-207
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal concerning the use of the word "when" since the NEC Style Manual considers "when" as a condition of time.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. See panel action on Comment 17-102.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-102 Log #2281 NEC-P17 **Final Action: Accept**
(680.43 Exception No. 2)

Submitter: Brian Myers, IBEW Local Union 98
Comment on Proposal No: 17-207
Recommendation: Revise text to read as follows:

Exception No. 2: The equipotential bonding requirements for perimeter surfaces in 680.26(B)(2) shall not apply to a listed self-contained spa or hot tub installed above a finished floor.

Substantiation: The word "when" refers to a condition of time according to the NEC Style Manual, section 3.3.1, writing style guidelines.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-103 Log #2668 NEC-P17 **Final Action: Accept in Principle**
(680.43(D) Exception No. 2)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-210
Recommendation: Accept the proposal.
Substantiation: The proposal removes a violation of 3.1.4.1 of the NEC Style Manual requiring complete sentences. The submitter happens to be the author of this Style Manual provision, and it is absolutely intended to address exceptions like this one. As written, it is impossible for an inspector looking at a spa or hot tub to determine what circulating system parts are required to be bonded to what and how, if the tub is listed. Is this a carte-blanche exemption from bonding these items? Is it therefore an exemption from 680.43(E)(3) and a 10 AWG bonding conductor is permitted to these items? The exception needs to provide this information so the rule will be transparent to Code users, and inspectors will know where they stand when they look under the skirt.
Panel Meeting Action: Accept in Principle

Delete 680.43(D) Exception No. 2 and revise 680.43(D)(2) to read as follows:

(2) Metal parts of electrical equipment associated with the spa or hot tub water circulating system, including pump motors, unless part of a listed self-contained spa or hot tub.

Panel Statement: The panel has revised 680.43(D)(2) so that Exception No. 2 can be deleted. This makes it clear as to the intended allowance.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-104 Log #1972 NEC-P17 **Final Action: Accept in Principle**
(680.51(A))

Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-215
Recommendation: Revise text to read as follows:

680.51 Luminaires, Submersible Pumps, and Other Submersible Equipment.

(A) Ground-Fault Circuit Interrupter. Luminaires, submersible pumps, and other submersible equipment, unless listed for operation at the Wet Contact Voltage Limit ~~15 volts~~ or less and supplied by a transformer or power supply that complies with 680.23(A)(2), shall be protected by a ground-fault circuit interrupter.

Substantiation: To be consistent with the Panel Action on 680.13, the specified voltage needs to reflect other than sinusoidal ac. My comment on 17-106 proposed that the substance of 680.13 be made a definition in 680.2. If the text from my comment to 17-106 is adopted, all you need to do here is reference the new definition and drop the 15V references.
Panel Meeting Action: Accept in Principle

In the submitter's recommendation replace "Wet Contact Voltage Limit" with "low voltage contact limit."

Panel Statement: The panel action correlates with the action on Comment 17-41.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-105 Log #704 NEC-P17 **Final Action: Reject**
(680.52(A)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-217
Recommendation: Accept the proposal and revise as follows:

Where the box is connected to nonmetallic conduit(s) it shall have supports and fasteners of copper, brass, or other approved corrosion-resistant material unless embedded in the pool structure.

Substantiation: Embedment in pool structure makes additional support unnecessary.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original reason for rejection as stated in Proposal 17-217. The submitter has not provided any additional substantiation.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-106 Log #1973 NEC-P17 **Final Action: Accept in Principle**
(680.54)

TCC Action: The Technical Correlating Committee revises the panel's action in 680.54 to comply with 2.6 and 3.1.4 of the NEC Style Manual regarding exceptions and directs that the text will read as follows:

"Other than listed low-voltage luminaires not requiring grounding, all...".

Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-218
Recommendation: Revise text to read as follows:

680.54 Grounding. The following equipment shall be grounded:

(1) Except for listed low-voltage luminaires not requiring grounding, all ~~All~~ electrical equipment located within the fountain or within 1.5 m (5 ft) of the inside wall of the fountain

(2) All electrical equipment associated with the recirculating system of the fountain

Substantiation: When the Panel rejected the proposal addressing line-voltage luminaires, it also effectively rejected a part of the proposal addressing low-voltage luminaires not requiring grounding. The proposed change reflects similar exceptions for ungrounded low-voltage systems in Section 680.23. These are established technologies with proven field histories.

Panel Meeting Action: Accept in Principle
Revise text to read as follows:
680.54 Grounding. The following equipment shall be grounded:
(1) Except for listed low-voltage luminaires not requiring grounding, all ~~All~~ electrical equipment located within the fountain or within 1.5 m (5 ft) of the inside wall of the fountain
(2) All electrical equipment associated with the recirculating system of the fountain
(3) Panelboards that are not part of the service equipment and that supply any electrical equipment associated with the fountain.
Panel Statement: The panel added back the missing (3).
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-107 Log #709 NEC-P17 **Final Action: Reject**
(680.56(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-221
Recommendation: Accept the proposal.
Substantiation: Cord connector bodies and flanged surface devices are devices also used with flexible cords.
Panel Meeting Action: Reject
Panel Statement: Cord connectors and flanged surface devices would conflict with the intent of this Code requirement that connections be permanent unless necessary.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-108 Log #1951 NEC-P17 **Final Action: Accept**
(680.62(B) Exception (New))

Submitter: Thomas V. Blewitt, Underwriters Laboratories Inc.
Comment on Proposal No: 17-223
Recommendation: Add new text to read as follows:
Exception: Small conductive surfaces not likely to become energized, such as air and water jets and drain fittings not connected to metallic piping, and towel bars, mirror frames, and similar nonelectrical equipment not connected to metal framing, shall not be required to be bonded.
Substantiation: The UL negative ballot had an incorrect reference to 680.42(D)(4) Exception 1. It should have referred to 680.43(D)(4) Exception 1, but otherwise correctly stated UL's position. The proposed text is the same as that of the original submitter except "where not connected to metal studs" was added in response to a Panel concern over this being a case where such parts could be inadvertently energized.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-109 Log #2669 NEC-P17 **Final Action: Accept in Principle**
(680.62(B) Exception (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-223
Recommendation: Accept the proposal.
Substantiation: As pointed out in the comments in the voting, the wording is the same as has been deemed acceptable for spa and hot tub environments [680.43(D) Exception No. 1]. In fact it has been acceptable for over 16 years as of this writing, since the publication of the 1993 NEC. If this is not technically substantiated, then by all means remove the exception for spas and hot tubs, and while doing that, remove the comparable allowance for swimming pools generally. This type of exception is simply a matter of common sense.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 17-108.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-110 Log #2689 NEC-P17 **Final Action: Accept**
(680.73)

Submitter: Frederic P. Hartwell, Rep. Massachusetts Electrical Code Advisory Committee
Comment on Proposal No: 17-229
Recommendation: Accept the proposal.
Substantiation: The panel statement is not responsive. If the receptacle is a GFCI receptacle, then yes, it must be readily accessible, which may well preclude it from being anywhere under the skirt of the bathtub structure. If the receptacle is not a GFCI receptacle due to the protection being applied at a remote location, then there is no specific access rule. The language in the proposal addresses a safety issue because a receptacle located so as to be extremely difficult to access presents a powerful temptation to work the circuit hot. The proposal is very reasonable, easy to apply, and still allows the cosmetic concealment that most owners look for.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-111 Log #708 NEC-P17 **Final Action: Reject**
(680.74)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-231
Recommendation: Accept the proposal.
Substantiation: Sections 680.6(3) and 680.21(A) do not exempt double-insulated motors. 680.62(D)(1)(b) requires grounding; 680.26(B)(6)(a) indicated an EGC for double-insulated motors. An ungrounded double-insulated motor does not provide protection from shock if an ungrounded supply conductor in the terminal housing short-circuits to the metal housing.
Panel Meeting Action: Reject
Panel Statement: The submitter has confused bonding jumpers used for equipment grounding with those used for equipotential bonding.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-112 Log #2322 NEC-P17 **Final Action: Reject**
(680.74)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 17-230
Recommendation: Reject the proposal.
Substantiation: This change doesn't make any sense. If the motor is double insulated, the bonding jumper isn't required in the first place. As currently written, the text refers to a conductor that doesn't exist—"the bonding jumper shall…".
Panel Meeting Action: Reject
Panel Statement: The submitter is incorrect in that the 8 AWG or larger solid copper bonding jumper is in fact required to allow for replacement of the double-insulated motor with one that is not double-insulated.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 682 — NATURAL AND ARTIFICIALLY MADE BODIES OF WATER

17-113 Log #2716 NEC-P17 **Final Action: Reject**
(682.2.Power Safe Protector (PSP))

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 17-233
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent
injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: This new definition is not required since the proposed code changes requiring PSP devices in Article 682 were rejected.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-114 Log #703 NEC-P17 **Final Action: Reject**
(682.13)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-236
Recommendation: Accept the proposal and revise second sentence as follows:
Portable power cable Type W in Table 400.4 shall be permitted for feeders and branch circuits where flexibility is required.
Substantiation: Portable power cable designated Type W is the only portable cable identified to wet locations and sunlight resistance. Article 400 does not require listing and there is no other table comparable to Table 400.4 for listed cords and cables. See Proposal 17-237, 682.14 in the 2010 ROP.
Panel Meeting Action: Reject

Panel Statement: The submitter has not provided any new substantiation for the original recommendation. Also, limiting power cable to Type W precludes the development of future cable suitable for the application.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-115 Log #2715 NEC-P17 **Final Action: Reject**
(682.15)

Submitter: Michael Baxter, Energy Safe Technologies Inc.
Comment on Proposal No: 17-242
Recommendation: Same as originally submitted.
Substantiation: The Underwriters Laboratory completed a study of problems associated with receptacles that lead to fires as well as the effectiveness of an advanced receptacle, such
as the PSP, to address these problems. This report shows that such a receptacle has the potential to make a positive difference to the rate of fires and consequent injuries and loss. The result of this work is detailed in the accompanying UL Report on Project 09CA32520 published 21 October 2009.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any additional documentation to show that this product has been listed. The companion proposals for 682.2 [Proposal 17-233] nor the associated Article 100 Power Safe Protector definition [Proposal 2-27] do not establish limiting safe values for any protection parameters. Any device with a current-interrupting feature and red and green indicator lights could purport to provide power safe protector protection. As such, the proposed requirement is unenforceable.
The additional documentation does not provide sufficient data to show the PSP device will add any greater level of safety in regards to mitigating electrocution hazards than the currently required GFCI devices provide. The UL Research Report clearly states that its scope was to "assess the ability of the Energy Safe Technologies Power Safe Protector (PSP) receptacle design to prevent overheating and thereby mitigate the likelihood of ignition of the electrical wiring system." The requirement for using GFCI protection in this code section is to prevent electrocution where electricity is being used in wet locations. The report clearly states that "An evaluation of this "Power Off" paradigm was not included in this research investigation".
The submitter has not addressed prohibited use of a proprietary trademarked name in mandatory Code requirements (Annex A.14, Guide for Officers of Technical Committees and Technical Correlating Committees of the NFPA). U.S. Patent & Trademark Office shows a live application [USPTO Serial Number 77633351] for registration of "POWERSAFE" by the submitter's corporation Energy Safe Technologies Inc.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-116 Log #697 NEC-P17 **Final Action: Reject**
(682.31)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-243
Recommendation: Accept the proposal and revise as follows:
Equipment Grounding and Bonding Conductor.
(A) Type. Equipment grounding and bonding conductors shall be insulated copper conductor sized in accordance with 250.122 but not smaller than 12 AWG.
(B) Feeders and Branch Circuits Feeder and branch circuit equipment grounding conductors shall be connected to a grounding terminal(s) or bus(es) in the equipment where the feeder or branch circuit originates and terminates.
(C) Cord Connected Equipment Where grounded, flexible cord and cable connected equipment shall be grounded by an equipment grounding conductor in the flexible cord or cable.
Substantiation: Where bonding conductors are employed, they should also comply with (A). Which already requires the equipment grounding conductors of (B) and (C) to be insulated. Feeder and branch circuit conductors are not required to originate in a panelboard; they may originate in a single fused switch or circuit breaker. Present (C) should apply to cord connected equipment which are not "appliances". The attachment plug may not always be the means of attachment to a circuit. In present (B) "remote" is not defined and is irrelevant to the provision. See 17-246, 682.32 of the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original reason for rejecting the proposal. No additional substantiation has been provided.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-117 Log #696 NEC-P17 **Final Action: Reject**
(682.32)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-246
Recommendation: Revise panel action as follows:
All metal parts in the water, including metal piping and tubing, tanks, and noncurrent-carrying metal parts that are likely to become energized shall be effectively bonded to a grounding terminal(s) or bus(es) in the distribution equipment for the circuit(s) that can energize such material.
Substantiation: Metal tubing may not be deemed to be piping. Bonding should be to equipment. The distribution equipment should be directly associated with the circuits that can energize these components, to provide the most effective ground fault current path.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original action and statement. No additional substantiation has been provided. Metal tubing is covered under "all metal parts." Bonding includes the source equipment as indicated in 250.4.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 685 — INTEGRATED ELECTRICAL SYSTEMS

12-112 Log #702 NEC-P12 **Final Action: Reject**
(685.1(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-178
Recommendation: Accept the proposal.
Substantiation: Panel statement that the scope is (only) to ensure an orderly shutdown necessary for safe operation is belied by "is required to minimize equipment damage", which also does not necessarily create a personnel hazard.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its panel statement on Proposal 12-178. Further, the submitter's text does not add clarity. The submitter has provided no new substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

12-113 Log #701 NEC-P12 **Final Action: Reject**
(685.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-182
Recommendation: Accept the proposal and revise as follows:
Location of overcurrent devices and disconnecting means that are critical to integrated electrical systems shall be readily accessible but shall be permitted to be locked to prevent access or operation by unauthorized personnel. Exceptions No. 1, 2, and 3 for 404.8 shall apply.
Substantiation: Disconnecting means as well as overcurrent devices can disrupt integrated electrical systems. Height cannot ensure unauthorized operation by use of ladders, or extension poles. Locking permits quicker access and less hazard by not requiring ladders or other equipment which may delay quick access for safety. A qualified person is not necessary to operate disconnecting means or reset a circuit breaker; homeowners and others do this every day.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide definitive substantiation that a problem exists in the field or with this requirement. The existing wording is adequate. The panel continues to point out that the requirements in 685.10 focus on overcurrent protection.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 690 — SOLAR PHOTOVOLTAIC SYSTEMS

4-64 Log #272 NEC-P04 **Final Action: Accept**
(690.4(B))

TCC Action: The Technical Correlating Committee directs that the proposed wording be revised to remove a redundant sentence.
The text will now read as follows:
"Photovoltaic source circuits and PV output circuits shall not be contained in the same raceway, cable tray, cable, outlet box, junction box, or similar fitting as conductors, feeders, or branch circuits of other non-PV systems, unless the conductors of the different systems are separated by a partition. PV system conductors shall be identified and grouped as required by 690.4(B)(1) through (4). The means of identification shall be permitted by separate color coding, marking tape, tagging, or other approved means."
The Technical Correlating Committee directs that the Exception to (3) be revised to comply with the NEC Style Manual to read as follows:
"Exception No. 3: Where the identification of the conductors is evident by spacing or arrangement, further identification shall not be required."
The Technical Correlating Committee directs that the Exception to (4) be revised to comply with the NEC Style Manual to read as follows:
"Exception No. 4: The requirement for grouping shall not apply where the circuit enters from a cable or raceway unique to the circuit that makes the grouping obvious."
Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-184
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by revising the numbering and lettering of (B) since there is only a (1) and no (2). Mandatory text must be used in the text in each exception to comply with the NEC Style Manual 2.6.1.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel has revised the section, as shown below, to comply with the Technical Correlating Committee's request.
Remove the **(B)(1)** and modify the section to read:
(B) Conductors of Different Systems. Photovoltaic source circuits and PV output circuits shall not be contained in the same raceway, cable tray, cable, outlet box, junction box, or similar fitting as conductors, feeders, or branch circuits of other non-PV systems, unless the conductors of the different systems are separated by a partition. PV system conductors shall be identified and grouped as required by 690.4(B). PV system conductors shall be identified as required in 690.4(B)(1) through (4). The means of identification shall be permitted by separate color coding, marking tape, tagging, or other approved means.
Renumber the proposed A through D as 1 through 4.
The Exceptions to (3) and (4) are changed to read as follows:
Exception: The requirement for grouping shall not apply if the circuit enters from a cable or raceway unique to the circuit that makes the grouping obvious.
Panel Statement: The panel's revision were made in order for the ext to comply with the NEC Style Manual, and do not alter the intent of the Proposal 4-184.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-65 Log #1950 NEC-P04 **Final Action: Reject**
(690.4(B)(1)(A))

Submitter: D. Jerry Flaherty, Electrical Inspection Service, Inc. / Rep. New York Solar Industries Association (NYSEIA) & Long Island Solar Industries Association (LISEIA)
Comment on Proposal No: 4-183
Recommendation: Revise text to read as follows:
(1) Identification and Grouping.
(A) Photovoltaic Source Circuits. Where a PV system has more than one source or output circuit ~~connected in parallel, either directly or through overcurrent protective devices, the parallel connected~~ the conductors of each source or output circuit shall be identified at all points of termination, connection, and splices.
Substantiation: All source circuit conductors should be identified.
Some inverters have more then one maximum power tracking circuit and these source circuits are not in parallel, but should be individually identified.
The intent is not clear; does this mean that all the circuits are identified the same or each circuit is identified separately? To clarify this add: "each source or output circuit".
Panel Meeting Action: Reject
Panel Statement: The submitter is commenting on the original proposal, not on what was Accepted in the ROP and the material is, therefore, out of context and the panel is unable to address the matter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-66 Log #1948 NEC-P04 **Final Action: Accept**
(690.4(B)(1)(C))

Submitter: D. Jerry Flaherty, Electrical Inspection Service, Inc. / Rep. New York Solar Industries Association (NYSEIA) & Long Island Solar Industries Association (LISEIA)
Comment on Proposal No: 4-183
Recommendation: Revise text to read as follows:
(1) Identification and Grouping.
(C) Conductors of Multiple Systems. Where the conductors of more than one PV system ~~(subarray or inverter)~~ occupy the same junction box, raceway, or equipment, the conductors of each system shall be identified at all termination, connection, and splice points.
Substantiation: The words "subarray or inverter" are superfluous and should be removed.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BOWER, W.: I disagree with the proposal and panel action to delete the words "subarray or inverter". They are not superfluous. The words clarify that the junction box, raceway or equipment contains conductors associated with more than one circuit. Of note, the subarray conductors typically carry current with different characteristics than the circuits associated with the input of an inverter. One area of difference includes the fact that inverter circuits may contain energy stored in capacitors and the circuit current is not limited. Conversely the current source characteristics such as a PV subarray currents is limited and may not clear a fuse if those circuits are shorted.
ZGONENA, T.: This proposal should have been rejected since the terms "sub-array and inverter" add clarity and identify the wiring that could be interpreted as part of the same circuit. A sub-array circuit can be very different than an inverter input circuit. Many PV inverters have large capacitor banks across the input terminals and can source high backfeed currents. The original text purposely defines the need to identify these circuits separately.

4-67 Log #1947 NEC-P04 **Final Action: Accept in Principle**
(690.4(B)(1)(D))

Submitter: D. Jerry Flaherty, Electrical Inspection Service, Inc. / Rep. New York Solar Industries Association (NYSEIA) & Long Island Solar Industries Association (LISEIA)
Comment on Proposal No: 4-183
Recommendation: Revise text to read as follows:
(1) Identification and Grouping.
(D) Grouping. Where the conductors of more than one PV system ~~(subarray or inverter)~~ occupy the same junction box or raceway with removable cover(s), the ac and dc conductors of each system shall be grouped separately by wire ties or similar means at least once, and then shall be grouped at intervals not to exceed 1.8 m (6 ft).
Substantiation: The words "subarray or inverter" are superfluous and should be removed.
Panel Meeting Action: Accept in Principle
Revise the text of 690.4(B)(2) to read as follows:
(B) Identification and Grouping.
(2) Grouping. Where the conductors of more than one PV system occupy the same junction box or raceway with removable cover(s), the ac and dc conductors of each system shall be grouped separately by wire ties or similar means at least once, and then shall be grouped at intervals not to exceed 1.8 m (6 ft).
Panel Statement: The has panel corrected the section reference.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BOWER, W.: See My Explanation of Negative on 4-66.

4-68 Log #1758 NEC-P04 **Final Action: Reject**
(690.4(D))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 4-186
Recommendation: Accept this proposal.
Substantiation: The panel statement on the action to reject this proposal recognizes that the submitter is correct. These systems demand that they be installed by qualified persons. In Pennsylvania there is an abundance of "solar installers' emerging into the market place. These solar installers are applying for and receiving grant monies to install solar grid tie systems. These new "solar installers" are landscapers, plumbers and other entities getting involved in what they believe is a new created business opportunity. This industry does not consider the installation of PV as electrical work.

I disagree with the portion of the panel statement which reads: "However, the NEC cannot contain requirements relative to the qualifications of installers for any electrical system, these requirements need to be handled by local or state qualification committees or licensing boards." A review of the NEC will reveal that the NEC does indeed include numerous installation requirements tied to "qualified persons." In fact CMP-4 includes the "qualified person" requirement in 225.32 Exception No. 1 and 230.204(C).

Panel Meeting Action: Reject

Panel Statement: See panel action on Comment 4-69.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 7 Negative: 5

Explanation of Negative:

MCDANIEL, R.: The panel action on Comment 4-68 should have been an Accept in Principle in Part. While we accept in principle the idea of a qualified person as evidenced by our action on Comment
4-69, we do not accept the part at this time as to the document trail that was included in Comment 4-68. By voting negative on Comment 4-68, this will provide clear indication to the Technical Correlating Committee as to what our intention was at the panel meeting, to accept Comment 4-69.

ROGERS, J.: While there has been much debate relative to the "Qualified Person(s)" requirements being included as a requirement for installation of PV equipment and wiring, it is my belief that the Panel must remain consistent in one direction or another. As expressed in the balloting, the tenor of the Panel appears to be in the direction of supporting the concept, at least for this code cycle.

That being said and as explained by Mr. Brian Crise, we cannot vote in opposite directions on two different comments to the same proposal as that causes confusion for everyone. Therefore, I am changing my vote to reflect consistency. The issue that comes to the forefront here is enforceability and that issue may still need to be addressed either by the Technical Correlating Committe or at the NFPA annual meeting.

STAFFORD, T.: This panel member desires a stringent verification method be specified in order to verify qualified persons only are working on photovoltaic systems. The original proposal submitted by Mr. Brand and supported by Mr. Dollard and supported by the panel comments for proposal 4-186, does provide the necessary verification method.

The panel action on Comment 4-68 should have been an Accept in Principle in Part. While we accept in principle the idea of a qualified person as evidenced by our action on Comment 4-69, we do not accept the part at this time as to the document trail that was included in Comment 4-68. By voting negative on Comment 4-68, this will provide clear indication to the Technical Correlating Committee as to what our intention was at the panel meeting, to accept comment 4-69.

TOOMER, R.: This panel member desires a stringent verification method be specified in order to verify qualified persons only are working on photovoltaic systems. The original proposal submitted by Mr. Brand and supported by Mr. Dollard and supported by the panel comments for proposal 4-186, does provide the necessary verification method.

The panel action on Comment 4-68 should have been an Accept in Principle in Part. While we accept in principle the idea of a qualified person as evidenced by our action on Comment 4-69, we do not accept the part at this time as to the document trail that was included in Comment 4-68. By voting negative on Comment 4-68, this will provide clear indication to the Technical Correlating Committee as to what our intention was at the panel meeting, to accept comment 4-69.

ZGONENA, T.: The panel action on Comment 4-68 should have been an Accept in Principle in Part. While we accept in principle the idea of a qualified person as evidenced by our action on Comment 4-69, we do not accept the part at this time as to the document trail that was included in Comment 4-68. By voting negative on Comment 4-68 this will provide clear indication to the Technical Correlating Committee as to what our intention was at the panel meeting, to accept Comment 4-69.

4-69 Log #1783 NEC-P04 **Final Action: Accept**
(690.4(D) and (E))

TCC Action: The Technical Correlating Committee directs that the Informational Note be revised to read as follows:

"Informational Note: See Article 100 for the definition of "qualified person"."

Submitter: Michael J. Johnston, National Electrical Contractors Association

Comment on Proposal No: 4-186

Recommendation: Accept the proposal in principle and include a new subdivision (E) and informational note as follows:

(D) Equipment. Inverters, motor generators, photovoltaic modules, photovoltaic panels, ac photovoltaic modules, source-circuit combiners, and charge controllers intended for use in photovoltaic power systems shall be identified and listed for the application. ~~and be installed by qualified persons with documented training and experience in the installation of and NEC requirements applicable to such equipment. The name(s) of the qualified person(s) shall be kept in a permanent record at the office of the establishment in charge of the completed installation. Records of qualified persons must be furnished upon request to the local authority having jurisdiction.~~

(E) Wiring and Connections. The equipment and systems in 690.4(A) through (D) and all associated wiring and interconnections shall be installed only by qualified persons.

Informational Note: The defined term qualified person indicates that knowledge related to construction and operation of equipment and installations is necessary along with safety training to recognize and avoid hazards to persons and property.

Substantiation: There were several key points made by the submitter that members of CMP-4 agreed with as indicated in the ballot statements. In fact, the panel statement indicates that the "panel supports installations of these systems by qualified workers." The NEC is an installation Code and defines the term "qualified person" which is definitely necessary for these types of installations as indicated in the submitter's substantiation. This is specialized work and requires significant training and knowledge (including basic NEC knowledge). This comment attempts to preserve the points made by the submitter by retaining the concepts proposed while addressing the concerns of CMP-4 expressed in the panel statement. The NEC should require more specific qualifications for special equipment and systems requiring highly trained and knowledgeable workers and draw specific attention to it again within this article. Knowledge of the general requirements in the NEC (Chapters 1-4) is essential in addition to any specialty certification for installers of this type of equipment, yet in the field more PV installations are being performed by workers and electrical workers and contractors that also obtain specialty certifications beyond the minimum requirements to satisfy the criteria of qualified persons as defined in Article 100. Including the requirement that only qualified workers perform and be responsible for such installations as an NEC requirement supports what is anticipated as a general provision in the Code anyway, while at the same time helps support local regulation of qualified persons and contractors whether or not the electrical worker and contractor licensing and qualifications is regulated at the state and local levels.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

BOWER, W.: I agree with the panel action to strike the language "and be installed by qualified persons with documented training and experience in the installation of and NEC requirements applicable to such equipment. The name(s) of the qualified person(s) shall be kept in a permanent record at the office of the establishment in charge of the completed installation. Records of qualified persons must be furnished upon request to the local authority having jurisdiction." as proposed for 690.4(D). That was an overzealous proposal to begin with, and would set a precedent that every section of the code dealing with installations has similar requirements for qualified personnel spelled out.

Note that this code is written to cover installations from a few watts to multi-megawatts. Per Article 90.1(C) stating "This code is not intended as a design specification or an instruction for untrained persons," implies trained (qualified) or at least supervised persons are doing the work. I can't imagine AHJ personnel running around every small PV installation to be assured qualified persons are making every connection and running every inch of wire. This will become a huge burden in the future as PV installations amounting tera-watt cumulative power production are installed. Further, as PV systems become more plug and play using listed vertically integrated hardware, which wires and connectors will have to be installed by qualified persons?

The proposed language for 690.4(E) is "(E) Wiring and Connections. The equipment and systems in 690.4(A) through (D) and all associated wiring and interconnections shall be installed only by qualified persons. The addition of 690.4(E) as accepted by the panel may appear to attempt to improve the safety of installed PV systems, and I agree safety is paramount, but this is a dangerous precedent. NOWHERE ELSE IN THE NEC IS THERE SUCH UNENFORCABLE LANGUAGE FOR INSTALLATION OF HARDWARE BY QUALIFIED PERSONNEL. NOT FOR THE INSTALLATION OF BATTERIES, EMERGENCY SYSTEMS, EQUIPMENT IN HAZARDOUS LOCATIONS, BULK STORAGE FACILITIES, X-RAY INSTALLATIONS, AMBULATORY CARE UNITS, FIREPUMPS, SERVICE PANELS, SERVICE CONDUCTORS, TRANSFORMERS, MOTOR GENERATORS, UNINTERRUPTIBLE POWER SUPPLIES, ELEVATORS, COORDINATION EQUIPMENT, COMMUNICATIONS EQUIPMENT AND MANY MORE. Note: I recognize there are many instances in the code where equipment shall be accessible ONLY by qualified personnel or be serviced IN INDUSTRIAL SETTINGS OR THEATERS by qualified personnel, but nowhere is the installation of equipment or systems by qualified personnel CALLED OUT! THIS PROPOSAL SHOULD BE REJECTED. PV INSTALLATIONS ARE NO MORE COMPLEX THAN installations such as ELEVATATORS WITH REGENERATIVE BRAKING, UPS SYSTEMS TO BACK UP CRITICAL LOADS (and in the future to interact with the Smart Grid) OR THE MANY OTHERS MENTIONED ABOVE. If this proposal is not rejected then ONLY QUALIFIED personnel should be called out for the installation of ALL equipment.

The "Informational Note" proposed in the comment DOES NOT meet the requirements of the style manual for the NEC. This could have been a fine print note and no mandatory language should have been included. The "Informational Note" should not be allowed and the proposal/comment should be "REJECTED".

If this proposal is not rejected then ONLY QUALIFIED personnel should be called out for the installation of ALL electrical equipment. The current language in Article 690.4(D) already covers the requirement for hardware to be identified and listed for the application, and that does not need to change. Mechanisms to assure good workmanship and assuring hardware meets all the physical requirements of the code are already in place.

WILLS, R.: I do not believe that this language falls within the scope of the NEC.

ZINNANTE, V.: While I agree that "qualified persons" should install these systems, I do not feel it is necessary to redefine the term "qualified person" as an informational note in this article. The definition is clearly defined in Article 100 and needs no further clarification.

Comment on Affirmative:

ROGERS, J.: The submitter has presented a very good and workable solution to referencing a requirement for "Qualified Persons" performing work on PV systems. There was much discussion about adding these words in Article 690 even though the term is already used in five locations within the article. Some are viewing this as a restriction for those already performing these installations, it clearly is not, it is just a baseline statement that workers should be safe for their own good and for the good of the people whose property they are working on. This basic minimum level of competency goes to the very basic purpose of the NEC, the practical safeguarding of people and property. This basic premise starts with protecting the worker by making sure they are qualified to recognize and avoid any hazards they may encounter while performing their work. This is so necessary when dealing with PV systems where one commonly encounters fall hazards, lifting hazards, and electrical shock or burn hazards. Having qualified persons perform these installations is the minimum assurance that the industry owes to the consumers who own the properties where these installations are being made.

STAFFORD, T.: As the panel recognizes the need for qualified persons working upon photovoltaic systems, this panel member wants to stress that it is necessary to require electrical workers to install electrical systems. Comment 4-69 does require qualified persons to perform all work related to photovoltaic installations. The informational note provides some detail into what is considered necessary for a person to become qualified with references to: electrical safety, electrical equipment, installation standards, and operation of electrical equipment.

4-70 Log #2670 NEC-P04 **Final Action: Reject**
(690.4(E))

TCC Action: The Technical Correlating Committee directs that the panel action on Comment 4-70 be reported as "Hold" in compliance with the NFPA Regulations Governing Committee Projects, Section 4.4.6.2.2.
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-187
Recommendation: Accept the proposal in principle.

Change "in and out of conduit" to read "where not run in metal raceways or Type MC cable in accordance with 690.31(E)."

Substantiation: The proposal wording effectively removes 690.31(E) from the NEC in most cases. On the literal text, running a steel raceway horizontally across a group of roof rafters in the attic (instead of the permitted "along" such structural members) is a violation. Running the same steel raceway vertically between studs in the wall (duly secured in accordance with the relevant raceway Section 30, generally within 10-ft intervals) would be a violation. In terms of the intended benefit, the closer the raceway is to the roof membrane, the more likely it would be to be in the way of fire fighting activities. In fact, a steel raceway is likely to allow ventilation activities to proceed without danger. CMP 4 has improved 690.31(E) by virtue of its action on Proposal 4-228 accordingly, and this language correlates with that action.

There are trade-offs involved here. A effective requirement to route these raceways on the outside of buildings will not be well received aesthetically and will discourage the progress of this industry. A disconnect requirement that results in a relatively inaccessible attic location is unlikely to be of much assistance during an emergency. As written the proposal is excessive.

Panel Meeting Action: Hold
Panel Statement: This is new material and the panel "Rejects" the comment.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-71 Log #2671 NEC-P04 **Final Action: Accept**
(690.4(F))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-188
Recommendation: Accept the panel action in principle.

Insert the word "and" after "circuits" and before "containing".

Substantiation: This will clarify that the requirement for the barrier and the requirement for the maximum voltage rating are different concepts, and that the circuits are not thought to contain a barrier. This addresses the concern expressed in the voting.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-72 Log #700 NEC-P04 **Final Action: Reject**
(690.5(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-192
Recommendation: Accept the proposal.
Substantiation: A label that is not durable (adhesion or material) is not a very effective safety measure.
Panel Meeting Action: Reject
Panel Statement: The panel has correctly referenced the general requirement for labels as stated in 110.21.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-73 Log #273 NEC-P04 **Final Action: Accept**
(690.7(E)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-194
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by complying with the NEC Style Manual 3.1 and use the term "shall be permitted" instead of "may".

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel Accepts the use of the term "shall be permitted" instead of the word "may".

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

ZGONENA, T.: There is an editorial problem with the proposed text that should be corrected by TCC. The word "to" needs to be added at the end of "shall be permitted" in order to make the sentence grammatically correct.

4-74 Log #2469 NEC-P04 **Final Action: Hold**
(690.10 (New))

Submitter: Robert H. Wills, Intergrid, LLC / Rep. American Wind Energy Association
Comment on Proposal No: 4-201
Recommendation: Move common language in Articles 690, 692 & 694 to a new common Article 70X:

Article 70X – Stand-Alone Electric Systems

70X.1 Scope. The provisions of this article apply to electric systems that supply power independent of the electric production and distribution network (utility). Stand-alone electric systems can be supplied by sources including engine generators, inverters, fuel cells, and renewable energy sources such as wind and solar-electric systems.

70X.3 Other Articles. Whenever the requirements of other articles of this *Code* and Article 70X differ, the requirements of Article 70X shall apply.

70X.2 Premises Wiring

When used to supply a building or other structure, a stand-alone electric system shall be adequate to meet the requirements of this *Code* for a similar installation connected to a service. The wiring on the supply side of the building or structure disconnecting means shall comply with this *Code* except, as modified by 690.10(A) through (D).

(A) Inverter Output. The ac output from an electrical source such as a generator or stand-alone inverter shall be permitted to supply ac power to the building or structure disconnecting means at current levels less than the calculated load connected to that disconnect. The electrical source output rating shall be not less than the load posed by the largest single utilization equipment connected to the system. Calculated general lighting loads shall not be considered as a single load.

(B) Sizing and Protection. The circuit conductors between the inverter output and the building or structure disconnecting means shall be sized based on the output rating of the inverter. These conductors shall be protected from overcurrent in accordance with Article 240. The overcurrent protection shall be located at the output of the inverter.

(C) Single 120-Volt Supply. The inverter output of a stand-alone solar photovoltaic system shall be permitted to supply 120 volts to single-phase, 3-wire, 120/240-volt service equipment or distribution panels where there are no 240-volt outlets and where there are no multi-wire branch circuits. In all installations, the rating of the overcurrent device connected to the output of the inverter shall be less than the rating of the neutral bus in the service equipment. This equipment shall be marked with the following words or equivalent:

WARNING
SINGLE 120-VOLT SUPPLY. DO NOT CONNECT
MULTIWIRE BRANCH CIRCUITS!

(D) Energy Storage or Backup Power System Requirements. Energy storage or backup power supplies shall not be required.
Substantiation: The same language for stand-alone systems is included in the three renewable energy Articles (690, 692 and 694).
It makes sense to eliminate redundancy and to move it to a general Article so that common language can serve all three.

In addition, the permissions and safety issues resolved by this language are not solely applicable to PV, fuel cells and wind energy.
In particular, there are many houses that are powered "off-grid" by prime-power generators that are not capable of the full 100 or 200A capacity of a conventional service. Experience with the approximately 100,000 off-grid PV systems in the USA has shown the need to clarification the requirements for stand-alone systems in the *Code*. This should be extended to the general case.

There is no existing article that covers the general area of stand-alone systems:

- Article 705 covers the opposite (interconnected systems).
- These systems are not for standby use, and so do not belong in Article 702 (Optional Standby Systems).

It makes sense then to create a new article in Chapter 7 to complement Article 705. (covering essentially "non-interconnected power production sources").

The language above is based on that of Article 690.10, but with the specific references to PV power sources changed to the generic term "stand-alone electric system source". The language was also changed to make it compliant with the NEC Style Manual.

This proposal was originally rejected for not being presented as a complete article. I trust that this revision meets the panel's requirements.
Panel Meeting Action: Hold
Panel Statement: The panel Holds the comment as it would change the text to the point where the panel would have to restudy the entire subject text, and it is something that can not be properly handled in the time available to process the report.

The panel notes that Proposal 4-201 was Rejected and, therefore, is not "Held".
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

BOWER, W.: I agree that a task group that consists of experts from installation AND INDUSTRY and not a single person is needed to propose such a wholesale movement of the stand-alone section of Article 690 for PV systems. It is recommended that a section on stand-alone systems remain in Article 690 to cover areas that are unique to stand-alone PV systems. Furthermore, a reference to the new locations for "universal" stand-alone requirements must be contained in Article 690. To move all language associated with stand-alone PV systems out of Article 690 will result in a code that is more difficult to understand and will create a need to search other sections of the code for requirements that will not be spelled out specifically for the PV applications but logically should reside in Article 690.

WILLS, R.: We need to move common language in Articles 690, 692 and 694 to a common location. In addition, such stand-alone systems are not properly addressed by the NEC at this point. Situations that are particular to PV (if any exist) can be addressed in a new 690.10. A task group should be appointed for this subject.

4-75 Log #699 NEC-P04 **Final Action: Reject**
(690.10(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-202
Recommendation: Accept the proposal.
Substantiation: This provision doesn't literally apply where equipment is not in the form of a "panel."
Panel Meeting Action: Reject
Panel Statement: The comment does not meet the requirements of 4.3.3(B) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-76 Log #1584 NEC-P04 **Final Action: Reject**
(690.11)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative on this comment.

The Technical Correlating Committee notes that Proposal 4-204 remains "Accepted in Principle" and that Proposal 4-205 remains "Accepted" as modified by the action taken on Comment 4-83.
Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 4-204
Recommendation: Reject this proposal.
Substantiation: While there seems little doubt that dc arc fault protection should be required in PV systems, this proposal is premature. Using the ac AFCI requirement as a model, were this proposal to have progressed in a similar manner, UL would have begun an investigation into technologies that could mitigate dc arc faults in PV systems in at least 2005, UL would have begun working with prospective manufacturers on a standard in at least 2007 and the proposed effectivity date of the requirement would be at least 2014. But in this case no product standard exists today, the only meeting UL has held on the subject was on April 7, 2009 and there isn't even agreement on the type of arc fault protection that should be provided and where in the system it should be located. All interested parties are certainly encouraged to move ahead with the work that needs to be done, however, this proposal might better be considered for the 2014 NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 7 Negative: 5
Explanation of Negative:

BOWER, W.: I agree with the comment that the original proposal is premature. Material was presented at the panel meeting that a device to detect arc faults is currently being tested and may be ready in time for the 2011 NEC, but the applicability and range of power levels of a single device in all types of PV systems is not likely! Several panel members expressed confidence that when no commercially available product is available then the mandatory language of the code is not enforced. This is a gamble that could potentially harm the PV industry. Enforcement will be at the discretion of the AHJ and could result in costly delays, multiple appeals and interpretation misunderstandings with each installation.

I agree that all interested parties should move ahead with development of reliable and consistent dc arc fault detection methodologies and devices, but that language proposed for the 2011 NEC would best be delayed until the 2014 edition.

I also believe there should have been a panel statement on this comment to reference the "ACCEPT" on Comment 4-83.

ROGERS, J.: There is no rationale to accept this comment especially in light of the fact that comment 4-80 on the same proposal was rejected. There is definitive forensic evidence of PV ground faults causing fires, although this technology is new the ability to prevent even one fire that cause personal injury or property damage makes its acceptance well worthwhile. The basic premise of the NEC is the protection of persons and property from hazards that may arise from the use of electricity, this technology clearly meets that premise.

STAFFORD, T.: Evidence provides a definitive link to PV ground faults causing fires. This example is enough for this panel member to believe that a technology, while new, is a method that could help mitigate the direct cause of PV ground faults causing fires.

WILLS, R.: I believe that the panel was confused by the double negative involved in this comment which was to Reject Proposal 4-204.

The panel action should have been Reject with the same panel statement as used on Comment 4-80.

I support the requirement for dc arc fault detectors for PV in the 2011 NEC.

While concerned with the lack of available equipment, I believe that the rapid growth of the PV industry and the potential for fire hazard justifies acceptance of this proposal. It will give manufacturers solid reason to continue developing these detectors prior to the release of the 2011 NEC.

ZGONENA, T.: The panel action to accept 4-76 is inconsistent with the action taken on 4-77, and 4-83. The panel action should have been to reject this comment. The ROP panel action on 4-204 was to accept in principal based upon its similarity to 4-205, which was accepted by the panel. The panel actions and statements on 4-80 and 4-81 further collaborate the intent and action to be taken on 690.11.

4-77 Log #1585 NEC-P04 **Final Action: Reject**
(690.11)

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 4-205
Recommendation: Reject this proposal.
Substantiation: While there seems little doubt that dc arc fault protection should be required in PV systems, this proposal is premature. Using the ac AFCI requirement as a model, were this proposal to have progressed in a similar manner, UL would have begun an investigation into technologies that could mitigate dc arc faults in PV systems in at least 2005, UL would have begun working with prospective manufacturers on a standard in at least 2007 and the proposed effectivity date of the requirement would be at least 2014. But in this case no product standard exists today, the only meeting UL has held on the subject was on April 7, 2009 and there isn't even agreement on the type of arc fault protection that should be provided and where in the system it should be located. All interested parties are certainly encouraged to move ahead with the work that needs to be done, however, this proposal might better be considered for the 2014 NEC.
Panel Meeting Action: Reject
Panel Statement: Code-Making Panel 4 affirms that PV AFCI protection is necessary as soon as possible. The safety benefits outweigh the potential challenges associated with an earlier implementation of the 690.11 requirements.

This action will allow us to achieve the earliest possible fire safety improvement, with the best protection available at the time, and to allow for future improvements as technology permits.

The submitter is directed to 90.4 relative to his concerns regarding unavailability of appropriate products.
Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BOWER, W.: See My Explanation of Negative on 4-76.
YOUNG, J.: As noted in the substantiation there is not a standard and there are no products available.

4-78 Log #1731 NEC-P04 **Final Action: Reject**
(690.11 (New))

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 4-205
Recommendation: Add the term "(series arc faults)" shown with double underlining in the proposal.
690.11 Arc-Fault Circuit Protection (DC). PV systems with dc source and/or output circuits on or penetrating a building operating at a PV system maximum system voltage of 80 volts or greater shall be protected by a listed (DC) arc-fault circuit interrupter, PV type, or other system components listed to provide equivalent protection. The PV arc-fault protection means shall comply with the following requirements:
(1) The system output circuits on or penetrating a building operating at a PV system maximum system voltage of 80 volts or greater shall be protected by a listed (DC) arc fault circuit interrupter, PV type, or other system components listed to provide equivalent protection. The PV arc-fault protection means shall comply with the following requirements:
(1) The system shall detect and interrupt arcing faults (series arc faults) resulting from a failure in the intended continuity of a conductor, connection, module, or other system component in the direct current PV source and output circuits.
(2) The system shall disable or disconnect one of the following:
a. Inverters or charge controllers connected to the fault circuit when the fault is detected
b. The system components within the arcing circuit
(3) The system shall require that the disabled or disconnected equipment be manually restarted.
(4) The system shall have an annunciator that must be manually disabled.
Substantiation: The words "intended continuity of a conductor, connection, module, or other system component" do not fully convey the intent that this requirement applies only to series types of arc faults. There are parallel circuit connections in inverters, modules where the continuity of the connection, if broken, would not result in an arc, and parallel arcs of the line-to-line type are not and should not be addressed by this proposal.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any substantiation for some of the requested changes and introduce new material that has not had public review.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
YOUNG, J.: In the Panel Statement to Comment 4-80 it is noted "Therefore, the panel recognizes "parallel arc detection" as a desirable feature, but not a requirement." The proposed and accepted wording from Proposal 4-205 makes no mention of series arcing or parallel arcing. It only reads that the device shall detect and interrupt arcing faults. This would include all types of arcing. The CMP may recognize that parallel arc detection is not a requirement but the reader of the Code will not recognize that. It would be clear if the change were accepted clarifying that only series arcing faults were required to be detected.

4-79 Log #1946 NEC-P04 **Final Action: Reject**
(690.11 (New))

Submitter: D. Jerry Flaherty, Electrical Inspection Service, Inc. / Rep. New York Solar Industries Association (NYSEIA) & Long Island Solar Industries Association (LISEIA)
Comment on Proposal No: 4-205
Recommendation: Revise text to read as follows:
690.11 Arc-Fault Circuit Protection (DC). PV systems with dc source and/or output circuits on or penetrating a building operating at a PV system maximum system voltage of 80 volts or greater shall be protected by a listed (DC) arcfault circuit interrupter, PV type, or other system components listed to provide equivalent protection. The PV arc-fault protection means shall comply with the following requirements:
(1) The system shall detect and interrupt arcing faults resulting from a failure in the intended continuity of a conductor, connection, module, or other system component in the direct current PV source and output circuits.
(2) The system shall disable or disconnect one of the following:
a. Inverters or charge controllers connected to the fault circuit when the fault is detected
b. The system components within the arcing circuit
(3) The system shall require that the disabled or disconnected equipment be manually restarted.
(4) The system shall have an annunciator that must be manually disabled.
This requirement shall become effective January 1, 2014.
Substantiation: I was in the electrical field when ground fault circuits were introduced into the NEC. Manufacturers were not prepared, circuit breakers were not available, and there were problems with some that were available.
Giving the manufacturers this additional time will allow time for engineering, testing to avoid problems, and also allow time to set up production.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree with delaying the effective date beyond the issuance of the code.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
YOUNG, J.: The proposed effective date of January 1, 2014 would provide time for the standard to be developed and product to be developed. If products become available before that date they can be used but the later date does not introduce the enforcement problem if products are not available. Comments in other panel actions indicate the use is based strictly on availability of the product and not Code inclusion. If that is the case it would be expected these would be used if available even if not included in the Code.

4-80 Log #2142 NEC-P04 **Final Action: Reject**
(690.11 (New))

Submitter: Jim Eichner, Xantrex Technology, Inc.
Comment on Proposal No: 4-204
Recommendation: Reject this proposal.
Substantiation: We feel the proposal is incomplete and premature for the following reasons:
1. Basic research into PV arcing signatures is lacking or at least incomplete, and will be very difficult. For AC arc-fault detectors there are still problems in this area, and problems were caused due to the code requirement being in force before the technology was ready. PV arc signature research will be even harder in PV systems because, unlike AC appliances, inverters and charge controllers are not subject to conducted emissions requirements on the DC input circuit that the arc-fault detector would be monitoring and because DC arcs do not have the 120Hz signature that AC arcs have.
2. The development of a consensus standard for PV arc fault detectors is not very far along, and will take considerable time since that standard will have to answer all the questions in the remaining points below.
3. The proposal deals only with series arc faults, yet parallel arc faults, both line-to-line and line-to-ground (in grounded PV systems) are at least as significant in terms of the severity and likelihood of the hazard. Line-to-ground faults are a type of parallel fault and carry just as much possibility of arcing, and the number of locations for possible ground faults is very large - everywhere the ungrounded conductors are near or in contact with grounded metal such as conduit. Line-to-line parallel faults are also possible in a large number of locations: the terminal box on the back of each panel, any wire run where + and - are bundled and exposed to mechanical damage or rodents, etc.
4. The proposal seems intent on protection being on the output end of the PV system, where a single device can be used, rather than at the source, as is typically required for protective systems. Putting the protection at the source may be unpopular with panel manufacturers, but it's the right (only) way to provide protection against both series and parallel arc faults. A compromise might be to put protection against both series and parallel faults in the string combiners, which leaves a smaller portion of the system unprotected.
5. What action the protector should take isn't clear. Shorting the array may be the best approach to ensure the arc is extinguished. For a parallel arc fault, opening the circuit would unload the array and drive the voltage up, worsening the arc. It is even possible that opening the circuit could extinguish the series arc but cause a parallel arc to start.
We would like to see this proposal rejected for this code cycle, allowing time for further study of arc signatures and time for industry to come to some consensus on how and where to address parallel faults not just series faults.
Panel Meeting Action: Reject
Panel Statement: There has been an alarming increase in the number of PV arc fault fires occurring worldwide. While PV AFCI technology is relatively new, Code-Making Panel 4 concludes it is critical and necessary to address this significant void in PV system protection. Research and development of PV arc fault products and certification requirements is progressing quickly.
These efforts have resulted in a draft standard, and multiple functional prototypes from multiple manufacturers. The experience gathered from the growth and development of the AC AFCI will allow the PV AFCI to avoid similar pitfalls.
The 690.11 requirements provide protection for the most likely type of PV arc faults and allows for its implementation anywhere within a PV system. The requirements in 690.11 are written based upon the protection function and not the implementation method.
While not required by the requirements in 690.11, the PV AFCI certification requirements will include additional requirements for parallel arc fault protection for manufacturers that choose to provide such protection.
Research into arcing faults has been the subject of work by UL, NREL, Sandia, Southwest Research and industry authorities. There is sufficient knowledge to advance PV DC AFCI topics in the code. The remaining technical details listed in the public comments relate to detection methods and are not withstanding to the recognized need for the safety improvements.

While series and parallel PV AFCI protection would be preferable, the series protection required by 690.11 provides a substantial increase in the level of protection over a system without PV AFCI protection.

Additionally, parallel PV AFCI protection cannot be added to 690.11 for the 2011 NEC, based upon the already received comments and proposals currently under review. Therefore, the panel recognizes "parallel arc detection" as a desirable feature, but not a requirement.

With regard to the comment on ground faults being parallel faults, most modern listed PV inverters include GFDI protection and will mitigate parallel arcing ground faults.

The future effective date method allows time for new technical developments. New system solutions will be forth coming to meet the intent of 690.11. This should not be a barrier to achieving the safety improvement that can be accomplished at this time.

The panel affirms that PV AFCI protection is necessary as soon as possible and that the safety benefits outweigh the potential challenges associated with an earlier implementation of the 690.11 requirements. This action will allow us to achieve the earliest possible fire safety improvement with the best protection available at the time and to allow for future improvements as technology permits.

The submitter is directed to 90.4 relative to his concerns regarding unavailability of appropriate products.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

BOWER, W.: I agree with the comment that the proposal is incomplete and premature with possible areas of serious contention. Material was presented at the panel meeting that a device to detect arc faults is being tested and may be ready in time for the 2011 NEC, but the applicability of a single device in all types of PV systems is not likely! I agree with the author of the comment that the proposal appears to be intent on only series arc faults AND protection only at the output end of the PV system. There will likely be better and a multiplicity of ways to detect arc faults nearer to the fault location. Several panel members expressed confidence "out of past experience" that when no commercially available product is available then the mandatory language of the code is not enforced. But what about the scenario where the available device is not applicable to the system? This is huge gamble and could be harmful to the PV industry. Enforcement will be at the discretion of the AHJ and could result in multiple expensive delays, appeals and interpretation misunderstandings with each PV installation.

I agree that all interested parties should move ahead with development of reliable and consistent dc arc fault detection methodologies and devices, but also believe that language in the 2011 NEC would best be delayed until the 2014 edition in order to assure the PV industry that a single method for arc-fault detection not be imposed for all systems.

YOUNG, J.: See comments on 4-79.

4-81 Log #2143 NEC-P04 **Final Action: Reject**
(690.11 (New))

Submitter: Jim Eichner, Xantrex Technology, Inc.
Comment on Proposal No: 4-205
Recommendation: Reject this proposal.
Substantiation: We feel the proposal is incomplete and premature for the following reasons:

1. Basic research into PV arcing signatures is lacking or at least incomplete, and will be very difficult. For AC arc-fault detectors there are still problems in this area, and problems were caused due to the code requirement being in force before the technology was ready. PV arc signature research will be even harder in PV systems because, unlike AC appliances, inverters and charge controllers are not subject to conducted emissions requirements on the DC input circuit that the arc-fault detector would be monitoring and because DC arcs do not have the 120Hz signature that AC arcs have.

2. The development of a consensus standard for PV arc fault detectors is not very far along, and will take considerable time since that standard will have to answer all the questions in the remaining points below.

3. The proposal deals only with series arc faults, yet parallel arc faults, both line-to-line and line-to-ground (in grounded PV systems) are at least as significant in terms of the severity and likelihood of the hazard. Line-to-ground faults are a type of parallel fault and carry just as much possibility of arcing, and the number of locations for possible ground faults is very large - everywhere the ungrounded conductors are near or in contact with grounded metal such as conduit. Line-to-line parallel faults are also possible in a large number of locations: the terminal box on the back of each panel, any wire run where + and - are bundled and exposed to mechanical damage or rodents, etc.

4. The proposal seems intent on protection being on the output end of the PV system, where a single device can be used, rather than at the source, as is typically required for protective systems. Putting the protection at the source may be unpopular with panel manufacturers, but it's the right (only) way to provide protection against both series and parallel arc faults. A compromise might be to put protection against both series and parallel faults in the string combiners, which leaves a smaller portion of the system unprotected.

5. What action the protector should take isn't clear. Shorting the array may be the best approach to ensure the arc is extinguished. For a parallel arc fault, opening the circuit would unload the array and drive the voltage up, worsening the arc. It is even possible that opening the circuit could extinguish the series arc but cause a parallel arc to start.

We would like to see this proposal rejected for this code cycle, allowing time for further study of arc signatures and time for industry to come to some consensus on how and where to address parallel faults not just series faults.

We would also like to comment that relative to Proposal 4-204, this Proposal 4-205 is preferable in two ways:

a) 4-205 replaces the undefined term "series arcing faults" with a description that does not require defining ("arcing faults resulting from a failure in the intended continuity of…")

and

b) added flexibility in the location of the interrupting means - in 4-204 it is required to disable or disconnect the inverter or charge controller, but in 2-205 an allowance is made to disconnect the faulted component instead, opening the door to arc fault protection located in combiner boxes or upstream.

Panel Meeting Action: Reject

Panel Statement: There has been an alarming increase in the number of PV arc fault fires occurring worldwide. While PV AFCI technology is relatively new, the panel concludes it is critical and necessary to address this significant void in PV system protection. Research and development of PV arc fault products and certification requirements is progressing quickly. These efforts have resulted in a draft standard, and multiple functional prototypes from multiple manufacturers. The experience gathered from the growth and development of the AC AFCI will allow the PV AFCI to avoid similar pitfalls.

The 690.11 requirements provides protection for the most likely type of PV arc faults and allows for its implementation anywhere within a PV system. The requirements in 690.11 are written based upon the protection function and not the implementation method. While not required by the requirements in 690.11, the PV AFCI certification requirements will include additional requirements for parallel arc fault protection for manufacturers that choose to provide such protection.

Research into arcing faults has been the subject of work by UL, NREL, Sandia, Southwest Research and industry authorities. There is sufficient knowledge to advance PV DC AFCI topics in the code. The remaining technical details listed in the public comments relate to detection methods and are not withstanding to the recognized need for the safety improvements.

While series and parallel PV AFCI protection would be preferable, the series protection required by 690.11 provides a substantial increase in the level of protection over a system without PV AFCI protection.

Additionally, parallel PV AFCI protection cannot be added to 690.11 for the 2011 NEC, based upon the already received comments and proposals currently under review. Therefore, the panel recognizes "parallel arc detection" as a desirable feature, but not a requirement.

With regard to the comment on ground faults being parallel faults, most modern listed PV inverters include GFDI protection and will mitigate parallel arcing ground faults.

The future effective date method allows time for new technical developments. New system solutions will be forth coming to meet the intent of 690.11. This should not be a barrier to achieving the safety improvement that can be accomplished at this time.

The panel affirms that PV AFCI protection is necessary as soon as possible, and that the safety benefits outweigh the potential challenges associated with an earlier implementation of the 690.11 requirements.

This action will allow us to achieve the earliest possible fire safety improvement with the best protection available at the time and to allow for future improvements as technology permits.

The submitter is directed to 90.4 relative to his concerns regarding unavailability of appropriate products.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

BOWER, W.: See My Explanation of Negative on 4-80.

YOUNG, J.: See comments on 4-80.

4-82 Log #2530 NEC-P04 **Final Action: Reject**
(690.11 (New))

Submitter: Timothy P. Zgonena, Underwriters Laboratories Inc.
Comment on Proposal No: 4-205
Recommendation: Propose to accept the original proposal with a future effective date to be agreed upon at the ROC meeting.
Substantiation: Affirmative Comment on panel action for Proposal 4-205:

I would like to thank the panel for its support of this proposal. UL with the help of AFCI industry experts and PV industry experts has drafted 1699X, Photovoltaic (PV) DC Arc-Fault Circuit-Interrupters. During this time since the ROP meeting, there have been an increasing number of serious PV related fires. These fires could have been prevented if these systems included PV AFCI protection. With the permission of the CMP-4 chairman, I would appreciate a short period of time to provide a presentation on the PV AFCI status and test results. It is expected that these PV AFCI safety requirements will be published and Listed products will be commercially available by the time that the 2011 NEC is published. In the event that this process encounters delays, the proposal should be modified to allow for a future effective date so this crucial safety technology can be implemented as soon as the industry is ready.

Panel Meeting Action: Reject
Panel Statement: The panel concludes that a delay in the effective date is not required.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
ROGERS, J.: The Panel was correct in rejecting this comment and remaining with the language and implementation date that are found in the original proposal. There is documented evidence that PV systems are already beginning to encounter arcing faults and start fires. The technology may be new and there may even unforeseen problems when first using the product but that is the case with many new products that enter the NEC. There is no question from the technical data that has been presented that this product will reduce the likelihood of fires and thus increases the likelihood that it will also reduce injuries or deaths to either firefighters or building occupants. There are multiple hazards involved in fighting PV array fires so preventing the fire in the first place would obviously remove these hazards.

4-83 Log #2672 NEC-P04 **Final Action: Accept**
(690.11 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-205
Recommendation: Accept the proposal in principle.
In the first sentence, change "dc source and/or output circuits" to "dc source circuits, dc output circuits, or both". Revise list item (4) to read: "(4) The system shall have an annunciator that provides a visual indication that the circuit interrupter has operated. This indication shall not reset automatically."
Substantiation: This comment corrects two violations of the NEC Style Manual ("and/or" and "must") and provides a clearer description of how the annunciator should function.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BOWER, W.: I would like to go on record to say that I believe that the detection of dc arc faults is not as simple as with the ac arc faults that are now covered by the code. The fact that it will be difficult to determine whether a dc arc fault is in series with the circuit or is a parallel arc fault is of major concern. The required actions to mitigate series and parallel arc faults are very different. If the wrong action is taken, the arc fault current will likely be worsened. It is likely that several types of arc-fault detectors will be developed out of need because of 690.11, but it is unlikely all will be covered by the requirements being included in the 2011 code.
I agree that all interested parties should move ahead with development of reliable and consistent dc arc fault detection methodologies and devices, but also believe that language in the 2011 NEC would best be delayed until the 2014 edition in order to assure the PV industry that a single method for arc-fault detection not be imposed for all systems.

4-84 Log #694 NEC-P04 **Final Action: Reject**
(690.13)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-213
Recommendation: Accept the proposal and revise as follows:
All Conductors. Approved means shall be provided to disconnect all dc conductors of a photovoltaic system from all other system conductors. (remainder unchanged)
Substantiation: "Current-carrying" may be perceived as not including neutrals, per 310.15(B)(2) and (B)(4). This provision should apply whether or not other system conductors are in a building or other structure or on premises with no buildings. See proposal 4-208, 690.13 in the 2010 ROP which specified current-carrying conductors, not equipment grounding conductors.
Panel Meeting Action: Reject
Panel Statement: The comment does not meet the requirements of 4.3.3(b) of the NFPA Regulations Governing Committee Projects. In addition, the submitter did not indicate where the new text is intended to be added.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
ROGERS, J.: The Panel was correct in rejecting the comment as written due to the fact that it was somewhat unclear and did not meet the regulations as described. I believe that submitter was correct in his concern and should resubmit the proposal as well as that referenced in comment 4-85 in the next NEC cycle with new language and a better defined technical statement.

4-85 Log #698 NEC-P04 **Final Action: Reject**
(690.13)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-207
Recommendation: Accept the proposal and revise as follows:
An approved means shall be provided to simultaneously disconnect ungrounded conductors of a solar photovoltaic power source from all other system conductors.
Substantiation: Disconnection from other systems should be required whether or not in a building or other structure or other premises. Simultaneous disconnection should be specified so as not to imply it is amended by this section.
Panel Meeting Action: Reject
Panel Statement: The comment does not meet the requirements of 4.3.3(b) of the NFPA Regulations Governing Committee Projects. In addition, the submitter did not indicate where the new text is intended to be added.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-86 Log #1730 NEC-P04 **Final Action: Accept**
(690.13)

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 4-209
Recommendation: The PV Industry Forum requests that CMP 4 revisit this proposal and reject it for the reasons stated below.
Substantiation: The requirements of the *NEC* have been developed based on over 110 years of installing, inspecting, and using grounded electrical systems. Electricians, inspectors and other qualified people know that a properly identified, grounded conductor represents less of a safety hazard than an ungrounded conductor since the grounded conductor is supposedly always at earth/ground potential. Despite training and experience, these people do not always follow full safety procedures when dealing with grounded conductors. "They're safe because they are grounded at zero voltage aren't they?" is a common expression. Currently, we have normal and expected operating conditions and modes for utility-interactive inverters where the utility power may be interrupted, the inverter turned off, or a backfed breaker in a load center may be opened. This proposal, if accepted, will allow inverter manufacturers to save a few dollars in the cost of the inverter by allowing the normally grounded and marked grounded PV array conductors to become ungrounded from normal and expected actions that have nothing to do with a failure of the PV system. These array conductors operate up to 600 volts dc and higher and now, that marked, white, grounded array conductor is floating at hundreds of volts above ground. Normal and expected leakage paths to ground make this now ungrounded conductor a significant electric shock hazard. A warning sign on the inverter won't work because under these circumstances, no one has any motivation to look at the inverter since the system is in a normal operating mode. People working on the roof, repairing other electrical equipment on the roof, or even working on the PV systems are now unnecessarily exposed to an electric shock hazard that does not need to happen.
Previous code actions (690.5) have determined that ungrounding the grounded conductor under abnormal and unexpected ground-fault conditions to prevent fires was a valid action in the interests of life safety. Since a ground fault is an abnormal condition for the PV system and the system is automatically shut down, the warning sign/indicator on the inverter will be noticed.
Furthermore, the added term "(unground)" should not be added to the Code in this section because opening a grounded conductor during a ground fault event will not necessarily "unground" the conductor if it is the conductor faulted to ground. However, the disconnection of this conductor is one way to interrupt ground fault currents and that requirement should not be modified.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-87 Log #274 NEC-P04 **Final Action: Accept**
(690.16)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-217
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal and identify the specific lack of conformance with 4.3.3(b) of the NFPA Regulations Governing Committee Projects.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel agrees that the reference in the panel statement on Proposal 4-217 should have referenced 4.4.4(c) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-88 Log #693 NEC-P04 **Final Action: Reject**
(690.16)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-217
Recommendation: Accept the proposal and revise as follows:
An approved means shall be provided to disconnect a fuse(s) from all sources of power. Such a fuse (in a photovoltaic circuit) shall have approved means for being disconnected independently of fuses in photovoltaic source circuits. A warning label shall be provided to indicate the fuse(s) may be back-fed. The disconnecting means shall be readily accessible and immediately adjacent to the fuse(s).
Substantiation: This provision should apply whether or not accessible to other than qualified persons. A warning label should be required similar to 404.6(C) Exception, and 690.17.
Panel Meeting Action: Reject
Panel Statement: The comment does not meet the requirements of 4.3.3(c) of the NFPA Regulations Governing Committee Projects.
Additionally, the use of line and load terminals for fuses is technically incorrect.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-89 Log #1265 NEC-P04 **Final Action: Accept**
(690.16(A) and (B))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 4-218
Recommendation: 690.16 Fuses.
(A) Disconnecting means shall be provided to disconnect a fuse from all sources of supply if the fuse is energized from both directions ~~and is accessible to other than qualified persons~~. Such a fuse in a photovoltaic source circuit shall be capable of being disconnected independently of fuses in other photovoltaic source circuits.
(B) Fuse Servicing. Disconnecting means shall be installed on PV output circuits where overcurrent devices (fuses) must be serviced that cannot be isolated from energized PV circuits. The disconnecting means shall be within sight and accessible to the location of the fuse or integral with fuse holder and shall comply with 690.17. Where the disconnecting means are located more than 1.8 m (6 ft) from the overcurrent device, a directory showing the location of each disconnect shall be installed at the overcurrent device location. Non-load-break rated disconnecting means shall be marked "Do not open under load."
Substantiation: The new-labeled Paragraph (A) appears to be in conflict with the new Paragraph (B). On large solar photovoltaic systems, it is common to see 200 amp to 400 amp 600 volt dc fuses without disconnection means. These systems are fusing at the module level to a combiner box, and there may be disconnects there, then taking a substantial feeder to another "feeder combiner box" where a high amperage bus then goes into the inverter. The "feeder combiner box" is not provided with disconnects for the individual feeders entering from the various arrays or disconnects to separate a feeder from the other arrays in order to change a fuse. This is requiring the service person to potentially remove and reinstall a fuse energized and very possibly under load which presents an unacceptable hazard. The only other alternative is to de-energize the whole system, which is not necessary, practical or even possible. Designers are using the words "accessible to other than qualified persons" as the justification not to install disconnects in these feeder circuits. The New Paragraph (B) would require the disconnection means to provide users a means to safely replace these fuses, yet paragraph (A) seems to negate this important safety requirement. Removing the words ~~and is accessible to other than qualified persons~~ will resolve the conflict between paragraphs (A) and (B). Qualified or not, it is unsafe work practice to change fuses in these high energy circuits while energized and the installation per the NEC should allow for a safe work practice to be executed.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-90 Log #2151 NEC-P04 **Final Action: Accept**
(690.16(B))

Submitter: Jim Eichner, Xantrex Technology, Inc.
Comment on Proposal No: 4-218
Recommendation: We support the addition of paragraph (B) as the requirement for disconnecting means improves the safety of service personnel.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-91 Log #695 NEC-P04 **Final Action: Reject**
(690.17(3) and (4))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-219
Recommendation: Accept revised as follows:
(3) With a durable marked open (off) and closed (on) position.
(4) Having an interrupting rating not less than the nominal voltage and available fault current at its terminals.
Substantiation: Indication of open and closed by position of a handle or lever is not adequate; marking should indicate switch position, and not apply to the enclosure door or cover. Where the disconnecting means is backfed, the interrupting rating should not be less than the available fault current at the terminals.
Panel Meeting Action: Reject
Panel Statement: The submitter has referenced a proposal that is unrelated to his recommended text.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-92 Log #689 NEC-P04 **Final Action: Reject**
(690.31)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-221
Recommendation: Accept the proposal and revise as follows:
(A) Wiring Methods. Wiring methods included in this Code that are identified for the use shall be employed. Other approved systems and associated fittings shall be permitted. The wiring method shall be of a length and flexibility to permit necessary movement and replacement of equipment (remainder unchanged).
Delete exception.
(B) No change
(C) Flexible Cords and Cables. Flexible cords and cables shall comply with 400.3 and shall be extra-hard usage or hard usage types that are water resistant and sunlight resistant, and contain an equipment grounding conductor. (remainder unchanged).
Substantiation: All wiring methods are not suitable. This section may be perceived as amending "uses permitted" and "uses not permitted". Section 690.31(A) does not require raceways or any other wiring method, but merely permits them. Flexible cords and cables should comply with 400.3; this provision may be deemed to permit extra-hard usage and hard service type cords or cables not suitable, e.g. TypeEV, EVJ, EVE, etc. All hard service cords are extra-hard usage types. Article 400 does not require listing; Table 400.4 can be used for unlisted cords, but what table is to be used that covers listed cords?
Panel Meeting Action: Reject
Panel Statement: The addition of the word "identified" and the reference to 690.31(C) is redundant and unnecessary.
The deletion of the ampacity correction is unsubstantiated. Wiring methods to be utilized are adequately covered in Chapter 3 of the NEC.
The application of other wiring methods specific to PV installations are covered by 110.3 of the NEC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-93 Log #1729 NEC-P04 **Final Action: Reject**
(690.31(A))

TCC Action: The Technical Correlating Committee notes that the comment does not comply with 4.4.5(c) of the NFPA Regulations Governing Committee Projects in that it does not provide a recommendation.
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 4-223
Recommendation: The PV Industry Forum respectfully asks the Panel how the PV industry should comply with the requirements of this section as written.
Substantiation: PV modules manufactured today have NO provisions for the attachment of raceways. Effectively, ground-mounted PV systems, which have exposed wiring between the modules, cannot be installed. Most of the new multi-megawatt PV systems installed in California (on the 2005 NEC) will be prohibited under the 2008 NEC.

It is practical and absolutely necessary to render this wiring not readily accessible or it will not be possible to install these large ground mounted systems.
While fences can be used to make the wiring not readily accessible, unqualified people inside the fence will do grounds maintenance and they would be subject to the potential shock hazards this section was intended to eliminate.

Attaching a barrier such as wire mesh (hardware cloth) to the rack behind the modules makes them not readily accessible. A PV array *is not* listed and this action does not touch or affect the listed modules. The PV Industry Forum respectfully requests that the Fine Print Note be approved as submitted.
Panel Meeting Action: Reject
Panel Statement: No specific text is proposed and, therefore, this comment does not comply with 4.3.3(B) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-94 Log #275 NEC-P04 **Final Action: Accept**
(690.31(B), FPN)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-224
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal and comply with the NEC Style Manual 3.1.3 in that Fine Print Notes shall not contain mandatory text.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise the FPN to read as follows:
FPN: Photovoltaic (PV) Wire (also Photovoltaic (PV) Cable) has a non-standard outer diameter. Conduit fill may be calculated using Table 1, Chapter 9.
Panel Statement: The panel revised the text to comply with the directive of the Technical Correlating Committee.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-95 Log #1781 NEC-P04 **Final Action: Reject**
(690.31(B), FPN (New))

Submitter: Larry Cross, Local Union #98 IBEW
Comment on Proposal No: 4-225
Recommendation: Revise as follows:

FPN: See 310.13 FPN Conductor Construction and Applications for Thermoplastic Insulation where used on DC circuits in wet locations.
Substantiation: Would it not be a better code practice to help the photovoltaic installer, and let the installer be aware of a condition that could exist if they were to use a wiring method that may result in failure under an installation in wet location with DC circuits? The likelihood of this condition could happen in 690.3(B) and in 310.13 due to the overwhelming demand in the solar photovoltaic industry. The electrical industry MUST BE WARE that this condition does exist with DC circuits and wet locations.
Panel Meeting Action: Reject
Panel Statement: Fine Print Notes are not allowed to contain requirements as indicated in the NEC Style Manual.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

ROGERS, J.: This comment should have been accepted. The informational note that the submitter is recommending is only a reference and considering that many PV installers are somewhat new to the NEC they may not be aware of this information. It is rather contradictory that the Panel chose to accept adding a code requirement referencing clearances to telecommunications and yet chose not to accept this informational note. If the Panel is concerned with the mandatory language they could change to Accept in Principle and add the words “For further information” before the word “See”. In my opinion it is not mandatory language, instructing someone to see something does not mandate a change in installation practice.

4-96 Log #1945 NEC-P04 **Final Action: Reject**
(690.31(E))

Submitter: D. Jerry Flaherty, Electrical Inspection Service, Inc. / Rep. New York Solar Industries Association (NYSEIA) & Long Island Solar Industries Association (LISEIA)
Comment on Proposal No: 4-228
Recommendation: Revise text to read as follows:

(E) Direct-Current Photovoltaic Source and Output Circuits Inside a Building.

Where flexible metal conduit (FMC) or metal clad cable (MC) smaller than metric designator 21 (trade size 3/4) containing PV power circuit conductors is installed across ceilings or floor joists, the raceway or cable shall be protected by substantial guard strips that are at least as high as the cable. Where run exposed, other than within 1.8 m (6 ft) of their connection to equipment, these wiring methods shall closely follow the building surface or be protected from physical damage by an approved means. Cable with aluminum interlocking armor shall not be permitted.
Substantiation: Cables with aluminum interlocking armor can be damaged quite easily if not installed properly and not protected from physical damage. Allowing this cable in areas that might be used for storage (residential attics, etc.) will be problematic after installation.
Panel Meeting Action: Reject
Panel Statement: The submitter has not presented any technical rationale for the proposed change.

Other code requirements and product standards adequately address the installation of this wiring method.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-97 Log #2673 NEC-P04 **Final Action: Accept**
(690.31(E))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-228
Recommendation: I. In 690.31(E) first paragraph revise the 690.14 reference to say “…690.14(A), (B), and (D). Add “The wiring methods shall comply with the additional installation requirements in (1) through (4).”

II Assign the number “(1)” to the second paragraph and add a title “Beneath Roofs”

III. In this second paragraph [to become (1)] change “vertically from” to “perpendicular to”.

IV. Assign the number “(2)” to the fourth paragraph (the one after the note) and add a title “Flexible Wiring Methods.”

V. In this paragraph [to become (2)] change “Where flexible metal conduit (FMC) or metal clad cable (MC) smaller than metric designator 21 (trade size ¾) containing” to “Where flexible metal conduit (FMC) smaller than metric designator 21 (trade size ¾) or Type MC cable smaller than 25 mm (1 in.) in diameter containing.”

VI. In the paragraph identified with a (1) in the ROP, change the number to (3) and assign a title of “Marking or Labeling Required.”

VII. In the paragraph identified with a (2) in the ROP, change the number to (4) and assign a title of “Marking and Labeling Methods and Locations.” Change “labels and/or markings” to “labels or markings, or between a label and a marking”.
Substantiation: I. The references to 690.14(E) through (I) cannot be correct because 690.14 has no such subsections.

II. As worded this section needs systematic subdivisions with titles in order for users to find what they need to know.

III. A roof that is other than flat will need the poke-through wiring run perpendicular to the deck and not up and down in order to minimize the exposure, as seems to be the intent of this requirement.

IV. Another title, for readability.

V. Type MC cable does not come in trade sizes. The wording here uses a comparable diameter, slightly smaller because MC cable is stiffer than Greenfield.

VI. This is another title for readability.

VII. This is another title for readability. The other change corrects a NEC Style Manual violation because the form “and/or” is not permitted.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

ROGERS, J.: I agree with the Panel in accepting this comment as it adds some clarity to the original proposal. I remain firm in my opinion that the original proposal should never have been accepted and even with the changes remains unenforceable. The proposal was accepted with no technical substantiation and no demonstrated problem, just feel good language about firefighters and homeowners. Properly installed electrical installations that are placed inside of buildings are already required to meet the installation criteria of their respective article based upon the wiring method employed.

4-98 Log #276 NEC-P04 **Final Action: Accept**
(690.31(F))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-231
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 1-149.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel reconsidered Proposal 4-231 and changes its action from “Reject” to “Accept in Principle” and revised 690.31(F) to read as follows:
690.31 Methods Permitted.

(F) Flexible, Fine-Stranded Cables. Flexible, fine-stranded cables shall be

terminated only with terminals, lugs, devices, or connectors in accordance with 110.14(A).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-99 Log #277 NEC-P04 **Final Action: Accept**
(690.47(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-234
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by providing more description related to the words "identified for the purpose."

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Add the following second paragraph to 690.47(B).
A common dc grounding-electrode conductor shall be permitted to serve multiple inverters. The size of the common grounding electrode and the tap conductors shall be in accordance with 250.166. The tap conductors shall be connected to the common grounding-electrode conductor by exothermic welding or with connectors listed as grounding and bonding equipment in such a manner that the common grounding electrode conductor remains without a splice or joint.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-100 Log #1944 NEC-P04 **Final Action: Accept**
(690.47(C))

TCC Action: The Technical Correlating Committee understands that the comment recommendation is revising text in the third paragraph with the intent to continue to accept the entire corrected text in Proposal 4-235.
Submitter: D. Jerry Flaherty, Electrical Inspection Service, Inc. / Rep. New York Solar Industries Association (NYSEIA) & Long Island Solar Industries Association (LISEIA)
Comment on Proposal No: 4-235
Recommendation: Revise text to read as follows:

690.47(C) Systems with Alternating and Direct Current Grounding Requirements.

When using the methods of (2) or (3), ~~a visual inspection shall be made to ensure that~~ the existing ac grounding-electrode system shall meet~~s~~ the applicable requirements of Article 250, Part III.
Substantiation: "A visual inspection" is not consistent with a requirement of the NEC. The ac grounding-electrode system shall meet Article 250 or should not be included in the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-101 Log #1943 NEC-P04 **Final Action: Reject**
(690.47(C)(3))

Submitter: D. Jerry Flaherty, Electrical Inspection Service, Inc. / Rep. New York Solar Industries Association (NYSEIA) & Long Island Solar Industries Association (LISEIA)
Comment on Proposal No: 4-235
Recommendation: Revise text to read as follows:

690.47(C) Systems with Alternating and Direct Current Grounding Requirements.

~~(3) Combined DC Grounding Electrode Conductor and AC Equipment Grounding Conductor. An unspliced, or irreversibly spliced, combined grounding conductor shall be run from the marked dc grounding electrode conductor connection point along with the ac circuit conductors to the grounding bus bar in the associated ac equipment. This combined grounding conductor shall be the larger of the size specified by 250.122 or 250.166 and shall be installed in accordance with 250.64(E).~~
Substantiation: This configuration violates 250.64(C) that requires the grounding electrode conductor to be continuous to grounding electrode.

If the "associated ac equipment" (service panel or feeder panel) is removed for service or replacement, the grounding electrode conductor would no longer be continuous and the PV system would no longer be grounded. Furthermore, this configuration would depend on the equipment grounding conductor feeding the "associated ac equipment" that equipment grounding conductor might not be of sufficient size for grounding of the PV system.
Panel Meeting Action: Reject
Panel Statement: The submitter is correct that removal of the subpanel, however unlikely it may be, will interrupt the common grounding electrode conductor connection, however, this will also shut down the PV output through the inverter.

It is unclear what the submitter is referencing as a violation of 250.64(C) and the sizing requirements are included in the referenced section.

The proposal does maintain the continuity of the grounding electrode conductor.

Section 690.49 covers the situations when service removes ac equipment, such as panels.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-102 Log #1728 NEC-P04 **Final Action: Accept**
(690.47(D))

TCC Action: The Technical Correlating Committee understands that the comment recommendation is to Accept Proposal 4-238 to delete 690.47(D).
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 4-238
Recommendation: The PV Industry Forum respectfully suggests that the Panel review its decision that this section should remain in the Code. Additional substantiation for its removal has been placed below based on inputs from PV installers and electrical inspectors around the country attempting to use this section of the *2008 NEC*.
Substantiation: The PV Industry Forum proposed this addition to the *2008 NEC* as a permissive, optional grounding of the PV array for enhanced lightning protection. The proposal was based on 250.54. CMP 13 adopted the submission, but made it mandatory, revised the submission, and did not reference 250.54, which does not require that these optional electrodes be bonded to the existing electrodes.

Inspectors and installers reading the existing Code have no information to go on with respect to bonding.
There is no guidance or specificity to the term "as close as practical" with respect to where this new grounding electrode is to be located.

In the Exceptions: (1) As written, in the *2008 NEC*, it is unclear what "integral" means and some installers and inspectors have interpreted it as meaning that the inverter must be mounted on the array rack like the new micro inverters or other remotely located inverters near the PV array. Other inspectors have interpreted the word "integral" to mean that the inverter is in/on the same building as the PV array.

It is also not clear from the exceptions, whether or not the grounding-electrode conductor is still required when a new grounding electrode is not required. To meet the intent of the original submission in the 2008 NEC, the lightning protection function would require the array grounding electrode conductor in all situations.

(2) The distance of six feet has no reference since there is no prescriptive detail on how the grounding electrode is to be routed to the array.

The PV Industry again requests that Section 690.47 be removed from the Code due to its lack of clarity, the fact that it is related to equipment damager prevention and not directly to safety, and to the fact that 250.54 will address the requirement for those desiring to install these grounding electrodes.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

BOWER, W.: Comment 4-102 correctly cites 690.47(D) but the substantiation incorrectly requests that Article 690.47 be removed. The "Accept" of the proposal correctly removes 690.47(D).

STAFFORD, T.: This panel member wants to ensure that by our action on this comment, no text is altered or deleted in 690.47(D) as the comment of submitter requested a review by the panel only.

WILLS, R.: Comment 4-102 correctly cites 690.47(D) but the substantiation incorrectly requests that Article 690.47 be removed. The "Accept" of the proposal correctly removes 690.47(D).

4-103 Log #278 NEC-P04 **Final Action: Accept**
(690.62)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-242
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by complying with the NEC Style Manual to provide titles for each subsection.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise text to read as follows:

690.62 Ampacity of Neutral Conductor.

The ampacity of the neutral conductors shall comply with either A or B.

A. **Inverter Outputs Connected Between Neutral Conductor and Ungrounded Conductor(s).** Where the outputs of single or multiple single-phase inverter(s) are connected between the neutral conductor and one or more of the ungrounded conductors of a 3-phase 4-wire, wye-connected system or a 120/240V single-phase system, the ampacity of the neutral conductor shall be no less than the greater of (1) or (2)

(1) 125 percent of the continuous load plus 100 percent of the non continuous load on that neutral conductor or

(2) 125 percent of the sum of the rated output current of all inverters

considering worst-case imbalance.
Renumber second paragraph as B with the title "**Used for Instrumentation, Voltage Detection or Phase Detection.**
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-104 Log #279 NEC-P04 **Final Action: Accept**
(690.63)

TCC Action: The Technical Correlating Committee clarifies that the comment recommendation be revised to read as follows:
"690.63. Unbalanced Interconnections. Unbalanced interconnections shall be in accordance with 705.100."
Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-243
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal since the text does not comply with the NEC Style Manual requiring mandatory text and including the subject of the rules being referenced.
The title of 705.100 is also inconsistent with the reference.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise text to read as follows:
690.63 Unbalanced Interconnections. Unbalanced Connections shall be in accordance with 705.100
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-105 Log #280 NEC-P04 **Final Action: Accept**
(690.64)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-246
Recommendation: The Technical Correlating Committee directs that the panel comply with the NEC Style Manual by providing the specific text necessary for the point of connection requirements in 705.12 that should be used in 690.64.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise text to read as follows:
690.64 Point of Connection. Point of Connection shall be in accordance with 705.12
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-106 Log #2470 NEC-P04 **Final Action: Hold**
(690.71 (New))

Submitter: Robert H. Wills, Intergrid, LLC / Rep. American Wind Energy Association
Comment on Proposal No: 4-247
Recommendation: Move common language on Storage Batteries (Section VIII) in Articles 690, 692 & 694 to a new common Article 69X.
Rename this article "Energy Storage Systems":
Article 69X – Energy Storage Systems
70X.1 Scope. The provisions of this article apply to energy storage systems such as batteries, ultra-capacitors, flywheels, etc. Energy storage systems can be ac or dc devices, and can include inverters and converters to transform from one form to the other.
70X.3 Other Articles. Whenever the requirements of other articles of this *Code* and Article 69X differ, the requirements of Article 69X shall apply.
690.11 Installation.
(A) General. Storage batteries in an energy storage system shall be installed in accordance with the provisions of Article 480. For photovoltaic power sources, the storage system shall be considered to be grounded when the connected power source is installed in accordance with 690.41.
(B) Dwellings.
(1) Operating Voltage. Energy storage systems for dwellings shall be configured so as to operate at less than 50 volts nominal. Lead-acid storage batteries for dwellings shall have no more than twenty-four 2-volt cells connected in series (48-volts nominal).
Exception: Where live parts are not accessible during routine battery maintenance, an energy storage system voltage in accordance with the maximum permitted for the connected energy source shall be permitted.
(2) Guarding of Live Parts. Live parts of energy storage systems for dwellings shall be guarded to prevent accidental contact by persons or objects, regardless of voltage or type.
Informational Note: Batteries in energy storage systems are subject to extensive charge–discharge cycles and typically require frequent maintenance, such as checking electrolyte and cleaning connections.
(C) Current Limiting. A listed, current-limiting, overcurrent device shall be installed in each circuit adjacent to the energy storage system where the available short-circuit current from a source exceeds the interrupting or withstand ratings of other equipment in that circuit. The installation of current-limiting fuses shall comply with 69x.20.
(D) Battery Nonconductive Cases and Conductive Racks. Flooded, vented, lead-acid batteries with more than twenty-four 2-volt cells connected in series (48 volts, nominal) shall not use conductive cases or shall not be installed in conductive cases. Conductive racks used to support the nonconductive cases shall be permitted where no rack material is located within 150 mm (6 in.) of the tops of the nonconductive cases. This requirement shall not apply to any type of valve regulated lead-acid (VRLA) battery or any other types of sealed batteries that may require steel cases for proper operation.
(E) Disconnection of Series Battery Circuits. Battery circuits subject to field servicing, where more than twenty four 2-volt cells are connected in series (48 volts, nominal), shall have provisions to disconnect the series-connected strings into segments of 24 cells or less for maintenance by qualified persons. Non–load-break bolted or plug-in disconnects shall be permitted.
(F) Battery Maintenance Disconnecting Means. Battery installations, where there are more than twenty-four 2-volt cells connected in series (48 volts, nominal), shall have a disconnecting means, accessible only to qualified persons, that disconnects the grounded circuit conductor(s) in the battery electrical system for maintenance. This disconnecting means shall not disconnect the grounded circuit conductor(s) for the remainder of the photovoltaic electrical system. A non–load-break-rated switch shall be permitted to be used as the disconnecting means.
(G) Battery Systems of More Than 48 Volts. On energy storage systems where the battery system consists of more than twenty-four 2-volt cells connected in series (more than 48 volts, nominal), the battery system shall be permitted to operate with ungrounded conductors, provided the following conditions are met:
~~(1) The photovoltaic array source and output circuits shall comply with 690.41.~~
(1) The dc and ac load circuits shall be solidly grounded.
(2) All main ungrounded energy storage system input/output circuit conductors shall be provided with switched disconnects and overcurrent protection.
(3) A ground-fault detector and indicator shall be installed to monitor for ground faults in the system.
69X.20 Fuses. Means shall be provided to disconnect a fuse from all sources of supply if the fuse is energized from both directions and is accessible to other than qualified persons. Switches, pullouts, or similar devices that are rated for the application shall be permitted to serve as a means to disconnect fuses from all sources of supply.
69X.30 Charge Control.
(A) General. Equipment shall be provided to control the charging process of the energy storage system. Charge control shall not be required where the design of the energy source is matched to the voltage rating and charge current requirements of the energy storage system. For battery systems, this requirement can be met if the maximum charging current multiplied by 1 hour is less than 3 percent of the rated battery capacity expressed in ampere-hours or as recommended by the battery manufacturer. All adjusting means for control of the charging process shall be accessible only to qualified persons.
Informational Note: Certain battery types such as valve regulated lead acid or nickel cadmium can experience thermal failure when overcharged.
(B) Diversion Charge Controller.
(1) Sole Means of Regulating Charging. An energy storage system employing a diversion charge controller as the sole means of regulating charging shall be equipped with a second independent means to prevent overcharging.
(2) Circuits with Direct-Current Diversion Charge Controller and Diversion Load. Circuits containing a dc diversion charge controller and a dc diversion load shall comply with the following:
(1) The current rating of the diversion load shall be less than or equal to the current rating of the diversion load charge controller. The voltage rating of the diversion load shall be greater than the maximum energy storage system voltage. The power rating of the diversion load shall be at least 150 percent of the power rating of the energy source.
(2) The conductor ampacity and the rating of the overcurrent device for this circuit shall be at least 150 percent of the maximum current rating of the diversion charge controller.
(3) Energy Storage Systems Using Utility-Interactive Inverters. Systems using utility-interactive inverters to control energy storage state-of-charge by diverting excess power into the utility system shall comply with (1) and (2):
(1) These systems shall not be required to comply with 69X.30(B)(2). ~~The charge regulation circuits used shall comply with the requirements of 690.8.~~ Energy system currents shall be considered to be continuous.
(2) These systems shall have a second, independent means of controlling the energy storage system charging process for use when the utility is not present or when the primary charge controller fails or is disabled.
(C) Buck/Boost dc Converters. When buck/boost charge controllers and other dc power converters that increase or decrease the output current or output voltage with respect to the input current or input voltage are installed, the following requirements must be met:
(1) The ampacity of the conductors in output circuits shall be based on the maximum rated continuous, output current of the charge controller or converter

for the selected output voltage range.

(2) The voltage rating of the output circuits shall be based on the maximum voltage output of the charge controller or converter for the selected output voltage range.

690.74 Battery Interconnections. Flexible cables, as identified in Article 400, in sizes 2/0 AWG and larger shall be permitted within the battery enclosure from battery terminals to a nearby junction box where they shall be connected to an approved wiring method. Flexible battery cables shall also be permitted between batteries and cells within the battery enclosure. Such cables shall be listed for hard-service use and identified as moisture resistant. Flexible, fine-stranded cables shall only be used with terminals, lugs, devices, and connectors that are listed and marked for such use.

Substantiation: The same language for stand-alone systems is included in the three renewable energy Articles (690, 692 and 694).

It makes sense to eliminate redundancy and to move it to a general Article so that common language can serve all three.

In this code cycle, we are already seeing significant divergence in the requirements for energy storage systems for PV, fuel cells and wind as it is difficult to coordinate the proposals for all of the technologies.

It is possible to write a generic Article that addresses the issues raised in the existing Articles.

Further, energy storage in renewable energy systems has gone beyond storage batteries. Ultracaps are commonly used for example.

By creating a new Article in Chapter 6 titled "Energy Storage Systems", we have a place to address emerging technologies such as home energy storage, ultra-capacitors, bi-directional electric vehicle charging (V2G) etc.

The language above is based on that of Article 690.71-74, but with the specific references to changed to the generic term "energy storage system". The language was also changed to make it compliant with the NEC Style Manual.

This proposal was originally rejected for not being presented as a complete article. I trust that this revision meets the panel's requirements.

Panel Meeting Action: Hold

Panel Statement: The panel reports this comment as "Hold" as it is new material.

The panel notes that Proposal 4-247 remains Rejected.

The Chair of Code-Making Panel 4 will establish a Task Group to review this issue and take the appropriate action for during the 2014 NEC Proposal stage.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

BOWER, W.: I agree with the panel action to hold the proposal/comment. The proposal is a significant change and it should not be taken lightly. It will take serious word by word examination and agreement from a task group that includes members of the industry as well as CMP members to correctly move the relevant parts from Article 690 to a new section. I would like to emphasize that there is likely a need to insure that all PV unique areas remain in Article 690.

WILLS, R.: Common language in Articles 690, 692 and 694 should be moved to a common location. Issues specific to PV (if any) can still be dealt with explicitly in 690. A task group should be assigned to this topic prior to the next code cycle.

4-107 Log #281 NEC-P04 **Final Action: Accept**
(690.72(C))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-250

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal and comply with the NEC Style Manual 3.1 regarding the use of the wording "must be met" and use mandatory language.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel agrees that the wording in Proposal 4-250 as it relates to 690.72(C) should be revised as follows:

At the end of 690.72(C) change "the following requirements must be met", with "...the requirements shall comply with 690.72(C)(1) and 690.72(C)(2).

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

4-108 Log #282 NEC-P04 **Final Action: Accept**
(690.74)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-251

Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action taken on Proposal 1-149.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel reconsidered the action taken on Proposal 4-251, and changed its action from "Reject" to "Accept in Principle", and revises the wording as follows:

690.74 Battery Interconnections. Flexible cables, as identified in Article 400, in sizes 2/0 AWG and larger shall be permitted within the battery enclosure from battery terminals to a nearby junction box where they shall be connected to an approved wiring method. Flexible battery cables shall also be permitted between batteries and cells within the battery enclosure. Such cables shall be listed for hard-service use and identified as moisture resistant.

Flexible, Fine-Stranded Cables. Flexible, fine-stranded cables shall be terminated only with terminals, lugs, devices, or connectors ~~that are identified and listed for such use.~~ in accordance with 110.14(A).

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

ARTICLE 692 — FUEL CELL SYSTEMS

4-109 Log #1784 NEC-P04 **Final Action: Accept**
(692.4(C))

TCC Action: Technical Correlating Committee directs that the Informational Note be revised to read as follows:

"Informational Note: See Article 100 for the definition of "qualified person"."

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 4-252

Recommendation: Accept the proposal in principle and revise as follows:

692.4(C) System Installation. Fuel Cell Systems including all associated wiring and interconnections shall be installed by only qualified persons. ~~with documented training and experience in the installation of and NEC requirements applicable to such equipment. the name(s) of the qualified person(s) shall be kept in a permanent record at the office of the establishment in charge of the completed installation. Records of qualified persons must be furnished upon request to the local authority having jurisdiction.~~

Informational Note: The defined term qualified person indicates that knowledge related to construction and operation of equipment and installations is necessary along with safety training to recognize and avoid hazards to persons and property.

Substantiation: There were several key points made by the submitter that members of CMP-4 agreed with as indicated in the ballot statements. In fact the panel statement indicates that the "panel supports installations of these systems by qualified workers." The NEC is an installation Code and defines the term "qualified person" which is definitely necessary for these types of installations as indicated in the submitter's substantiation. This is specialized work and requires significant training and knowledge (including basic NEC knowledge). This comment attempts to preserve the points made by the submitter by retaining the concepts proposed while addressing the concerns of CMP-4 expressed in the panel statement. The NEC should require more specific qualifications for special equipment and systems requiring highly trained and knowledgeable workers and draw specific attention to it again within this article. Knowledge of the general requirements in the NEC (Chapters 1-4) is essential in addition to any specialty certification for installers of this type of equipment, yet in the field more of these installations and systems qualify for the expertise of trained electrical workers and contractors that also obtain specialty certifications beyond the minimum requirements to satisfy the criteria of qualified persons as defined in Article 100. Including the requirement that only qualified workers perform and be responsible for such installations as an NEC requirement supports what is anticipated as a general provision in the Code anyway, while at the same time helps support local regulation of qualified persons and contractors whether or not the electrical worker and contractor licensing and qualifications is regulated at the state and local levels.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

BOWER, W.: I agree with the panel action to strike the language "and be installed by qualified persons with documented training and experience in the installation of and NEC requirements applicable to such equipment. The name(s) of the qualified person(s) shall be kept in a permanent record at the office of the establishment in charge of the completed installation. Records of qualified persons must be furnished upon request to the local authority having jurisdiction." as proposed for 692.4(C). That was an overzealous proposal to begin with, and would set a precedent that every section of the code dealing with installations has similar requirements for qualified installation personnel spelled out.

Note that this code is written to cover installations from a few watts to multi-megawatts. Per Article 90.1(C) stating "This code is not intended as a design specification or an instruction for untrained persons," implies trained (qualified) or supervised persons are doing the work. I can't imagine AHJ personnel running around every small fuel cell installation to be assured qualified persons are making every electrical connection and running every inch of wire.

The proposed language for 692.4(C) is **"System Installation**. Fuel Cell

Systems including ALL ASSOCIATED WIRING AND INTERCONNECTIONS SHALL BE INSTALLED by only qualified persons." The addition of 692.4(C) as accepted by the panel may appear to improve the safety of installed fuel cell systems, and I agree safety is paramount, but this is a dangerous precedent. NOWHERE ELSE IN THE NEC IS THERE SUCH UNENFORCEABLE LANGUAGE FOR INSTALLATION OF HARDWARE BY QUALIFIED PERSONNEL. NOT FOR THE INSTALLATION OF BATTERIES, EMERGENCY SYSTEMS, EQUIPMENT IN HAZARDOUS LOCATIONS, BULK STORAGE FACILITIES, X-RAY INSTALLATIONS, AMBULATORY CARE UNITS, FIREPUMPS, SERVICE PANELS, SERVICE CONDUCTORS, TRANSFORMERS, MOTOR GENERATORS, UNINTERRUPTIBLE POWER SUPPLIES, ELEVATORS, COORDINATION EQUIPMENT, COMMUNICATIONS EQUIPMENT AND MANY MORE. Note: I recognize there are many instances in the code where equipment shall be accessible ONLY by qualified personnel or be serviced IN INDUSTRIAL SETTINGS OR THEATERS by qualified personnel, but nowhere is the installation of equipment or systems by qualified personnel CALLED OUT! **THIS PROPOSAL SHOULD BE REJECTED.** FUEL CELL INSTALLATIONS ARE NO MORE COMPLEX THAN INSTALLATIONS SUCH AS ELEVATORS WITH REGENERATIVE BRAKING, UPS SYSTEMS TO BACK UP CRITICAL LOADS and in the future to interact with the Smart Grid, OR THE MANY OTHERS MENTIONED ABOVE. The "Informational Note" proposed in the comment DOES NOT meet the requirements of the style manual for the NEC. This could have been a fine print note and no mandatory language should have been included. The "Informational Note" should not be allowed and the proposal/comment should be "REJECTED".

If this proposal is not rejected then ONLY QUALIFIED personnel should be called out for the installation of ALL electrical equipment. The current language in Article 692.6 already covers the requirement for hardware to be identified and listed for the application, and that does not need to change. Mechanisms to assure good workmanship and assuring hardware meets all the physical requirements of the code are already in place.

WILLS, R.: This language falls outside the scope of the NEC.

ZINNANTE, V.: While I agree that "qualified persons" should install these systems, I do not feel it is necessary to redefine the term "qualified person" as an informational note in this article. The definition is clearly defined in Article 100 and needs no further clarification.

Comment on Affirmative:

ROGERS, J.: The submitter has presented a very good and workable solution to referencing a requirement for "Qualified Persons" performing work on fuel cell systems. There was much discussion about adding these words in Article 690 even though the term is already used in five locations within the article. Some are viewing this as a restriction for those already performing these installations, it clearly is not, it is just a baseline statement that workers should be safe for their own good and for the good of the people whose property they are working on. This basic minimum level of competency goes to the very basic purpose of the NEC, the practical safeguarding of people and property. This basic premise starts with protecting the worker by making sure they are qualified to recognize and avoid any hazards they may encounter while performing their work. Fuel cell systems have their own unique installation requirements and hazards and like PV systems require training that is different from standard electrical training. Having qualified persons perform these installations is the minimum assurance that the industry owes to the consumers who own the properties where these installations are being made.

4-110 Log #1785 NEC-P04 **Final Action: Accept**
(692.4(C))

TCC Action: The Technical Correlating Committee directs that the proposed language be moved to 694.7 and be revised to read as follows:

" 694.7 Installation. Systems covered by this Article shall be installed only by qualified persons."

In addition, the Technical Correlating Committee directs that the Informational Note be revised to read as follows:

"Informational Note: See Article 100 for the definition of "qualified person"."

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 4-253
Recommendation: 692.4(C) Equipment Installation. Equipment covered in Article 692 shall be installed only by qualified persons. ~~with documented training and experience in the installation of and NEC requirements applicable to such equipment. The name(s) of the qualified person(s) shall be kept in a permanent record at the office of the establishment in charge of the completed installation. Records of qualified persons must be furnished upon request to the local authority having jurisdiction.~~

Informational Note: The defined term qualified person indicates that knowledge related to construction and operation of equipment and installations is necessary along with safety training to recognize and avoid hazards to persons and property.

Substantiation: There were several key points made by the submitter that members of CMP-4 agreed with as indicated in the ballot statements. In fact, the panel statement indicates that the "panel supports installations of these systems by qualified workers." The NEC is an installation Code and defines the term "qualified person" which is definitely necessary for these types of installations as indicated in the submitter's substantiation. This is specialized work and requires significant training and knowledge (including basic NEC knowledge). This comment attempts to preserve the points made by the submitter by retaining the concepts proposed while addressing the concerns of CMP-4 expressed in the panel statement. The NEC should require more specific qualifications for special equipment and systems requiring highly trained and knowledgeable workers and draw specific attention to it again within this article. Knowledge of the general requirements in the NEC (Chapters 1-4) is essential in addition to any specialty certification for installers of this type of equipment, yet in the field more of these installations are being performed by workers and firms without the minimum qualifications of an electrician. The evidence is mounting. These types of installations and systems qualify for the expertise of trained electrical workers and contractors that also obtain specialty certifications beyond the minimum requirements to satisfy the criteria of qualified persons as defined in Article 100. Including the requirement that only qualified workers perform and be responsible for such installations as an NEC requirement, supports what is anticipated as a general provision in the Code anyway, while at the same time helps support local regulation of qualified persons and contractors whether or not the electrical worker and contractor licensing and qualifications is regulated at the state and local levels.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

ZINNANTE, V.: While I agree that "qualified persons" should install these systems, I do not feel it is necessary to redefine the term "qualified person" as an informational note in this article. The definition is clearly defined in Article 100 and needs no further clarification.

Comment on Affirmative:

ROGERS, J.: The submitter has presented a very good and workable solution to referencing a requirement for "Qualified Persons" performing work on fuel cell systems. There was much discussion about adding these words in Article 690 even though the term is already used in five locations within the article. Some are viewing this as a restriction for those already performing these installations, it clearly is not, it is just a baseline statement that workers should be safe for their own good and for the good of the people whose property they are working on. This basic minimum level of competency goes to the very basic purpose of the NEC, the practical safeguarding of people and property. This basic premise starts with protecting the worker by making sure they are qualified to recognize and avoid any hazards they may encounter while performing their work. Fuel cell systems have their own unique installation requirements and hazards and like PV systems require training that is different from standard electrical training. Having qualified persons perform these installations is the minimum assurance that the industry owes to the consumers who own the properties where these installations are being made.

4-111 Log #2674 NEC-P04 **Final Action: Accept**
(692.59)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-255
Recommendation: Accept the proposal in principle.

Instead of rewording the final sentence as proposed, simply replace the word "When" with the word "Where."

Substantiation: If the Part V of Article 230 reference is simply to accommodate the service equipment suitability issue, then CMP 4 is correct. However, we are still left with condition of time instead of place, and in this case it is a very misleading wording because the relative position of a transfer switch is very definitely a condition of time. The wired connection to the transfer switch, however, is permanent and only a condition of place. Changing the first word makes the sentence read correctly, and comply with the NEC Style Manual.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-112 Log #283 NEC-P04 **Final Action: Accept**
(692.61)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-257
Recommendation: The Technical Correlating Committee directs that the panel comply with the NEC Style Manual by providing the specific text necessary for the output characteristic requirements in 705.14 to be used in 692.61.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel Accepted the directive of the Technical Correlating Committee and revised the text in question to read as follows:

692.61 Output Characteristics. Output Characteristics shall be in accordance with 705.14.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

4-113 Log #284 NEC-P04 **Final Action: Accept**
(692.64)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-258
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal since the text does not comply with the NEC Style Manual requiring mandatory text and including the subject of the rules being referenced.

The title of 705.100 is also inconsistent with the reference.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel Accepted the directive of the Technical Correlating Committee and revised the text in question to read as follows:

692.64 Unbalanced Interconnections. Unbalanced Connections shall be in accordance with 705.100.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-114 Log #285 NEC-P04 **Final Action: Accept**
(692.65)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-260
Recommendation: The Technical Correlating Committee directs that the panel comply with the NEC Style Manual by providing the specific text necessary for the point of connection requirements in 705.12 to be used in 692.65.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel Accepted the directive of the Technical Correlating Committee and revised the text in question to read as follows:
692.65 Utility-Interactive Point of Connection. Point of Connection shall be in accordance with 705.12.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-115 Log #688 NEC-P04 **Final Action: Reject**
(692.65(B)(5) and FPN)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-261
Recommendation: Accept the proposal and revise as follows:

(5)Suitable for backfeed circuit breakers not marked "line" and "load" shall be permitted for backfeed connection.

Or alternatively; Circuit breakers marked "line" and "load" shall not be backfed.

Delete FPN.
Substantiation: Directions East, West, North, South, are not marked on circuit breakers.
Panel Meeting Action: Reject
Panel Statement: This section of the code has been deleted.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 694 — SMALL WIND ELECTRIC SYSTEMS

4-116 Log #286 NEC-P04 **Final Action: Accept**
(694 (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-263
Recommendation: The Technical Correlating Committee directs that the panel reconsider the proposal relative to technical inconsistencies and NEC Style Manual issues.

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee directs that the new Article Scope be modified to read as follows:

"**694.1 Scope**. The provisions of this article apply to small wind (turbine) electric systems that consisting of one or more wind electric generators with individual systems up to and including 100 kW. These systems can include generators, alternators, inverters, and controllers.

FPN: See FPN Figure 694.1 No. 1 and FPN Figure 694.1 No. 2

FPN: These systems can be interactive with other electrical power production sources or may be stand-alone systems. These systems can have ac or dc output, with or without electrical energy storage, such as batteries.

FPN Figure 694.1 No. 1 Identification of Small Wind Electric System Components – Interactive System.

FPN Figure 694.1 No. 2 Identification of Small Wind Electric System Components – Stand-Alone System."
This action shall be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action Comment 4-121.

The panel acknowledges that the scope of this article is the responsibility of the Technical Correlating Committee, however, the panel requests that the Technical Correlating Committee consider changing 694.1 (Scope) as follows:

1. Add the term "rated power" in the scope to indicate that the definition value should be used.

2. Change "systems" to "generators" to remove the ambiguity that a system could be one or more generators. The use of the term "system" might be interpreted to limit the size of a wind farm to 100 kw total which is not the intent.

3. Fix a typographical error that would change "consist" to "consisting".

4. In the Informational Note change the word "These" to "Small wind electric systems".

5. Revise the Informational Notes and figure captions to simplify and clarify the language.

Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-117 Log #1020 NEC-P04 **Final Action: Hold**
(694 (New))

Submitter: Glenn A. Soles, Clark County Department of Development Services
Comment on Proposal No: 4-263
Recommendation: Create new text in new section (F).

(F) Metal or Nonmetallic Poles Supporting Wind Turbines.

Metal or nonmetallic poles shall be permitted to be used to support wind turbines and used as a raceway to enclose supply conductors, provided the following conditions are met:

(1) A pole shall have a handhole not less than 50 mm x 100 mm (2 in. x 4 in.) with a cover suitable for use in wet locations to provide access to the supply terminations within the pole or pole base.

Exception No. 1: No handhole shall be required in a pole 2.5 m (8 ft) or less in height above grade where the supply wiring method continues without splice or pull point, and where the interior of the pole and any splices are accessible by removing the wind turbine cover(s).

Exception No. 2: No handhole shall be required in a pole 6 m (20 ft) or less in height above grade that is provided with a hinged base.

(2) Where raceway risers or cable is not installed within the pole, a threaded fitting or nipple shall be brazed, welded, or attached to the pole opposite the handhole for the supply connection.

(3) A metal pole shall be provided with an equipment grounding terminal as follows:

a) A pole with a handhole shall have the equipment grounding terminal accessible from the handhole.

b) A pole with a hinged base shall have the equipment grounding terminal accessible within the base.

Exception No. 1: No grounding terminal shall be required in a pole 2.5 m (8 ft) or less in height above grade where the supply wiring method continues without splice or pull, and where the interior of the pole and any slices are accessible by removing the wind turbine cover(s).

(4) A metal pole with a hinged base shall have the hinged base and pole bonded together.

(5) Metal raceways or other equipment grounding conductors shall be bonded to the metal pole with an equipment grounding conductor recognized by 250.118 and sized in accordance with 250.122.

(6) Conductors in vertical poles used as raceway shall be supported as provided in 300.19.
Substantiation: Some wind turbines are mounted on poles. There needs to be language in Article 694 to address these installations. The language used was lifted from Article 410.30(B) with some minor terminology word changes to use wind turbines instead of luminares.
Panel Meeting Action: Hold
Panel Statement: The comment introduces a new concept, that while having merit, has not had public review and falls under 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.

The proposal will stand.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-118 Log #1214 NEC-P04 **Final Action: Accept in Principle**
(694 (New))

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 4-263
Recommendation: This proposal should continue to be Accept in Principle and Part. Proposed section 694.31(B) should be revised to read as follows:
(B) Flexible Cords and Cables. Flexible cords and cables, when used to connect the moving parts of turbines or used to permit ready removal for maintenance and repair, shall comply with Article 400 and shall be of a type identified as a hard service cord or portable power cable; they shall be suitable for extra-hard usage, listed for outdoor use, and water resistant. Cables exposed to sunlight shall be sunlight resistant. Flexible, fine-stranded cables shall be terminated only with terminals, lugs, devices, or connectors that are identified and listed for such use.
Substantiation: This comment adds the language used in 690.31(F) for Flexible, fine-stranded cables, that is used with Solar Photovoltaic Systems to section 694.31(B) for Small Wind Turbines. There is a history with wind turbines of these types of cables disconnecting from their terminations because the termination used was never evaluated for flexible fine-strand cables.
Panel Meeting Action: Accept in Principle
Revise 694.30(B) to read as follows:
"…sunlight resistant. Terminals used for flexible, fine-stranded conductors and cables shall comply with 110.14(A).
Panel Statement: The panel revised the proposed language to a reference to 110.14(A) that now includes a similar section which applies to the entire Code.
The allowance of recognized as well as listed inverters was originally included to allow for inverters integrated into turbine nacelles, and before any standards for overall turbine listing were available. The panel has been informed that Listing of integrated inverters is now possible, and, therefore, the additional allowance for recognized inverters can be removed.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
YOUNG, J.: The panel action is incorrect. It reads that 694.30(B) is being revised. This should be 694.31(B).

4-119 Log #1766 NEC-P04 **Final Action: Accept**
(694)

TCC Action: The Technical Correlating Committee understands that the comment recommendation is to revise 694.7(B).
Submitter: Marvin Hamon, Hamon Engineering
Comment on Proposal No: 4-263
Recommendation: Revise text as follows:
(B) Equipment. Inverters or motor generators intended for use in small wind electric systems shall be identified and ~~either~~ listed ~~or recognized~~ for the application.
Substantiation: Recognized components are for use in complete UL listed products and are not suitable for field installation. Because of this they should not be referenced in this
paragraph.
Panel Meeting Action: Accept
Panel Statement: The allowance of recognized as well as listed inverters was originally included to allow for inverters integrated into turbine nacelles, and before any standards for overall turbine listing were available. The panel has been informed that Listing of integrated inverters is now possible, and, therefore, the additional allowance for recognized inverters can be removed.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
YOUNG, J.: It is not indicated which Section is being revised.

4-120 Log #1767 NEC-P04 **Final Action: Accept**
(694)

Submitter: Marvin Hamon, Hamon Engineering
Comment on Proposal No: 4-263
Recommendation: Revise text as follows:
694.60 Identified Interactive Equipment. Only inverters listed ~~or recognized,~~ and identified as interactive shall be permitted in interactive systems.
Substantiation: Recognized components are for use in complete UL listed products and are not suitable for field installation. Because of this they should not be referenced in this paragraph.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-121 Log #2224 NEC-P04 **Final Action: Accept**
(694 (New))

TCC Action: The Technical Correlating Committee directs that Article 694 be revised to read as follows to comply with the NEC Style Manual:
"Article 694 - Small Wind Electric Systems
I. General.
694.1 Scope. The provisions of this article apply to small wind (turbine) electric systems that consist of one or more wind electric generators with individual generators having a rated power up to and including 100 kW. These systems can include generators, alternators, inverters, and controllers.
Informational Note: Small wind electric systems can be interactive with other electrical power production sources or might be stand-alone systems. Small wind electric systems can have ac or dc output, with or without electrical energy storage, such as batteries. See Informational Note Figures 694.1 and 694.2.

*****Insert Figure 694.1 Here (not shown)*****

Informational Note Figure 694.1 Identification of Small Wind Electric System Components – Interactive System.

*****Insert Figure 694.2 Here (not shown)*****

Informational Note Figure 694.2 Identification of Small Wind Electric System Components – Stand-Alone System.
694.2 Definitions.
Charge Controller. Equipment that controls dc voltage or dc current, or both, that is used to charge a battery or other energy storage device.
Diversion Charge Controller. Equipment that regulates the charging process of a battery or other energy storage device by diverting power from energy storage to dc or ac loads, or to an interconnected utility service.
Diversion Load. A load connected to a diversion charge controller or diversion load controller, also known as a dump load.
Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service.
Guy. A cable that mechanically supports a wind turbine tower.
Inverter Output Circuit. The conductors between an inverter and an ac panelboard for stand-alone systems, or the conductors between an inverter and service equipment or another electric power production source, such as a utility, for an electrical production and distribution network.
Maximum Output Power. The maximum 1 minute average power output a wind turbine produces in normal steady-state operation (instantaneous power output can be higher).
Maximum Voltage. The maximum voltage the wind turbine produces in operation including open circuit conditions.
Nacelle. An enclosure housing the alternator and other parts of a wind turbine.
Rated Power. The wind turbine's output power at a wind speed of 11 m/s (24.6 mph). If a turbine produces more power at lower wind speeds, the rated power is the wind turbine's output power at a wind speed less than 11 m/s that produces the greatest output power.
Informational Note: The method for measuring wind turbine power output is specified IEC 61400-12-1, Power Performance Measurements of Electricity Producing Wind Turbines.
Tower. A pole or other structure that supports a wind turbine.
Wind Turbine. A mechanical device that converts wind energy to electrical energy.
Wind Turbine Output Circuit. The circuit conductors between the internal components of a small wind turbine (which might include an alternator, integrated rectifier, controller, and/or inverter) and other equipment.
Wind Turbine System. A small wind electric generating system. Informational Note: See also definitions for interconnected systems in Article 705.
694.3 Other Articles. Wherever the requirements of other articles of this Code and Article 694 differ, the requirements of Article 694 shall apply. Where the system is operated in parallel with primary sources of electricity, the requirements of Article 705 shall apply.
Exception: Small wind electric systems, equipment, or wiring installed in a hazardous (classified) location shall also comply with the applicable requirements of Articles 500 through 516.
694.7 Installation.
(A) Small Wind Electric Systems. Small wind electric system(s) shall be permitted to supply a building or other structure in addition to any services of another electricity supply system.
(B) Equipment. Inverters used in small wind electric systems shall be identified and either listed or identified for the application.
(C) Diversion Load Controllers. A small wind electric system, employing a diversion load controller as the primary means of regulating the speed of a wind turbine rotor, shall be equipped with an additional, independent,

reliable means to prevent over-speed operation. An interconnected utility service shall not be considered to be a reliable diversion load.

(D) Surge Protective Devices (SPD). A surge protective device shall be installed between a small wind electric system and any loads served by the premises electrical system. The surge protective device shall be permitted to be a Type 3 SPD on a dedicated branch circuit serving a small wind electric system or a Type 2 SPD located anywhere on the load side of the service disconnect. Surge protective devices shall be installed in accordance with Part II of Article 285.

(E) Receptacles. A receptacle shall be permitted to be supplied by a small wind electric system branch or feeder circuit for maintenance or data acquisition use. Receptacles shall be protected by an overcurrent device with a rating not to exceed the current rating of the receptacle.

II. Circuit Requirements.

694.10 Maximum Voltage.

(A) Wind Turbine Output Circuits. For wind turbines connected to one- and two-family dwellings, turbine output circuits shall be permitted to have a maximum voltage up to 600 volts. Other installations with a maximum voltage over 600 volts shall comply with Part IX of Article 694.

(B) Direct-Current Utilization Circuits. The voltage of dc utilization circuits shall comply with 210.6.

(C) Circuits over 150 Volts to Ground. In one- and two-family dwellings, live parts in circuits over 150 volts to ground shall not be accessible to other than qualified persons while energized.

Informational Note: See 110.27 for guarding of live parts and 210.6 for branch circuit voltage limitations.

694.12 Circuit Sizing and Current.

(A) Calculation of Maximum Circuit Current. The maximum current for a circuit shall be calculated in accordance with 694.12(A)(1) through (A)(3).

(1) Turbine Output Circuit Currents. The maximum current shall be based on the circuit current of the wind turbine operating at maximum output power.

(2) Inverter Output Circuit Current. The maximum output current shall be the inverter continuous output current rating.

(3) Stand-Alone Inverter Input Circuit Current. The maximum input current shall be the stand-alone continuous inverter input current rating of the inverter producing rated power at the lowest input voltage.

(B) Ampacity and Overcurrent Device Ratings.

(1) Continuous Current. Small wind turbine electric system currents shall be considered to be continuous.

(2) Sizing of Conductors and Overcurrent Devices. Circuit conductors and overcurrent devices shall be sized to carry not less than 125 percent of the maximum current as calculated in 694.12(A). The rating or setting of overcurrent devices shall be permitted in accordance with 240.4(B) and (C).

Exception: Circuits containing an assembly, together with its overcurrent devices, listed for continuous operation at 100 percent of its rating shall be permitted to be used at 100 percent of its rating.

694.15 Overcurrent Protection.

(A) Circuits and Equipment. Turbine output circuits, inverter output circuits, and storage battery circuit conductors and equipment shall be protected in accordance with the requirements of Article 240. Circuits connected to more than one electrical source shall have overcurrent devices located so as to provide overcurrent protection from all sources.

Exception: An overcurrent device shall not be required for circuit conductors sized in accordance with 694.12(B) where the maximum current from all sources do not exceed the ampacity of the conductors.

Informational Note: Possible backfeed of current from any source of supply, including a supply through an inverter to the wind turbine output circuit, is a consideration in determining whether adequate overcurrent protection from all sources is provided. Some small wind electric systems rely on the turbine output circuit to regulate turbine speed. Inverters may also operate in reverse for turbine startup or speed control.

(B) Power Transformers. Overcurrent protection for a transformer with sources on each side shall be provided in accordance with 450.3 by considering first one side of the transformer, then the other side of the transformer, as the primary.

Exception: A power transformer where the current rating on the side connected to the inverter output, which is not less than the rated continuous output current rating of the inverter, shall not be required to have overcurrent protection at the inverter.

(C) Direct-Current Rating. Overcurrent devices, either fuses or circuit breakers, used in any dc circuit of a small wind electric system shall be listed for use in dc circuits and shall have appropriate voltage, current, and interrupting ratings.

694.18 Stand-Alone Systems. The premises wiring system shall be adequate to meet the requirements of this Code for a similar installation connected to a service. The wiring on the supply side of the building or structure disconnecting means shall comply with this Code, except as modified by 694.18(A) through (D).

(A) Inverter Output. The ac output from stand-alone inverters shall be permitted to supply ac power to the building or structure disconnecting means at current levels less than the calculated load connected to that disconnect. The inverter output rating or the rating of a wind energy source shall be not less than the load of the largest single utilization equipment connected to the system. Calculated general lighting loads shall not be considered as a single load.

(B) Sizing and Protection. The circuit conductors between the inverter output and the building or structure disconnecting means shall be sized based on the output rating of the inverter. These conductors shall be protected in accordance with Article 240. The overcurrent protection shall be located at the output of the inverter.

(C) Single 120-Volt Supply. The inverter output of a stand-alone small wind electric system shall be permitted to supply 120 volts to single-phase, 3-wire, 120/240-volt service equipment or distribution panels where there are no 240-volt outlets and where there are no multiwire branch circuits. In all installations, the rating of the overcurrent device connected to the output of the inverter shall be less than the rating of the neutral bus in the service equipment. This equipment shall be marked with the following words or equivalent:

WARNING.
SINGLE 120-VOLT SUPPLY.
DO NOT CONNECT.
MULTIWIRE BRANCH CIRCUITS!.

(D) Energy Storage or Backup Power System Requirements. Energy storage or backup power supplies shall not be required.

III. Disconnecting Means.

694.20 All Conductors. Means shall be provided to disconnect all current-carrying conductors of a small wind electric power source from all other conductors in a building or other structure. A switch, circuit breaker, or other device, either ac or dc, shall not be installed in a grounded conductor if operation of that switch, circuit breaker, or other device leaves the marked, grounded conductor in an ungrounded and energized state.

Exception: A wind turbine that uses the turbine output circuit for regulating turbine speed shall not require a turbine output circuit disconnecting means.

694.22 Additional Provisions. Disconnecting means shall comply with 694.22(A) through (D).

(A) Disconnecting Means. The disconnecting means shall not be required to be suitable for use as service equipment. The disconnecting means for ungrounded conductors shall consist of manually operable switches or circuit breakers complying with all of the following requirements:

(1) They shall be located where readily accessible .

(2) They shall be externally operable without exposing the operator to contact with live parts.

(3) They shall plainly indicate whether in the open or closed position.

(4) They shall have an interrupting rating sufficient for the nominal circuit voltage and the current that is available at the line terminals of the equipment.

Where all terminals of the disconnecting means are capable of being energized in the open position, a warning sign shall be mounted on or adjacent to the disconnecting means.
The sign shall be clearly legible and shall have the following words or equivalent:

WARNING.
ELECTRIC SHOCK HAZARD.
DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH THE LINE
AND LOAD SIDES MAY BE
ENERGIZED IN THE OPEN POSITION.

(B) Equipment. Equipment such as rectifiers, controllers, output circuit isolating and shorting switches, and overcurrent devices shall be permitted on the wind turbine side of the disconnecting means.

(C) Requirements for Disconnecting Means.

(1) Location. The small wind electric system disconnecting means shall be installed at a readily accessible location either on or adjacent to the turbine tower, on the outside of a building or structure or inside, at the point of entrance of the wind system conductors.

Exception: Installations that comply with 694.30(C) shall be permitted to have the disconnecting means located remotely from the point of entry of the wind system conductors.

A wind turbine disconnecting means shall not be required to be located at the nacelle or tower.

The disconnecting means shall not be installed in bathrooms.

(2) Marking. Each wind turbine system disconnecting means shall be permanently marked to identify it as a small wind electric system disconnect. A plaque shall be installed in accordance with 705.10.

(3) Suitable for Use. Turbine system disconnecting means shall be suitable for the prevailing conditions. Equipment installed in hazardous (classified) locations shall comply with the appropriate requirements of Articles 500 through 517.

(4) Maximum Number of Disconnects. The turbine disconnecting means shall consist of not more than six switches or six circuit breakers mounted in a single enclosure, in a group of separate enclosures, or in or on a switchboard.

(D) Equipment that is Not Readily Accessible. Rectifiers, controllers, and inverters shall be permitted to be mounted in nacelles or other exterior areas that are not readily accessible.

694.24 Disconnection of Small Wind Electric System Equipment. Means shall be provided to disconnect equipment, such as inverters, batteries and charge controllers, from all ungrounded conductors of all sources. If the equipment is energized from more than one source, the disconnecting means shall be grouped and identified.

A single disconnecting means in accordance with 694.22 shall be permitted for the combined ac output of one or more inverters in an interactive system.

A shorting switch or plug shall be permitted to be used as an alternative to a disconnect in systems that regulate turbine speed using the turbine output circuit.

Exception: Equipment housed in a turbine nacelle shall not be required to have a disconnecting means.

694.26 Fuses. Means shall be provided to disconnect a fuse from all sources of supply where the fuse is energized from both directions and is accessible to other than qualified persons. Switches, pullouts, or similar devices that are rated for the application shall be permitted to serve as a means to disconnect fuses from all sources of supply.

694.28 Installation and Service of a Wind Turbine.

Open circuiting, short circuiting, or mechanical brakes shall be used to disable a turbine for installation and service.

Informational Note: Some wind turbines rely on the connection from the alternator to a remote controller for speed regulation. Opening turbine output circuit conductors may cause mechanical damage to a turbine and create excessive voltages that could damage equipment or expose persons to electric shock.

IV. Wiring Methods.

694.30 Permitted Methods.

(A) Wiring Systems. All raceway and cable wiring methods included in this Code, and other wiring systems and fittings specifically intended for use on wind turbines, shall be permitted. In readily accessible locations, turbine output circuits that operate at voltages greater than 30 volts shall be installed in raceways.

(B) Flexible Cords and Cables. Flexible cords and cables, where used to connect the moving parts of turbines or where used for ready removal for maintenance and repair, shall comply with Article 400 and shall be of a type identified as hard service cord or portable power cable; shall be suitable for extra-hard usage, shall be listed for outdoor use, and shall be water resistant. Cables exposed to sunlight shall be sunlight resistant.

(C) Direct-Current Turbine Output Circuits Inside a Building. Direct-current turbine output circuits, installed inside a building or structure, shall be enclosed in metal raceways or installed in metal enclosures from the point of penetration of the surface of the building or structure to the first readily accessible disconnecting means.

V. Grounding.

694.40 Equipment Grounding.

(A) General. Exposed non–current-carrying metal parts of towers, turbine nacelles, other equipment, and conductor enclosures shall be connected to an equipment grounding conductor in accordance with 250.134 or 250.136(A), regardless of voltage. Attached metal parts, such as turbine blades and tails that have no source of electrical energization, shall not be required to be connected to an equipment grounding conductors.

(B) Guy Wires. Guy wires used to support turbine towers shall not be required to be connected to an equipment grounding conductor or to comply with the requirements of 250.110.

Informational Note: Guy wires supporting towers that are adequately grounded are unlikely to become energized. Grounding of metallic guy wires may be required by lightning codes. See 694.40 (C)(4).

(C) Tower Grounding.

(1) Auxiliary Electrodes. A wind turbine tower shall be connected to one or more auxiliary electrodes to limit voltages imposed by lightning. Auxiliary electrodes shall be permitted to be installed in accordance with 250.54. Electrodes that are part of the tower foundation and meet the requirements for concrete encased electrodes in accordance with 250.52(A)(3) shall be acceptable. A grounded metal tower support shall be considered acceptable where meeting the requirements of 250.136(A). Where installed in close proximity to galvanized foundation or tower anchor components, galvanized grounding electrodes shall be used.

Informational Note: Copper and copper-clad grounding electrodes, where used in highly conductive soils, can cause electrolytic corrosion of galvanized foundation and tower anchor components.

(2) Equipment Grounding Conductor. An equipment grounding conductor shall be required between a turbine and the premises grounding system in accordance with 250.110.

(3) Tower Grounding Connections. Equipment grounding conductors and grounding electrode conductors, where used, shall be connected to the metallic tower by exothermic welding, listed lugs, listed pressure connectors, listed clamps, or other listed means. Devices, such as connectors and lugs, shall be suitable for the material of the conductor and the structure to which the devices are connected. Where practicable, contact of dissimilar metals shall be avoided anywhere in the system to eliminate the possibility of galvanic action and corrosion. All mechanical elements used to terminate these conductors shall be accessible.

(4) Lightning Protection Systems. Auxiliary electrodes and grounding electrode conductors shall be permitted to act as lightning protection system components where meeting applicable requirements. If separate, the tower lightning protection system grounding electrodes shall be bonded to the tower auxiliary grounding electrode system. Guy wires used as lightning protection system grounding electrodes shall not be required to be bonded to the tower auxiliary grounding electrode system.

Informational Note: See NFPA 780-2008, Standard for the Installation of Lightning Protection Systems, Informative Annex N, Wind Turbine Generator Systems, for information on lightning protection of wind turbines.

VI. Marking.

694.50 Interactive System Point of Interconnection. All interactive system points of interconnection with other sources shall be marked at an accessible location at the disconnecting means and with the rated ac output current and the nominal operating ac voltage.

694.52 Power Systems Employing Energy Storage.

Small wind electric systems employing energy storage shall be marked with the maximum operating voltage, any equalization voltage, and the polarity of the grounded circuit conductor.

694.54 Identification of Power Sources.

(A) Facilities with Stand-Alone Systems. Any structure or building, with a stand-alone system and not connected to a utility service source, shall have a permanent plaque or directory installed on the exterior of the building or structure at a readily visible location. The plaque or directory shall indicate the location of system disconnecting means and shall indicate that the structure contains a stand-alone electrical power system.

(B) Facilities with Utility Services and Small Wind Electric Systems. Buildings or structures with both utility service and small wind electric systems shall have a permanent plaque or directory providing the location of the service disconnecting means and the small wind electric system disconnecting means.

694.56 Instructions for Disabling Turbine. A plaque shall be installed at or adjacent to the turbine location providing basic instructions for disabling the turbine.

VII. Connection to Other Sources.

694.60 Identified Interactive Equipment. Only inverters listed and identified as interactive shall be permitted in interactive systems.

694.62 Installation. Small wind electric systems, where connected to utility electric sources, shall comply with the requirements of Article 705.

694.64 Ampacity of Neutral Conductor.

A conductor used solely for instrumentation, voltage detection, or phase detection and connected to a single-phase or three-phase utility-interactive inverter, shall be permitted to be sized at less than the ampacity of the other current-carrying conductors and shall be sized equal to or larger than the equipment grounding conductor.

Informational Note: See also 705.95.

694.66 Operating Voltage Range. Small wind electric systems connected to dedicated branch or feeder circuits shall be permitted to exceed normal voltage operating ranges on these circuits provided the voltage at any distribution equipment supplying other loads remains within normal ranges.

Informational Note: Wind turbines might use the electric grid to dump energy from short-term wind gusts. Normal operating voltages are defined in ANSI C84.1-2006, Voltage Ratings for Electric Power Systems and Equipment (60 Hz).

694.68 Point of Connection. Points of connection to interconnected electric power sources shall comply with 705.12.

VIII. Storage Batteries.

694.70 Installation.

(A) General. Storage batteries in small wind electric systems shall comply with the provisions of Article 480.

(B) Dwellings.

(1) Operating Voltage. Storage batteries shall have the cells connected to operate at less than 50 volts nominal. Lead-acid storage batteries shall have no more than twenty-four 2-volt cells connected in series (48-volts nominal).

Exception: Where live parts are not accessible during routine battery maintenance, a battery system voltage in accordance with 694.10 shall be permitted.

(2) Guarding of Live Parts. Live parts of battery systems shall be guarded to prevent accidental contact by persons or objects, regardless of voltage or battery type.

Informational Note: Batteries in small wind electric systems are subject to extensive charge/discharge cycles and typically require frequent maintenance, such as checking the electrolyte and cleaning of connections.

(C) Current Limiting. A listed, current-limiting overcurrent device shall be installed in each circuit adjacent to the batteries where the available short-circuit current from a battery or battery bank exceeds the interrupting or withstand ratings of other equipment in that circuit. The installation of current-limiting fuses shall comply with 694.26.

(D) Battery Nonconductive Cases and Conductive Racks. Flooded, vented, lead-acid batteries with more than twenty-four 2-volt cells

connected in series (48 volts nominal) shall not use conductive cases or shall not be installed in conductive cases. Conductive racks used to support the nonconductive cases shall be permitted where rack material is not located within 150 mm (6 in.) of the tops of the nonconductive cases. This requirement shall not apply to any type of valve-regulated lead-acid (VRLA) battery or any other types of sealed batteries requiring steel or other conductive material cases for proper operation.

(E) Disconnection of Series Battery Circuits. Battery circuits subject to field servicing,
with more than twenty-four 2-volt cells connected in series (48 volts nominal), shall have provisions to disconnect the series-connected strings into segments of 24 cells or less for maintenance by qualified persons. Non–load-break bolted or plug-in disconnects shall be permitted.

(F) Battery Maintenance Disconnecting Means. Battery installations, with more than twenty-four 2-volt cells connected in series (48 volts, nominal), shall have a disconnecting means, accessible only to qualified persons, that disconnects the grounded circuit conductors in the battery electrical system for maintenance. This disconnecting means shall not disconnect the grounded circuit conductors for the remainder of the small wind electric system. A non– load-break-rated switch shall be permitted to be used as the disconnecting means.

(G) Battery Systems of More Than 48 Volts. Where the battery system for a small wind electric system consists of more than twenty-four 2-volt cells connected in series (more than 48 volts, nominal), the battery system shall be permitted to operate with ungrounded conductors, provided the following conditions are met:

(1) The dc and ac load circuits are solidly grounded.

(2) All main ungrounded battery input/output circuit conductors are provided with
switched disconnects and overcurrent protection.

(3) A ground-fault detector and indicator is installed to monitor for ground faults in the battery bank.

694.75 Charge Control.

(A) General. Equipment shall be provided to control the charging process of the battery.
Charge control shall not be required where the design of the small wind electric source is matched to the voltage rating and charge current requirements of the interconnected battery cells, and the maximum charging current, multiplied by 1 hour, is less than 3 percent of the rated battery capacity expressed in ampere-hours or as recommended by the battery manufacturer. All adjusting means for control of the charging process shall be accessible only to qualified persons.

Informational Note: Certain battery types, such as valve regulated lead-acid or nickel-cadmium, can experience thermal failure when overcharged.

(B) Diversion Charge Controller.

(1) Sole Means of Regulating Charging. A small wind electric system employing a diversion charge controller as the sole means of regulating the charging of a battery shall be equipped with two, reliable, independent means to prevent overcharging of the battery. An interconnected utility service shall not be considered as a reliable diversion load.

(2) Circuits with Direct-Current Diversion Charge Controller and Diversion Load.
Circuits containing a dc diversion charge controller and a dc diversion load shall comply
with the following:

(1) The current rating of the diversion load shall not be greater than the current rating of
the diversion load charge controller. The voltage rating of the diversion load shall be
greater than the maximum battery voltage. The power rating of the diversion load shall be
not less than 150 percent of the maximum power output rating of the small wind electric system.

(2) The conductor ampacity and the rating of the overcurrent device for this circuit shall
be at least 150 percent of the maximum current rating of the diversion charge controller.

IX. Systems over 600 Volts.

694.80 General. Small wind electric systems with a maximum system voltage exceeding
600 volts ac or dc shall comply with Article 490 and all other requirements applicable to
installations rated over 600 volts.

694.85 Cable and Equipment Ratings. For the purposes of Part IX of this article, the
voltages used to determine cable and equipment ratings shall be as specified in 694.85(A)
and (B):

(A) Battery Circuits. In battery circuits, the voltage used shall be the highest voltage
experienced under charging or equalizing conditions.

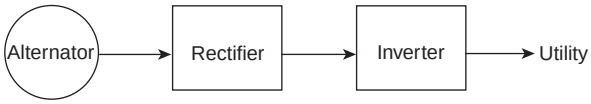
(B) Other Circuits. In other circuits, the voltage used shall be the maximum voltage
experienced in normal operation."

Submitter: Robert H. Wills, Intergrid, LLC / Rep. American Wind Energy Association
Comment on Proposal No: 4-262
Recommendation: Revise proposed text as follows:
~~ARTICLE~~ Article 694 -Small Wind Electric Systems
I. General.

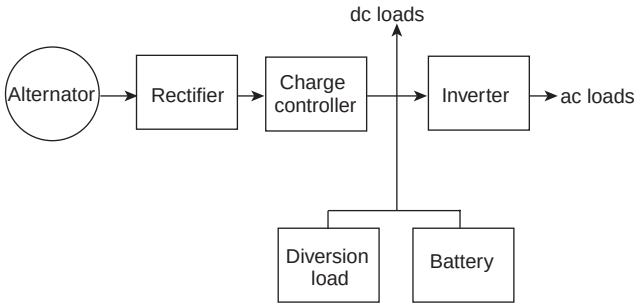
694.1 Scope.

The provisions of this article apply to small wind (turbine) electric systems that consisting of one or more wind electric generators with individual ~~systems~~ generators having a rated power up to and including 100kW. These systems can include generators, alternators, inverters, and controllers.

Informational Note: ~~These Systems~~ Small wind electric systems can be interactive with other electrical power production sources or might be stand-alone systems. These systems can have ac or dc output, with or without electrical energy storage, such as batteries. See Informational Note Figures 694.1 and 694.2.



Informational Note Figure 694.1~~(A)~~ Identification of Small Wind Electric System Components – Interactive System.



Informational Note Figure 694.~~1(B)~~2 Identification of Small Wind Electric System Components – Stand-Alone System.

694.2 Definitions.

[Editorial Note that these have been re-ordered alphabetically]

Charge Controller. Equipment that controls dc voltage or dc current, or both, and that is used to charge a battery or other energy storage device.

Diversion Charge Controller. Equipment that regulates the charging process of a battery or other energy storage device by diverting power from energy storage to ~~direct current or alternating current~~ dc or ac loads, or to an interconnected utility service.

Diversion Load. A load connected to a diversion charge controller or diversion load controller. ~~A~~, also known as a dump load.

Diversion Load Controller. Equipment that regulates the output of a wind generator by diverting power from the generator to ~~direct current or alternating current~~ dc or ac loads or to an interconnected utility service.

Guy. A cable that mechanically supports a wind turbine tower.

Inverter Output Circuit. ~~C~~ The conductors between an inverter and an ac panelboard for stand-alone systems, or the conductors between an inverter and service equipment or another electric power production source, such as a utility, for an electrical production and distribution network.

Maximum Output Power. The maximum 1 ~~one~~-minute average power output a wind turbine ~~will~~ produces in normal steady-state operation (instantaneous power output can be higher).

Maximum Voltage. The maximum voltage the wind turbine ~~will~~ produces in operation including open circuit conditions.

Nacelle. An enclosure housing the alternator and other parts of a wind turbine.

Rated Power:. The wind ~~turbine's power~~ turbine's output power at a wind

speed of 11.0 m/s (24.6 mph) when measured in accordance with IEC 61400-12-1,). If a turbine produces more power at lower wind speeds, the rated power shall be is the wind turbine's output power at a wind speed less than 11 m/s that produces the greatest output power.

Informational Note: The method for measuring wind turbine power output is specified IEC 61400-12-1, *Power Performance Measurements of Electricity Producing Wind Turbines.*

Tower. A pole or other structure that supports a wind turbine.
Wind Turbine. A mechanical device that converts wind energy to electrical energy.
Wind Turbine Output Circuit. Circuit The circuit conductors between the internal components of a small wind turbine (which may might include an alternator, integrated rectifier, controller, and/or inverter), and other equipment.
Wind Turbine System. A small wind electric generating system.

FPN Informational Note: See also definitions for Interconnected Systems interconnected systems in Article 705 [or Article 100 if they are moved there].

694.3 Other Articles
Wherever, Whenever the requirements of other articles of this *Code* and Article 694 differ, the requirements of Article 694 shall apply and, if. If the system is operated in parallel with a primary source(s) of electricity, the requirements in of Article 705 shall apply.
Exception: Small wind electric systems, equipment, or wiring installed in a hazardous (classified) location shall also comply with the applicable portions of Articles 500 through 516.
694.4 7 Installation.
(A) Small Wind Electric System. A small**s**. Small wind electric system(s) shall be permitted to supply a building or other structure in addition to any service(s) of another electricity supply system(s).
(B) Equipment. Inverters or motor generators intended for use used in small wind electric systems shall be identified and either listed or recognized for the application.
(C) Diversion Load Controllers. A small wind electric system employing a diversion load controller as the sole primary means of regulating the speed of a wind turbine rotor shall be equipped with two reliable an additional, independent, reliable means to prevent over-speed operation. An interconnected utility service shall not be considered to be a reliable diversion load.
(D) Surge Protective Devices. A surge protective device shall be installed between a small wind electric system and any loads served by the premises electrical system. The surge protective device is permitted to be a Type 3 device located on a dedicated branch circuit serving a small wind electric system, or a Type 2 device located anywhere on the load side of the service disconnect. Surge protective devices shall be installed in accordance with Article 285 Part II.
(E) Receptacles. A receptacle is permitted to be attached to a small wind electric system branch or feeder circuit for maintenance or data acquisition use. Receptacles shall be protected with an overcurrent device that is rated at no greater than with a rating not to exceed the current rating of the receptacle.
II. Circuit Requirements.
694.7 10 Maximum Voltage.
(A) Turbine Output Circuits. For wind turbines connected to one- and two-family dwellings, turbine output circuits shall be permitted to have a maximum voltage up to 600 volts. Other installations with a maximum voltage over 600 volts shall comply with Article 694, Part IX.
(B) Direct-Current Utilization Circuits. The voltage of dc utilization circuits shall conform to 210.6.
(C) Circuits over 150 Volts to Ground. In one- and two-family dwellings, live parts in circuits over 150 volts to ground shall not be accessible to other than qualified persons while energized.

FPN Informational Note: See 110.27 for guarding of live parts, and 210.6 for branch circuit voltage to ground and between conductors limitations.

694.812 Circuit Sizing and Current.
(A) Calculation of Maximum Circuit Current. The maximum current for the specific a circuit shall be calculated in accordance with 694.812(A)(1) through (A)(3).
(1) Turbine Output Circuit Currents. The maximum current shall be the circuit current when the wind turbine is operating at Maximum Output Power *maximum output power*.
(2) Inverter Output Circuit Current. The maximum current shall be the inverter continuous output current rating.
(3) Stand-Alone Inverter Input Circuit Current. The maximum current shall be the stand-alone continuous inverter input current rating when the inverter is producing rated power at the lowest input voltage.
(B) Ampacity and Overcurrent Device Ratings.
(1) Continuous Current. Small wind electric system currents shall be considered to be continuous.
(12) Sizing of Conductors and Overcurrent Devices. The circuit Circuit conductors and overcurrent devices shall be sized to carry not less than 125 percent of the maximum currents as calculated in 694.812(A). The rating or setting of overcurrent devices shall be permitted in accordance with 240.4(B) and (C).
Exception: Circuits containing an assembly, together with its overcurrent device(s), that is listed for continuous operation at 100 percent of its rating shall be permitted to be utilized used at 100 percent of its rating.
694.915 Overcurrent Protection.
(A) Circuits and Equipment. Turbine output circuits, inverter output circuits, and storage battery circuit conductors and equipment shall be protected in accordance with the requirements of Article 240. Circuits connected to more than one electrical source shall have overcurrent devices located so as to provide overcurrent protection from all sources.
Exception: An overcurrent device shall not be required for circuit conductors sized in accordance with 694.812(B) and located where one of when the following apply: (a) There are no external sources such as batteries or backfeed from inverters. (b) The maximum currents from all sources do not exceed the ampacity of the conductors

FPN Informational Note: Possible backfeed of current from any source of supply, including a supply through an inverter *in*to the *alternator* wind turbine output circuit, is a consideration in determining whether adequate overcurrent protection from all sources is provided *for conductors and modules*. Some small wind electric systems rely on the turbine output circuit to regulate turbine speed. *In systems of this type, manufacturers instructions should be followed* .Inverters may also operate in reverse for turbine startup or speed control.

(B) Power Transformers. Overcurrent protection for a transformer with a source(s) sources on each side shall be provided in accordance with 450.3 by considering first one side of the transformer, then the other side of the transformer, as the primary.
Exception: A power transformer with a current rating on the side connected toward the small wind electric power source, to the inverter output, which is not less than the short-circuit rated continuous output current rating of the inverter, shall be permitted without overcurrent protection from that source .the inverter.
(C) Direct-Current Rating. Overcurrent devices, either fuses or circuit breakers, used in any dc portion of a small wind electric system shall be listed for use in dc circuits and shall have the appropriate voltage, current, and interrupting ratings.
[Note: The following common language to **694**, 692 and 694 should move to a common Article – perhaps a new one near 705, but focused on stand-alone rather than interconnected systems. A separate proposal has been submitted to this effect. If this proposal is accepted, 694.10 could be deleted]
694.1018 Stand-Alone Systems.
The premises wiring system shall be adequate to meet the requirements of this *Code* for a similar installation connected to a service. The wiring on the supply side of the building or structure disconnecting means shall comply with this *Code*, except as modified by 694.1018(A) through (D).
(A) Inverter Output. The ac output from a stand-alone inverter(s) shall be permitted to supply ac power to the building or structure disconnecting means at current levels less than the calculated load connected to that disconnect. The inverter output rating or the rating of an alternate a wind energy source shall be equal to or greater not less than the load posed by the largest single utilization equipment connected to the system. Calculated general lighting loads shall not be considered as a single load.
(B) Sizing and Protection. The circuit conductors between the inverter output and the building or structure disconnecting means shall be sized based on the output rating of the inverter. These conductors shall be protected from over currents overcurrent in accordance with Article 240. The overcurrent protection shall be located at the output of the inverter.
(C) Single 120-Volt Supply. The inverter output of a stand-alone small wind electric system shall be permitted to supply 120 volts to single-phase, 3-wire, 120/240-volt service equipment or distribution panels where there are no 240-volt outlets and where there are no multiwire branch circuits. In all installations, the rating of the overcurrent device connected to the output of the inverter shall be less than the rating of the neutral bus in the service equipment. This equipment shall be marked with the following words or equivalent:

WARNING, SINGLE 120-VOLT SUPPLY.
DO NOT CONNECT.
MULTIWIRE BRANCH CIRCUITS!

(D) Energy Storage or Backup Power System Requirements.
Energy storage or backup power supplies are shall not be required.
III. Disconnecting Means.
694.1320 All Conductors.
Means shall be provided to disconnect all current-carrying conductors of a small wind electric power source from all other conductors in a building or other structure. A switch, circuit breaker, or other device, either ac or dc, shall not be installed in a grounded
conductor if operation of that switch, circuit breaker, or other device leaves the marked, grounded conductor in an ungrounded and energized state.
Exception: A wind turbine that uses the turbine output circuit for regulating turbine speed does shall not require a turbine output circuit disconnecting means.

694.~~14~~22 Additional Provisions.
Disconnecting means shall comply with 694.~~14~~22(A) through (D).
(A) Disconnecting Means. The disconnecting means shall not be required to be suitable as service equipment ~~and shall comply with the following:~~ . The disconnecting means for ungrounded conductors shall consist of ~~a~~ manually operable switch~~(es)~~ or circuit breaker~~(s)~~ complying with all of the following requirements:
(1) ~~Located~~ They shall be located where readily accessible.
(2) ~~Externally~~ They shall be externally operable without exposing the operator to contact with live parts.
(3) ~~Plainly indicating~~ They shall plainly indicate whether in the open or closed position.
(4) ~~Having~~ They shall have an interrupting rating sufficient for the nominal circuit voltage and the current that is available at the line terminals of the equipment. ~~Where~~ When all terminals of the disconnecting means ~~may be~~ are capable of being energized in the open position, a warning sign shall be mounted on or adjacent to the disconnecting means. The sign shall be clearly legible and have the following words or equivalent:

WARNING.
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH THE LINE
AND LOAD SIDES MAY BE
ENERGIZED IN THE OPEN POSITION.

(B) Equipment. Equipment such as rectifiers, controllers, output circuit isolating and shorting switches, and over-current devices shall be permitted on the wind turbine side of the disconnecting means.
(C) Requirements for Disconnecting Means.
(1) Location. The small wind electric system disconnecting means shall be installed at a readily accessible location either on or adjacent to the turbine tower, on the outside of a building or structure or inside ~~nearest~~, at the point of entrance of the wind system conductors.
Exception: Installations that comply with 694.~~31(E~~30(C) shall be permitted to have the disconnecting means located remotely from the point of entry of the wind system conductors.
A turbine disconnecting means shall not be required to be located at the nacelle or tower. The disconnecting means shall not be installed in bathrooms.
(2) Marking. Each turbine system disconnecting means shall be permanently marked to identify it as a small wind electric system disconnect. A plaque shall be installed in accordance with 705.10.
(3) Suitable for Use. ~~Each turbine~~ Turbine system disconnecting means shall be suitable for the prevailing conditions. Equipment installed in hazardous (classified) locations shall comply with the appropriate requirements of Articles 500 through 517.
(4) Maximum Number of Disconnects. The turbine disconnecting means shall consist of not more than six switches or six circuit breakers mounted in a single enclosure, in a group of separate enclosures, or in or on a switchboard.
~~**(5) Grouping.** The turbine disconnecting means shall be grouped with other disconnecting means for the system to comply with 694.14(C)(4). A turbine disconnecting means shall not be required at the nacelle or tower location.~~
(D) Equipment ~~Mounted in~~ that is Not-Readily-Accessible ~~Locations~~.
Rectifiers, controllers, and inverters shall be permitted to be mounted in nacelles or other exterior areas that are not readily accessible.
694.~~15~~24 Disconnection of Small Wind Electric System Equipment.
Means shall be provided to disconnect equipment, such as inverters, batteries, and charge controllers, ~~and the like,~~ from all ungrounded conductors of all sources. If the equipment is energized from more than one source, the disconnecting means shall be grouped and identified. A single disconnecting means in accordance with 694.~~17~~22 shall be permitted for the combined ac output of one or more inverters in an interactive system. A shorting switch or plug shall be permitted to be used as an alternative to a disconnect in systems that regulate turbine speed using the turbine output circuit.
Exception: Equipment housed in a turbine nacelle ~~is~~ shall not be required to have a disconnecting means.
694.~~16~~26 Fuses. Means shall be provided to disconnect a fuse from all sources of supply if the fuse is energized from both directions and is accessible to other than qualified persons. Switches, pullouts, or similar devices that ~~have suitable ratings may~~ are rated for the application shall be permitted to serve as a means to disconnect fuses from all sources of supply. ~~A shorting plug shall be permitted to be used as an alternative to a disconnect in systems that regulate turbine speed using the turbine output circuit.~~
694.~~18~~28 Installation and Service of a Wind Turbine. Open circuiting, short circuiting, or mechanical brakes shall be used to disable a turbine for installation and service.

~~FPN~~ Informational Note: Some wind turbines rely on the connection from the alternator to a remote controller for speed regulation. Opening turbine output circuit conductors may cause mechanical damage to a turbine and create excessive voltages that could damage equipment or expose persons to electric shock.

~~**694.20 Disconnection of Wind Turbine Alternators.**~~
IV. Wiring Methods.
694.~~31~~ 30 ~~Methods Permitted~~ Permitted Methods.
(A) Wiring Systems. All raceway and cable wiring methods included in this *Code*, and other wiring systems and fittings specifically intended for use on wind turbines, shall be permitted. ~~Where turbine~~ Turbine output circuits ~~operating~~ in readily accessible locations that operate at ~~maximum~~ voltages greater than 30 volts ~~are installed in readily accessible locations, circuit conductors~~ shall be installed in raceways.
(B) Flexible Cords and Cables. Flexible cords and cables, where used to connect the moving parts of turbines or used to allow ready removal for maintenance and repair, shall comply with Article 400 and shall be of a type identified as ~~a~~ hard service cord or portable power cable; they shall be suitable for extra-hard usage, listed for outdoor use, and shall be water resistant. Cables exposed to sunlight shall be sunlight resistant.
(C) Direct-Current Turbine Output Circuits Inside a Building. When direct-current turbine output circuits are run inside a building or structure, they shall be contained in metal raceways or metal enclosures from the point of penetration of the surface of the building or structure to the first readily accessible disconnecting means.
V. Grounding.
694.~~43~~40 Equipment Grounding.
(A) General. Exposed non–current-carrying metal parts of towers, turbine nacelles, other equipment, and conductor enclosures shall be grounded in accordance with 250.134 or 250.136(A), regardless of voltage. Attached metal parts, such as turbine blades and tails that have no source of electrical energization ~~are not~~, shall not be required to be grounded.
(B) Guy Wires. Guy wires used to support turbine towers shall not be required to be grounded or to comply with the requirements of 250.110.

~~[FPN]~~ Informational Note: Guy wires supporting towers that are adequately grounded are ~~not~~ unlikely to become energized ~~and so are not subject to the requirements of 250.110~~. Grounding of metallic guy wires may be required by ~~lighting~~ lightning codes. See 694.40 (C)(4).

(C) Tower Grounding.
(1) Auxiliary Electrode(s). A wind turbine tower shall be grounded with one or more auxiliary electrode(s) to limit voltages imposed by lightning. Auxiliary electrodes ~~are~~ shall be permitted to be installed in accordance with 250.54. Electrodes that are part of the tower foundation and that meet the requirements for concrete encased electrodes (250.52(A)(3)) ~~are~~ shall be considered to be acceptable. A grounded metal tower support ~~is~~ shall be considered to be acceptable if it meets the requirements of 250.136(A). Where installed in close proximity to galvanized foundation or tower anchor components, galvanized grounding electrodes shall be used.

Informational Note: Copper and copper-clad grounding electrodes, when used in highly conductive soils, can cause electrolytic corrosion of galvanized foundation and tower anchor components.

(2) Equipment Grounding Conductor. An equipment grounding conductor shall be required between a turbine and the premises grounding system ~~grounded conductor~~ in accordance with 250.110.
(3) Tower Grounding Connections. The equipment grounding conductor, and grounding electrode conductors ~~(~~, if used~~)~~, shall be , shall be connected to a metallic tower by exothermic welding, listed lugs, listed pressure connectors, listed clamps, or other listed means. Devices such as connectors and lugs shall be suitable for the material of the conductor and the structure to which they connect. ~~Where~~ When practicable, dissimilar metals in contact anywhere in the system shall be avoided to eliminate the possibility of galvanic action and corrosion. All mechanical elements used to terminate these conductors shall be accessible.
(4) Lightning Protection Systems. Auxiliary electrodes and grounding electrode conductors shall be permitted to act as lightning protection system components if they meet ~~the~~ applicable requirements ~~of NFPA 780~~. If separate, the tower lightning protection system grounding electrodes shall be bonded to the tower auxiliary grounding electrode system. Guy lightning protection system ground electrodes shall not be required to be bonded to the tower auxiliary grounding electrode system.

~~FPN~~ Informational Note: See NFPA 780-2008, *Standard for the Installation of Lightning Protection Systems*, *Informative Annex N, Wind Turbine Generator Systems*, for information on lightning protection of wind turbines.

VI. Marking.
694.~~54~~50 Interactive System Point of Interconnection. All interactive system~~(s)~~ points of interconnection with other sources shall be marked at an accessible location at the disconnecting means as a power source and with the rated ac output current and the nominal operating ac voltage.
694.~~55~~52 Power Systems Employing Energy Storage. Small wind electric systems employing energy storage shall be marked with the maximum operating voltage, including any equalization voltage and the polarity of the grounded circuit conductor.
694.~~56~~ 54 Identification of Power Sources.
(A) Facilities with Stand-Alone Systems. Any structure or building with a power system that is not connected to a utility service source and is a stand-alone system shall have a permanent plaque or directory installed on the exterior of the building or structure at a readily visible location. The plaque or

directory shall indicate the location of system disconnecting means and that the structure contains a stand-alone electrical power system.

(B) Facilities with Utility Services and Small Wind Electric Systems. Buildings or structures with both utility service and a small wind electric system systems shall have a permanent plaque or directory providing the location of the service disconnecting means and the small wind electric system disconnecting means if not located at the same location.

694.56 Instructions for Disabling Turbine. A plaque shall be installed at or adjacent to a turbine location providing basic instructions for disabling the turbine.

VII. Connection to Other Sources.

[This section should be coordinated with similar language in 694 and 692 that indicates that the requirements of Article 705 apply.]

694.60 Identified Interactive Equipment. Only inverters listed or recognized, and identified as interactive shall be permitted in interactive systems.

694.62 Installation. Small wind electric systems, when connected to other electric sources, shall comply with the requirements of article Article 705.

694.62 64 Ampacity of Neutral Conductor.

If a single-phase, 2-wire inverter output is connected to the neutral conductor and one ungrounded conductor (only) of a 3-wire system or of a 3-phase, 4-wire, wye-connected system, the maximum load connected between the neutral conductor and any one ungrounded conductor plus the inverter output rating shall not exceed the ampacity of the neutral conductor.

A conductor used solely for instrumentation, voltage detection, or phase detection, and connected to a single-phase or 3-phase utility-interactive inverter, shall be permitted to be sized at less than the ampacity of the other current-carrying conductors and shall be sized equal to or larger than the equipment grounding conductor. See also 705.95.

694.6366 Operating Voltage Range. Systems Small wind electric systems operating on dedicated branch or feeder circuits may shall be permitted to exceed normal voltage operating ranges at the end of these circuits provided that the voltage at any general distribution equipment supplying other loads remains within these normal ranges.

> Informational Note: Wind turbines might use the electric grid to dump energy from short-term wind gusts. This may result in the voltage at the turbine exceeding the limits set out Normal operating voltages are defined in ANSI C84.1-2006, *Voltage Ratings for Electric Power Systems and Equipment (60 Hz)*, however the voltage at the distribution equipment must stay within the C84.1 range.]).

694.64 68 Point of Connection. See 705.12 Point of Connection.

[Note – this section may be deleted if Article 705 has equivalent language]

The output of a utility-interactive inverter shall be connected as specified in 694.64(A) or (B).

(A) Supply Side. The output of a utility-interactive inverter shall be permitted to be connected to the supply side of the service disconnecting means as permitted in 230.82(6).

(B) Load Side. The output of a utility-interactive inverter shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises. Where distribution equipment, including switchboards and panelboards, is fed simultaneously by a primary source(s) of electricity and one or more utility-interactive inverters, and where this distribution equipment is capable of supplying multiple branch circuits or feeders, or both, the interconnecting provisions for the utility-interactive inverter(s) shall comply with (B)(1) through (B)(7).

(1) Dedicated Overcurrent and Disconnect. Each source interconnection shall be made at a dedicated circuit breaker or fusible disconnecting means.

(2) Bus or Conductor Rating. The sum of the ampere ratings of overcurrent devices in circuits supplying power to a busbar or conductor shall not exceed 120 percent of the rating of the busbar or conductor. In systems with panelboards connected in series, the rating of the first overcurrent device directly connected to the output of a utility-interactive inverter(s) shall be used in the calculations for all busbars and conductors.

(3) Ground-Fault Protection. The interconnection point shall be on the line side of all ground-fault protection equipment.

Exception: Connection shall be permitted to be made to the load side of ground-fault protection, provided that there is ground-fault protection for equipment from all ground fault current sources. Ground-fault protection devices used with supplies connected to the load-side terminals shall be identified and listed as suitable for backfeeding.

(4) Marking. Equipment containing overcurrent devices in circuits supplying power to a busbar or conductor supplied from multiple sources shall be marked to indicate the presence of all sources.

(5) Suitable for Backfeed. Circuit breakers, if backfed, shall be suitable for such operation.

FPN: Circuit breakers that are marked "Line" and "Load" have been evaluated only in the direction marked. Circuit breakers without "Line" and "Load" have been evaluated in both directions.

(6) Fastening. Listed plug-in-type circuit breakers backfed from utility-interactive inverters complying with 694.60 shall be permitted to omit the additional fastener normally required by 408.36(D) for such applications.

(7) Inverter Output Connection. Unless the panelboard is rated not less than the sum of the ampere ratings of all overcurrent devices supplying it, a connection in a panelboard shall be positioned at the opposite (load) end from the input feeder location or main circuit location. The bus or conductor rating shall be sized for the loads connected in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment with the following or equivalent marking:

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE
THIS OVERCURRENT DEVICE

VIII. Storage Batteries.

[This common language should move to 480 or another common article]

694.7170 Installation.

(A) General. Storage batteries in small wind electric systems shall be installed in accordance with the provisions of Article 480.

(B) Dwellings.

(1) Operating Voltage. Storage batteries for dwellings shall have the cells connected so as to operate at less than 50 volts nominal. Lead-acid storage batteries for dwellings shall have no more than twenty-four 2-volt cells connected in series (48-volts nominal).

Exception: Where When live parts are not accessible during routine battery maintenance, a battery system voltage in accordance with 694.710 shall be permitted.

(2) Guarding of Live Parts. Live parts of battery systems for dwellings shall be guarded to prevent accidental contact by persons or objects, regardless of voltage or battery type.

> FPN Informational Note: Batteries in small wind electric systems are subject to extensive charge–/discharge cycles and typically require frequent maintenance, such as checking electrolyte and cleaning connections.

(C) Current Limiting. A listed, current-limiting, overcurrent device shall be installed in each circuit adjacent to the batteries where when the available short-circuit current from a battery or battery bank exceeds the interrupting or withstand ratings of other equipment in that circuit. The installation of current-limiting fuses shall comply with 694.1626.

(D) Battery Nonconductive Cases and Conductive Racks. Flooded, vented, lead-acid batteries with more than twenty-four 2-volt cells connected in series (48 volts, nominal) shall not use conductive cases or shall not be installed in conductive cases. Conductive racks used to support the nonconductive cases shall be permitted where when no rack material is located within 150 mm (6 in.) of the tops of the nonconductive cases.

This requirement shall not apply to any type of valve-regulated lead-acid (VRLA) battery or any other types of sealed batteries that may require steel or other conductive material cases for proper operation.

(E) Disconnection of Series Battery Circuits. Battery circuits subject to field servicing, where when more than twenty-four 2-volt cells are connected in series (48 volts, nominal), shall have provisions to disconnect the series-connected strings into segments of 24 cells or less for maintenance by qualified persons. Non–load-break bolted or plug-in disconnects shall be permitted.

(F) Battery Maintenance Disconnecting Means. Battery installations, where when there are more than twenty-four 2-volt cells connected in series (48 volts, nominal), shall have a disconnecting means, accessible only to qualified persons, that disconnects the grounded circuit conductor(s) in the battery electrical system for maintenance. This disconnecting means shall not disconnect the grounded circuit conductor(s) for the remainder of the small wind electric system. A non– load-break-rated switch shall be permitted to be used as the disconnecting means.

(G) Battery Systems of More Than 48 Volts. On small wind electric systems where when the battery system consists of more than twenty-four 2-volt cells connected in series (more than 48 volts, nominal), the battery system shall be permitted to operate with ungrounded conductors, provided the following conditions are met:

(1) The dc and ac load circuits shall be solidly grounded.

(2) All main ungrounded battery input/output circuit conductors shall be provided with switched disconnects and overcurrent protection.

(3) A ground-fault detector and indicator shall be installed to monitor for ground faults in the battery bank.

694.7275 Charge Control.

(A) General. Equipment shall be provided to control the charging process of the battery. Charge control shall not be required where when the design of the small wind electric source is matched to the voltage rating and charge current requirements of the interconnected battery cells, and the maximum charging current, multiplied by 1 hour, is less than 3 percent of the rated battery capacity expressed in ampere-hours or as recommended by the battery manufacturer. All adjusting means for control of the charging process shall be accessible only to qualified persons.

~~FPN~~ Informational Note: Certain battery types, such as valve-regulated lead -acid or nickel–cadmium, can experience thermal failure when overcharged.

(B) Diversion Charge Controller.

(1) Sole Means of Regulating Charging. A small wind electric system employing a diversion charge controller as the sole means of regulating the charging of a battery shall be equipped with two, reliable, independent means to prevent overcharging of the battery. An interconnected utility service shall not be considered to be a reliable diversion load.

(2) Circuits with Direct-Current Diversion Charge Controller and Diversion Load.

Circuits containing a dc diversion charge controller and a dc diversion load shall comply with the following:

(1) The current rating of the diversion load shall not be ~~less~~ greater than ~~or equal to~~ the current rating of the diversion load charge controller. The voltage rating of the diversion load shall be greater than the maximum battery voltage. The power rating of the diversion load shall be ~~at least~~ not less than 150 percent of the maximum power output rating of the ~~turbine~~ small wind electric system.

(2) The conductor ampacity and the rating of the overcurrent device for this circuit shall be at least 150 percent of the maximum current rating of the diversion charge controller.

IX. Systems over 600 Volts.

694.80 General. Small wind electric systems with a maximum system voltage ~~over~~ exceeding 600 volts ac or dc shall comply with Article 490 and other requirements applicable to installations rated over 600 volts.

694.85 ~~Definitions~~ Cable and Equipment Ratings. For the purposes of Part IX of this article, the voltages used to determine cable and equipment ratings ~~are~~ shall be as ~~follows.~~ specified in 694.85(A) and (B)**:**

(A) Battery Circuits. In battery circuits, the voltage used shall be the highest voltage experienced under charging or equalizing conditions~~.~~ , or

(B) Other Circuits. In other circuits, the voltage used shall be the maximum voltage experienced in normal operation.

Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-122 Log #2526 NEC-P04 **Final Action: Accept**
(694 (New))

Submitter: Timothy P. Zgonena, Underwriters Laboratories Inc.
Comment on Proposal No: 4-263
Recommendation: Propose to delete terms as follows.
(B) Equipment. Inverters or motor generators intended for use in small wind electric systems shall be identified and either listed (~~or recognized~~) for the application.
Substantiation: While I understand and appreciate the concerns of the author, recognition certifications vary greatly and are accompanied by conditions of acceptability. Conditions of acceptability appear in the individual recognition reports that are only available from the manufacturer. These conditions of acceptability contain the specific limitations of the product and /or certification. These limitations can include limited testing or construction evaluations. Recognized components are incomplete and are not eligible for an overall product certification like a Listing or Classification. Recognitions often exclude critical aspects that need to be further evaluated or accounted for in the end application.
The "recognized" verbiage in this proposal resulted from the lack of a US wind turbine certification program. This is no long the case since UL published Subject 6140, Outline Of Investigation For Wind Turbine Generating Systems and Subject 6141 Outline Of Investigation For Wind Turbine Converters And Interconnection Systems. These documents will allow for certifications of wind turbines and wind turbine components so these products can be certified as a complete product that can be readily accepted by AHJs in the field.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
ROGERS, J.: The comment should be accepted but the word "either" between the words "and" and "listed" should be removed.

4-123 Log #2675 NEC-P04 **Final Action: Accept in Principle in Part**
(694 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-263
Recommendation: Accept the proposal in principle.
In addition to addressing the TCC note, make the following additional changes:
I. In 694.2, Diversion Load, make the definition into a single sentence by removing the period the precedes the final sentence fragment and inserting a comma ("… load controller, also known as …")
II. In 694.3, delete the first sentence. Begin the remaining sentence "Where the system …".
III. In 694.4(A) Change "in addition to any services of another electricity supply system." to "in addition to other sources of supply, whether through a service, or through other separately derived systems, or both."
IV. In 694.4(B), revise the product acceptance criterion to read "shall be identified for the application."
V. In 694,4(E), change "to be attached to" to read "to be connected to".
VI. In 694.9(A), change "requirements of Article 240" to "requirements of Parts I and II of Article 240."
VII. In 694.9(A) Exception, change "when" to "where."
VIII. In 694.9(A) Informational Note, in the first sentence, delete "adequate" and add at the end of the sentence "in accordance with the provisions of this Code." In the third sentence, delete "to". In the fourth sentence, change "should be followed" to "contain the procedures to be followed." Also, add an apostrophe after "manufacturers."
IX. In. 694.10, delete the first sentence.
X. In 694.10(B), insert "Parts I and II of" ahead of "Article 240."
XI. In 694.10(D), change "are not" to "shall not be".
XII. In Part III, renumber all sections (694.13 through 694.18) by adding ten to the section numbers (694.23 through 694.28, respectively.)
XIII. In 694.14(C)(3) {will be 694.24(C)(3)}, delete the last sentence.
XIV. In 694.14(C)(4 and 5) {will be 694.24(C)(3)}, Change "group" to "set of grouped" near the end of (4) and delete (5).
XV. In 694.15 {will be 694.25} Exception, change "is not" to "shall not be."
XVI. Reword the title of Part IV to "Wiring Methods and Grounding." Incorporate both Section 694.31 and 694.43 in this part, with 694.31 renumbered as 694.41. Entitle this section as "Wiring Methods Permitted" and to correlate with this renumbering, change the reference in 694.14(C)(1) Exception from "694.31(C)" to "694.41(C)."
XVII. In 694.31(B) {will be 694.41(B)}, change "when" to "where" and change "Article 400" to "400.4".
XVIII. In 694.31(C) {will be 694.41(C)}, revise to read as follows:
694.41(C). Direct-Current Turbine Output Circuits Inside a Building. Where direct-current turbine output circuits are run inside a building or structure, they shall be contained in metal raceways, Type MC metal-clad cable that complies with 250.118(10), or metal enclosures, from the point of penetration of the surface of the building or structure to the first readily accessible disconnecting means. The disconnecting means shall comply with 694.24(A), (B) and (D). The wiring methods shall comply with the additional installation requirements of (1) through (4).
(1) Beneath Roofs. Wiring methods shall not be installed within 25 cm (10 in.) of the roof decking or sheathing. Circuits shall be run perpendicular to the roof penetration point to supports a minimum of 25 cm (10 in.) below the roof decking.
Informational Note: The 25 cm (10 in.) requirement is to prevent accidental damage from saws used by firefighters for roof ventilation during a structure fire.
(2) Flexible Wiring Methods. Where flexible metal conduit (FMC) or smaller than metric designator 21 (trade size ¾) or Type MC cable smaller than 25 mm (1 in.) in diameter containing direct-current turbine output circuit conductors is installed across ceilings or floor joists, the raceway or cable shall be protected by substantial guard strips that are at least as high as the raceway or cable. Where run exposed, other than within 1.8 m (6 ft) of their connection to equipment, these wiring methods shall closely follow the building surface or be protected from physical damage by an approved means.
(3) Marking or Labeling Required. The following wiring methods and enclosures that contain photovoltaic power source conductors shall be marked with the wording "DC Turbine Output Power Source" by means of permanently affixed labels or other approved permanent marking:
(1) Exposed raceways, cable trays, and other wiring methods.
(2) The covers or enclosures of pull boxes and junction boxes.
(3) Conduit bodies in which any of the available conduit openings are unused.
(4) Marking or Labeling Methods and Locations. The labels or markings shall be visible after installation. The power circuit labels shall appear on every section of the wiring system that is separated by enclosures, walls, partitions, ceilings, or floors. Spacing between labels or markings, or between a label and a marking, shall not be more than 3 m (10 ft). Labels required by this section shall be suitable for the environment where they are installed.
XIX. In 694.43(A), change "are not" to "shall not be". Change "grounded in accordance with 250.134 or 250.136(A) regardless of voltage" to "bonded to the system bonding jumper for dc systems and to the supply-side bonding jumper for ac systems, regardless of voltage."
XX. Combine 694.43(B) and (C) as follows:
(B) Tower Grounding.
(1) Auxiliary Grounding Electrodes and Grounding Electrode Conductors. A wind turbine tower shall be connected to one or more auxiliary grounding electrodes to limit voltages imposed by lightning. The auxiliary grounding electrodes shall comply with 250.52(A) in form and 250.54 for connections using a grounding electrode conductor that complies with 250.166 for dc systems and 250.62 through 250.70 for ac systems.
(2) System Bonding Jumper. A system bonding jumper or supply-side bonding jumper shall connect the turbine to the first system disconnecting means, sized and run in accordance with 250.168 for dc systems and 250.30(A)(2) for ac systems, respectively.

(3) Lightning Protection. Where a lightning protection system is present, its ground terminals shall be bonded to the tower grounding electrode system as required by 250.106. Where the tower is remote from the building or structure served, the tower grounding electrode system shall be permitted to be made a part of the lightning protection system.

Informational Note: See NFPA 780-2008, *Standard for the Installation of Lightning Protection Systems*, Informative Annex N, Wind Turbine Generator Systems, for information on lightning protection of wind turbines.

(4) Guy Wires. Guy wires used to support turbine towers shall not be required to be connected to the system bonding jumper or to a grounding electrode. Where included in a lightning protection system, the ground terminals for the guy wires shall not be required to be bonded to the one or more auxiliary grounding electrodes for the tower.

XXI. In 694.62, replace the proposal language with the following text:

The ampacity of the neutral conductors shall comply with either (A) or (B).

(A) Inverter Outputs Connected Between Neutral Conductor and Ungrounded Conductor(s). Where the outputs of single or multiple single-phase inverter(s) are connected between the neutral conductor and one or more of the ungrounded conductors of a 3-phase 4-wire, wye-connected system or a 120/240V single-phase system, the ampacity of the neutral conductor shall be no less than the greater of (1) or (2).

(1) 125 percent of the continuous load plus 100% of the non continuous load on that neutral conductor or

(2) 125 percent of the sum of the rated output current of all inverters considering worst-case imbalance.

(B) Used for Instrumentation, Voltage Detection or Phase Detection. A conductor used solely for instrumentation, voltage detection, or phase detection, and connected to a single-phase or 3-phase utility-interactive inverter, shall be permitted to be sized at less than the ampacity of the other current-carrying conductors and shall be sized equal to or larger than the equipment grounding conductor.

XXII. In 694.64 Revise to read as follows: "The output of a utility-interactive inverter shall be permitted to be connected to either the supply or the load side of the service disconnecting means in accordance with 705.12(A) or 705.12(D) as applicable."

Substantiation: General note: It is recognized that many of the sins corrected in the following items were copied from other related articles, and that those comparable issues will remain uncorrected in the source material. Where the source of the concern is the NEC Style Manual, that is abbreviated here as "NECSM".

I. The final sentence is not a sentence; this is a simple fix.

II. This is fully covered by 90.3. This process is taking place all over Chapter 6; see, for example, Proposal 12-165 in Article 665. The remaining sentence describes a condition of place.

III. Only a utility can supply a service. This wording is the most technically correct way to cover the additional sources.

IV. Apparently the intent is to recognize an inverter that is not necessarily listed (hence the undefined term "recognized." The correct terminology for this type of criterion is "identified" in its unmodified meaning as set forth in Article 100. If CMP 4 believes the standard should be "listed" the so be it. If CMP 4 wants the inverter to state in a visible way that it is for use with small wind electric systems, then this should say either "identified and marked" or "listed and marked" depending on CMP 4's preference.

V. This provision describes an electrical connection, not a mechanical attachment.

VI. This eliminates a violation of the whole-article-reference prohibition, NECSM at 4.1.1.

VII. This is a condition of place and not time.

VIII. "Adequate" is a word to be avoided (NECSM at 3.2.1). The word "to" in this case is an apparent typo. Recommendations are to be avoided in the NEC, and the missing apostrophe is an apparent typo.

IX. The first sentence hangs on the word "adequate" and since it does not add any real meaning to the code as a whole it should be deleted. Both its provisions (implicitly) and the second sentence are both modified by the three lettered subsections following, ending up in the same place.

X. This will eliminate a whole-article-reference violation of the NECSM at 4.1.1.

XI. The panel wording is not the correct way to frame a requirement, as covered in the NECSM at 3.1.1.

XII. This will preserve the spirit of the decade rule (NECSM at 2.4.2.1). It is understood that the proposal submitters were presumably attempting to maintain continuity with comparable material in related articles, with which this commenter is in full sympathy. The approach here retains the units digits and the relative order of material in order to respect the original numbering objective and still leave room for future additions.

XIII. The hazardous location rules apply as written unless this article attempts, with the approval of the TCC, to modify them. No such modification is contemplated here, so the sentence can be deleted, taking with it another violation of the whole-article-reference prohibition.

XIV. This makes the section simpler. By saying "set of grouped enclosures" the grouping requirement is fully covered in (4), and (5) is no longer necessary.

XV. This is the appropriate wording for a requirement (NECSM at 3.1.1).

XVI. Article parts are intended to help organize complicated articles and normally comprise more than a single section (NECSM at 2.1.4); in this case we have two successive parts with only a single section each, which is certainly not the intent of the Style Manual. Since they are adjacent to each other, the fix is simple: preserve the order of sections and make one part from the two. To make this work and leave space after694.18 (now to become 694.28), 694.31 becomes 694.41, which has, again, the same units digit. Normally this would be 694.40, but the intent with respect to correlating information with similar articles also has support (NECSM at 2.4.1).

XVII. This avoids a whole-article-reference violation and points to the section where the cord characteristics are detailed. Other provisions of Article 400 apply whether or not cited because they are not further amended in this article. The word "when" should not be used because it describes a condition of place.

XVIII. This is 690.31(E) (the obvious model for the proposal wording) as it has been changed during the ROP period by Proposal 4-228, and as it is recommended to be editorially modified in a companion comment by this submitter, all as modified to apply to small wind turbine sources. This wording assumes that a turbine might be placed on a roof, and therefore retains most of the roof provisions added to 690.31(E).

XIX. This is correct code language for a requirement (NECSM at 3.1.1). The second change is major and correlates with a decision to approach these connections as bonding connections on the supply side of a point-source separately derived system. Refer to the discussion in the next topic at item (2) for the full substantiation.

XX. The tower grounding rules are far more complicated than those for guy wires, and in addition the guy wire rules (as modified in this comment) depend on references to the tower they support. Since the tower rules can be simplified by appropriate references to other code material, it makes sense to combine the two subsections. The specific substantiation follows:

(1) This is essentially the same as proposed but better correlated with the work now ongoing in CMP 5 for this code cycle, and with Article 250 in general. Specifically, the actual electrodes must qualify under 250.52(A) and any such electrode should be suitable in this case. Note that as proposed the tower support reference to 250.136(A) is incorrect and should be to 250.52(A)(8), but this comment uses generic language that avoids this problem. This comment also adds appropriate dc system references as they will frequently apply. The notes made a part of the article scope clearly indicate both system types are covered. It also adds requirements for the grounding electrode conductors that were missing in the proposal.

(2) This is an interesting point of departure from Article 690. PV arrays are typically large in area and not thought of in the sense of a point source such as a generator, although everyone will agree they are separately derived systems. In addition, there is usually some form of overcurrent protection at the arrays. Therefore, Article 690 is generally organized around the terminology of an equipment grounding conductor. A wind turbine is a point source, and so it seemed more user-friendly to organize this portion of the article around system bonding jumpers. Where a generator is outside a building and the first disconnect is at the building, Article 250 has highly evolved terminology for the grounding connections between the two locations, and "equipment grounding conductors" are not used, because they are on the line side of any overcurrent protection. That is the case here, so the approach in this comment is the more technically correct. Note that the citation of 250.30(A)(2) is the new location for this conductor, now named for ac systems as a "supply-side bonding jumper." For dc systems the reference is in Part VIII of Article 250. The reference to 250.168 is particularly robust, since it brings in parts of 250.28 that in turn bring in 250.8.

(3) This part is somewhat troublesome because lightning protection systems are outside of the scope of the NEC, however, there is a precedent for limited coverage in 675.15. The second sentence accomplishes the submitter's objective of allowing the auxiliary grounding system to be a lightning protection system electrode, however, only for remote towers. This Chapter 6 amendment of 250.60 should not apply to a tower on the roof of the supplied premises

(4) This part is intended to meet the submitter's objectives. The informational note that came with this is deleted because it contained mandatory language as well is impermissible terminology ("adequately grounded"). It also is unnecessary because the NEC doesn't need to comment on whether they might be part of a lightning protection system, it is enough to say what to do in terms of the wiring system in the event they are so included. The implicit Chapter 6 waiver of 250.106 for ground terminal bonding on these items is retained. The informational note on NEPA 780 is also proper and has been retained.

XXI. This wording is that accepted for the same provision in 690.62 for what is electrically a comparable arrangement (see Proposal 4-242).

XXII. The text has been corrected to comply with the NEC Style Manual and the TCC Note on Proposal 4-246.

Panel Meeting Action: Accept in Principle in Part

The panel takes the following actions on the recommended text:

I. Accept

IIa. Accept

IIb. Accept in Principle: "Where" is changed to "If" in Comment 4-121.

III. Accept in Part: The panel accepted the first part of this change, however, considered the second part to be redundant.

IV. Accept in Principle: This is addressed in Comments 4-119, 4-120 and 4-122.

V. Accept

VI. Accept

VII. Reject: This is not a location reference and the NEC Style Manual in

3.3.4 states: Not permitted "Where" (in the sense of "when" or if) — Use "when" or "if" instead.
VIIIa. Accept
VIIIb. Reject : The panel prefers the existing text.
VIIIc. Accept in Principle: The sentence was deleted by the action taken on Comment 4-121.
VIIId. Accept in Principle: The sentence was deleted by the action taken on Comment 4-121.
IX. Reject: The sentence adds clarity.
X. Accept
XI. Accept
XII. Accept in Principle: The Article was renumbered by the action taken on Comment 4-121.
XIII. Accept
XIV. Accept
XV. Accept
XVI. Accept
XVIIa. Accept
XVIIb. Accept
XVIIIa. Accept in Part: The panel Accepts the first change, and Rejects the addition of the last sentence referring to 694.24 as it is unnecessary. The addition of "Type MC" is new material and is Rejected.
XVIIIb. Hold: The comment introduces a concept that has not had public review.
XIXa. Accept
XIXb. Reject: Unlike PV systems, the turbine output circuit is typically not grounded. The requirements for bonding (either ac or dc), therefore, do not apply. The grounding system conductor to the turbine is an equipment grounding conductor, not a bonding jumper.
XX. Reject: The panel Rejects the proposed language as it does not add clarity. Grounding system conductors are not bonding jumpers.
XXI. Reject: The action taken on Comment 4-121 moves the first part of 694.62 [new 64] into Article 705.
The action taken on Comment 4-133 moves the second part of 694.62 [new 64] into Article 705.
XXII. Reject: The text for 694.68 has been moved to 705.12 by the action taken on Comment 4-121.
Panel Statement: I. Accept
IIa. Accept
IIb. Accept in Principle: "Where" is changed to "If" by the action taken on Comment 4-121.
III. Accept in Part: The panel Accepted the first part of this change, however, considered the second part to be redundant.
IV. Accept in Principle: This issue is addressed by the actions taken in Comments 4-119, 4-120 and 4-122.
V. Accept
VI. Accept
VII. Reject: This is not a location reference and 3.3.4 of the NEC Style Manual 3.3.4 states: Not permitted: Where (in the sense of "when" or "if") — Use "when" or "if" instead.
VIIIa. Accept
VIIIb. Reject: The panel prefers the existing text.
VIIIc. Accept in Principle: The sentence has been deleted by the action taken on Comment 4-121.
VIIId. Accept in Principle: The sentence has been deleted by the action taken on Comment 4-121.
IX. Reject: The sentence improves clarity.
X. Accept
XI. Accept
XII. Accept in Principle: The Article was renumbered by the action taken on Comment 4-121.
XIII. Accept
XIV. Accept
XV. Accept
XVI. Accept
XVIIa. Accept
XVIIb. Accept
XVIIIa. Accept in Part: The panel Accepts the first proposed change, and Rejects the addition of the last sentence referring to 694.24 as it is unnecessary. The addition of Type MC is new material and is Rejected.
XVIIIb. Hold: The comment introduces a concept that has not had public review.
XIXa. Accept
XIXb. Reject: Unlike PV systems, the turbine output circuit is typically not grounded. The requirements for bonding (either ac or dc), therefore, do not apply. The grounding system conductor to the turbine is an equipment grounding conductor, not a bonding jumper.
XX. Reject: The panel Rejects the proposed language as it does not add further clarity. Grounding system conductors are not bonding jumpers.
XXI. Reject: Comment 4-121 moves the first part of 694.62 [new 64] into Article 705. Comment 4-133 moves the second part of 694.62 [new 64] into Article 705.
XXII. Reject: The text for 694.68 has been moved to 705.12 by the action taken on Comment 4-121.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-124 Log #2874 NEC-P04 **Final Action: Reject**
(694.4(D))

Submitter: Tom Baker, Puget Sound Electrical Training
Comment on Proposal No: 4-263
Recommendation: See comment on proposal 5-321
Substantiation: Comment 5-321, which was rejected, was to require Surge Protective Devices (SPDs) for dwelling units. Many dwelling units have the same exposure to lightning as wind turbines and SPDs should be installed. If the rationale is not the same, then the requirement in 694.4(D) should be deleted.
Panel Meeting Action: Reject
Panel Statement: There is no text or action requested.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

ARTICLE 695 — FIRE PUMPS

13-74 Log #2374 NEC-P13 **Final Action: Reject**
(695.1(B)(2))

Submitter: James E. Degnan, Sparling
Comment on Proposal No: 13-53
Recommendation: Revise text of 695.(B)(2) as follows:
(2) Pressure maintenance (jockey or makeup) pumps, when these pumps are connected to a source of supply that is separate from the fire pump's supervised supply circuit(s).
Substantiation: Although the panel clearly stated at the ROP that the proposed language is unnecessary, it is the submitter' opinion that the addition of this language will make the code clearer to a first time user. The language has been changed from the ROP to take advantage of the proposed language for 695.4.
Panel Meeting Action: Reject
Panel Statement: The added text implies that Article 695 covers jockey pumps, other than when these pumps are connected to a source of supply that is separate from the fire pump's supervised supply circuit and that definitely is not the case. The added text would cause more confusion than leaving the text as presently written.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-75 Log #453 NEC-P13 **Final Action: Reject**
(695.2)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 13-58
Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:
Fault-Tolerant External Control Circuits. Those control circuits either entering or leaving the fire pump controller enclosure, which if broken, disconnected, or shorted will not prevent the controller from starting the fire pump from all other internal or external means and ~~may~~ is capable of causeing the controller to start the pump under these conditions.
Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.
However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms may or can shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term may shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."
Since the use of the term "may" in this section does not meet either of these criteria, it should be changed.
Panel Meeting Action: Reject
Panel Statement: The text, as changed by the comment, would denote mandatory text. The word "may" cannot be used in text where mandatory is used but can be used in a definition where mandatory language is not permitted.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-76 Log #2361 NEC-P13 **Final Action: Reject**
(695.3)

Submitter: James S. Nasby, Skokie, IL
Comment on Proposal No: 13-60a
Recommendation: Reject this proposal.
Substantiation: This section is in the scope of NFPA-20 (FIM-AAA); but, this wording does not agree with either the 2007, nor the 2010 Edition of NFPA-20 as required by the Rules Governing Committee Projects; and, as required by Article 90. 9(C) (2).

The proposed verbiage is totally different from that in NFPA-20. There is no way for inspectors to enforce the two totally different wordings for fire pump power supply requirements. This is critical to the expected degree of life safety and property protection.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any specific problems with the NFPA extract policy. CMP 13 fully understands that NFPA 20 has primary purview over electric fire pumps. The NFPA extract policy permits Technical Committees to modify the style of the text to conform an individual code or standard provided the requirement is not modified. While the verbiage used in this action may be slightly different that seen in the body of NFPA 20, the requirements are concisely conveyed in this proposed revision of Article 695.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-77 Log #2362 NEC-P13 **Final Action: Reject**
(695.3 and 695.4)

Submitter: James S. Nasby, Skokie, IL
Comment on Proposal No: 13-50
Recommendation: Delete Aritcles 695.3 and 695.4.

Also, reject all proposals on these two Articles.
Substantiation: These two sections cover power supplies for fire pumps, which is covered in NFPA-20 (FIM-AAA) Chapter 9; and, is in the scope of NFPA-20. These sections were extract text; but, are not coordinated with either the 2007, nor the 2010 Edition of NFPA-20 as required by the Rules Governing Committee Projects; and, as required by Article 90.9(C)(2).

The proposed verbiage is totally different from that in NFPA-20. There is no way for inspectors to enforce the two totally different wordings for fire pump power supply requirements. This is critical to the expected degree of life safety and property protection.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-76.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-78 Log #443 NEC-P13 **Final Action: Accept**
(695.3 and 695.5(C))

Submitter: James W. Wilson, III, Consulting Electrical Engineer
Comment on Proposal No: 13-60a
Recommendation: Revise text to read as follows:

Change the first sentence of 695.5(C) as follows: "Where a feeder is provided in accordance with ~~695.3(B)(2)~~ 695.3(C),...".
Substantiation: 695.5(C) is affected by Proposal 13-60a changes to 695.3. To maintain the same intent, the reference to 695.3(B)(2), in 695.5(C), should be changed to 695.3(C).
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-79 Log #818 NEC-P13 **Final Action: Reject**
(695.3(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-60a
Recommendation: Revise text to read as follows:

(A) Individual Sources. Where approved by the authority having jurisdiction, and where capable of carrying indefinitely the sum...(remainder unchanged).
Substantiation: Reliability should be determined by the AHJ.
Panel Meeting Action: Reject
Panel Statement: Reliability of the power source for a fire pump is typically determined through a multiple disciplinary assessment including the authority having jurisdiction.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-80 Log #2273 NEC-P13 **Final Action: Reject**
(695.3(B)(1))

Submitter: Harold F. Willman, Colorado Code Consulting
Comment on Proposal No: 13-72
Recommendation: Revise as follows:

(1) Generator Capacity. An onsite generator(s) used to comply with this section shall be of sufficient capacity to indefinitely carry the locked-rotor current of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current of the associated fire pump accessory equipment ~~allow normal starting and running of the motor(s) driving the fire pump(s)~~ while supplying all other simultaneously operated load.
Substantiation: The panel did not address my question in the substantiation. Why would the capacity of the generator not be at least equal to the overcurrent protective device requirements? The generator for the fire pump is not normally considered a standby generator. The generator is considered an emergency generator. See 700.1, FPN No. 3. The concern is that if the fire pump has a locked rotor or has other problems, it will cause the generator to fail. This event would cause all of the emergency systems in the structure to fail.
Panel Meeting Action: Reject
Panel Statement: The suggested revision in Proposal 13-72, as well as this comment are outside of the purview of CMP 13. This requirement is extracted from NFPA 20 and is modified in the NEC style. The submitter is encouraged to address the NFPA 20 technical committee. The requirement in NFPA 20 exists in Section 9.6.1. The alternate power source is not required to be installed in accordance with Article 700. The overcurrent protective device between an on-site standby generator and the fire pump controller is required to be sized in accordance with 430.62 and not at the locked rotor current of the fire pump motor.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-81 Log #1801 NEC-P13 **Final Action: Accept in Principle**
(695.3(B)(1), FPN (New))

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 13-60a
Recommendation: Add text to read as follow:

FPN: NFPA 20.9.3.3 indicates that a second source of electric power is not required if a back-up engine driven or back-up steam turbine drive fire pump is installed.
Substantiation: Problem: As the revision to 695.3 is currently rewritten in Proposal 13-60a, the code requires a direct utility connection, or on-site production, or multiple sources or feeders to be considered reliable. Another alternative, as indicated in NFPA 20.9.3.3 is to provide a redundant pump with a diverse power source, other than an electrical source. This knowledge needs to be considered in reviewing fire pump installations. The limitation in the language of 695.3 is prescriptive, and without knowledge of the NFPA 20 allowance, is overly restrictive. As indicated by Ms. L. Little in the Comment on Affirmative Vote for Proposal 13-70, "This information should be inserted in Article 695 as a fine print note for clarity and usability. Users of the NEC do not necessarily own a copy of NFPA 20, nor are they familiar with this document. Users of the NEC including the enforcement community, rely on Article 695 for all prescriptive electrical requirements necessary. We believe that it is necessary to inform the user of the NEC that an alternate source of electrical power is not required if a back-up engine driven or back-up steam turbine drive fire pump is installed in accordance with NFPA 20."
Panel Meeting Action: Accept in Principle

Revise the recommendation as an exception to 695.3(B)(1) and (B)(2) as follows:

Exception to 695.3(B)(1) and (B)(2): An alternate source of power shall not be required where a back-up engine-driven or back-up steam turbine-driven fire pump is installed. [20:9.3.3]
Panel Statement: The panel action provides a direct correlation between NFPA 20 and NFPA 70, Article 695 on the conditions where an alternate source of power is not required.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-82 Log #2363 NEC-P13 **Final Action: Reject**
(695.3(B)(2))

Submitter: James S. Nasby, Skokie, IL
Comment on Proposal No: 13-77
Recommendation: Reject this proposal.
Substantiation: This section is in the scope of NFPA-20 (FIM-AAA); but, this wording does not agree with either the 2007, nor the 2010 Edition of NFPA-20 as required by the Rules Governing Committee Projects; and, as required by Article 90. 9(C) (2).

The proposed verbiage is totally different from that in NFPA-20. There is no way for inspectors to enforce the two totally different wordings for fire pump power supply requirements. This is critical to the expected degree of life safety and property protection.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-76.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-83 Log #1802 NEC-P13 **Final Action: Accept in Principle**
(695.3(C))

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 13-60a
Recommendation: Revise text to read as follow:
...feeder sources shall be permitted if approved by the authority having jurisdiction and installed in accordance with (C)(1) through (C)(3). Either (C)(1) or C(2) shall apply.
Substantiation: The revised rewording of Proposal 13-60a has changed the original intent of the equivalent 2008 Edition Section 695.3(B)(2). The original wording allowed two or more feeder sources to act as one power source, or as more than one power source where the feeders "are connected to or derived from separate utility services". The current rewording in the new 695.3(C) indicates that multi-building campus-style complexes installed in accordance with (C)(1) through (C)(3) inclusive, which would require feeder sources to comply with both conditions of 695.3(C)(1) and 695.3(C)(2), where the 2008 Edition requires either 695.3(C)(1) or 695.3(C)(2).
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
(C) Multibuilding Campus-Style Complexes. If the sources in 695.3(A) are not practicable and the installation is part of a multibuilding campus style complex, feeder sources shall be permitted if approved by the authority having jurisdiction and installed in accordance with either (C)(1) and (C)(3) or C(2) and (C)(3).
Panel Statement: For a multibuilding complex, there must either be two or more feeders as covered in (C)(1) or a feeder and an alternate source as covered in (C)(2). Whether (C)(1) or (C)(2) is used, compliance with (C)(3) for selective coordination is necessary.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-84 Log #1800 NEC-P13 **Final Action: Reject**
(695.3(C) Exception (New))

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 13-60a
Recommendation: Add text to read as follows:
"Exception: In industrial establishments, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, and where multiple fire pumps operate into a common firewater system, a fire pump controller shall be permitted to be supplied power by a single feeder from a disconnect dedicated to the fire water pump, meeting the requirements of 695.4(B). The industrial establishment shall have an interconnected power distribution system utilizing multiple electrical sources.
Substantiation: The intent of this change is to address the needs of large industrial complexes that fall under the requirements for multibuilding campus-style complexes which utilize feeders for fire pumps. This exception outlines the conditions in these industrial complexes on which a single feeder to a fire pump can be considered reliable in accordance with NFPA 20. These industrial complexes typically purchase power at a high voltage and have inherently reliable configuration from multiple utility sources. The IEEE Red Book (IEEE Std 141), IEEE Recommended Practice for Electric Power Distribution for Industrial Plants, illustrates the type of reliable industrial power distribution configuration typically found. This proposal permits these large industrial complexes to provide reliable service to multiple fire water pumps, each with a single dedicated feeder in a manner allowed by 695.3(A), without the need of providing an electrical utility service connection or multiple feeders (in accordance with 695.3(C)(I) or 695.3(C)(2)) dedicated to each fire pump.
Panel Meeting Action: Reject
Panel Statement: The recommendation proposes a fire pump power source that is not currently recognized in Section 9.2.2 of NFPA 20. The NFPA 20 committee is responsible for power sources to fire pumps and this proposal should be submitted to that technical committee for consideration.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-85 Log #2364 NEC-P13 **Final Action: Reject**
(695.4)

Submitter: James S. Nasby, Skokie, IL
Comment on Proposal No: 13-77a
Recommendation: Reject this proposal.
Substantiation: This section is in the scope of NFPA-20 (FIM-AAA); but, this wording does not agree with either the 2007, nor the 2010 Edition of NFPA-20 as required by the Rules Governing Committee Projects; and, as required by Article 90. 9(C) (2).
The proposed verbiage is totally different from that in NFPA-20. There is no way for inspectors to enforce the two totally different wordings for fire pump power supply requirements. This is critical to the expected degree of life safety and property protection.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any specific problems with the NFPA extract policy. CMP 13 fully understands that NFPA 20 has primary purview over electric fire pumps. The NFPA extract policy permits Technical Committees to modify the style of the text to conform an individual code or standard provided the requirement is not modified. While the verbiage used in this action may be slightly different that seen in the body of NFPA 20, the requirements are concisely conveyed in this proposed revision of Article 695.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-86 Log #1776 NEC-P13 **Final Action: Reject**
(695.4(B))

Submitter: Richard Schneider, Lancaster, SC
Comment on Proposal No: 13-82
Recommendation: Add to 695.4(B)(1)... And shall comply with 700.27 based on the following:
(a) The circuit breaker in the FPC set @ 20 × MFLC (Ref. 10.4.3.3.1(6), NFPA 20.
(b) The motor LRC = 8 times MFLC
(c) Re-start transient = 24 × MFLC
(d) No trip within 3 minutes @ 300 percent MFLC (cold start)
Substantiation: Overcurrent protective devices within the fire pump controller are set per NFPA 20 rather than Article 430. Locked rotor currents are based on actual field experiences.
Panel Meeting Action: Reject
Panel Statement: The parameters specified in (b) and (c) of the recommendation are not currently part of the requirements for coordination contained in the 2010 edition of NFPA 20. This material needs to be first reviewed by the NFPA 20 committee before it can be extracted into the NEC.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-87 Log #1803 NEC-P13 **Final Action: Reject**
(695.4(B)(3)(3) Exception (New))

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 13-77a
Recommendation: Add text to read as follow:
"Exception: In industrial establishments, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, metal-enclosed power switchgear disconnecting means, rated greater than 1000V and located in a dedicated vertical section, may be located adjacent to and interconnected with equipment that feeds loads other than the fire pump if the other provisions of 695.4(3) are met.
Substantiation: The intent of the exception is to provide a more reliable disconnecting means for the fire pump, as compared with separate switchgear and connection bus or cable as would be required without the exception. These industrial establishments typically use medium-voltage (rated greater than 1000V) metal-enclosed power switchgear. This switchgear is used to provide switching devices that have inherent design characteristics to prevent the expansion of a failure in one device into an adjacent section serving another load or source. Adjacent sections are connected by the manufacturer using bus bar connections. To meet the existing requirement for the disconnecting means to "not located within equipment that feeds other loads.. ", independent switchegear would be required. The connection of the indpendent switchgear would require some interconnection including cable-bus, six cable terminators and bus connections. Adjacent section of one switchgear are connected with bus bar connections that are more reliable than the cable-bus, six cable terminators and bus connections, needed to connect independent switchgear. Metal-enclosed power switchgear, as defined in Article 100, and built for medium-voltage is specified using well established industry standards such as C37.20.02 for metal-clad switchgear and ANSI C27.30.3 for metal-enclosed interrupter switchgear.
Panel Meeting Action: Reject
Panel Statement: This requirement to which the exception is based is extracted from Section 9.2.3.1 in NFPA 20 and the technical content of that section is the responsibility of the NFPA 20 committee. The submitter is encouraged to submit this material to the NFPA 20 committee for action.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-88 Log #2300 NEC-P13 **Final Action: Accept**
(695.4(B))

Submitter: William F. Stelter, Master Control Systems, Inc.
Comment on Proposal No: 13-82
Recommendation: Revise to read as follows:
695.4(B)(2)(a)... shall be ~~selected or set~~ rated to carry indefnitely the sum of the locked rotor current of the fire pump motor(s) and....
Substantiation: NFPA-20-2010 Clause 9.2.3.4 specifically requires the overcurrent protection device to be "rated to carry indefinitely the sum..." Since this paragraph is extract material from NFPA 20, it should be revised accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-89 Log #2365 NEC-P13 **Final Action: Reject**
(695.4(B))

Submitter: James S. Nasby, Skokie, IL
Comment on Proposal No: 13-86
Recommendation: Reject this proposal.
Substantiation: This section is in the scope of NFPA-20 (FIM-AAA); but, this wording does not agree with either the 2007, nor the 2010 Edition of NFPA-20 as required by the Rules Governing Committee Projects; and, as required by Article 90. 9(C) (2).
The proposed verbiage is totally different from that in NFPA-20. There is no way for inspectors to enforce the two totally different wordings for fire pump power supply requirements. This is critical to the expected degree of life safety and property protection.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-85.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-90 Log #2367 NEC-P13 **Final Action: Reject**
(695.4(B))

Submitter: James S. Nasby, Skokie, IL
Comment on Proposal No: 13-81
Recommendation: Reject this proposal.
Substantiation: This section is in the scope of NFPA-20 (FIM-AAA); but, this wording does not agree with either the 2007, nor the 2010 Edition of NFPA-20 as required by the Rules Governing Committee Projects; and, as required by Article 90. 9(C) (2).
The proposed verbiage is totally different from that in NFPA-20. There is no way for inspectors to enforce the two totally different wordings for fire pump power supply requirements. This is critical to the expected degree of life safety and property protection
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-85.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-91 Log #2366 NEC-P13 **Final Action: Reject**
(695.4(B)(1))

Submitter: James S. Nasby, Skokie, IL
Comment on Proposal No: 13-87
Recommendation: Reject this proposal.
Substantiation: This section is in the scope of NFPA-20 (FIM-AAA); but, this wording does not agree with either the 2007, nor the 2010 Edition of NFPA-20 as required by the Rules Governing Committee Projects; and, as required by Article 90. 9(C) (2).
The proposed verbiage is totally different from that in NFPA-20. There is no way for inspectors to enforce the two totally different wordings for fire pump power supply requirements. This is critical to the expected degree of life safety and property protection.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-85.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-92 Log #1594 NEC-P13 **Final Action: Accept**
(695.4(B)(1)(b))

Submitter: Jim Pauley, Schneider Electric
Comment on Proposal No: 13-77a
Recommendation: Change the reference from 695.3(B)(2) to 695.3(C).
Substantiation: The provision is intended to apply to the multi-building campus style arrangements. These were moved from 695.3(B)(2) to 695.3(C) in the ROP draft.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-93 Log #1649 NEC-P13 **Final Action: Reject**
(695.4(B)(1)(b))

Submitter: Daniel J. Caron, Bard, Rao + Athanas Consulting Engineers, LLC
Comment on Proposal No: 13-77a
Recommendation: Revise (b) as follows:
(b) *Multiple* ~~*Feeder*~~ *Sources.* For systems with two or more feeders as required to comply with other provisions of this *Code*, ~~installed under the provisions of 695.3(B)(2) only~~, additional disconnecting means and associated overcurrent protective device(s) shall be permitted provided each of the disconnecting means meets the requirements of 694.4(B)(2) and 695.4(B)(3). ~~as required to *comply* with other provisions of this Code.~~
Substantiation: The Article, as written, only allows 2 or more feeders for systems installed per 695.3(B)(2), however, 695.3(C) has additional applications where multiple feeders are required. "Feeder Sources" is changed to "Multiple Sources" due to the fact that the entire section, 695.4(B) is referring to feeders, so "Multiple Sources" is a more appropriate heading. The proposed rewrite also clarifies that multiple disconnecting means are allowed and each disconnecting means must then meet the requirements of 695.4(B)(2) alld695.4(B)(3)
Panel Meeting Action: Reject
Panel Statement: The requirements of 695.4(B)(1)(b) address only those installations covered by "695.3(C) Multibuilding Campus Style Complexes", not all feeders installed per the requirements of the NEC. The proposed revision is in direct conflict with NFPA 20 9.2.3. Confusion may have been caused by the incorrect reference to 695.3(B)(2) in Proposal 13-77a and in the ROP Draft.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-94 Log #1804 NEC-P13 **Final Action: Accept in Principle**
(695.4(B)(1)(b))

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 13-77a
Recommendation: Revise the 695.3 reference in the revised wording of 695.4(B)(1)(b) from "695.3(B)(2)" to "695.3(C)(1) and 695.3(C)(2)".
Substantiation: The reference in the Proposal 13-77a is incorrect with respect to the revision to 695.3 as provided in Proposal 13-60a. In the revised wording, the correct reference, as intended in the original wording, in the 2008 Edition is "695.3(C)(1) and 695.3(C)(2)".
Panel Meeting Action: Accept in Principle
Panel Statement: The panel action on Comment 13-92 addresses the recommendation of this comment.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-95 Log #817 NEC-P13 **Final Action: Reject**
(695.4(B)(2), (3), and (4))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-92
Recommendation: Revise as follows:
(B)(2) Be provided with integral permanent means for locking in the closed (ON) position.
(3) not be located within equipment that supplies other load(s).
(4) Be located remote from other premises disconnecting means except snap switches and the like, such that simultaneous operation by one person cannot be accomplished.
Substantiation: Locking means should be permanent and integral. The closed position should be designated "ON", since covers and doors can be locked closed.
Panel Meeting Action: Reject

Panel Statement: There was insufficient technical substantiation for the recommended changes. Changes in the 2008 NEC have addressed disconnecting means lock off provisions with standardized language, none of which was used within this comment. No substantiation was provided for deleting "other than the fire pump," deleting the word "sufficiently" as it applies to the remote location of the fire pump disconnecting means, or adding the phrase "except snap switches and the like."
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-96 Log #592 NEC-P13 **Final Action: Reject**
(695.4(B)(3)(a))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" as it is extracted material from NFPA 20, and is under the purview of the NFPA 20 Technical Committee.
Submitter: Daniel J. Caron, Bard, Rao + Athanas Consulting Engineers, LLC
Comment on Proposal No: 13-77a
Recommendation: Add text to read as follows:
(3) Disconnecting Means. All disconnecting devices that are unique to the fire pump loads shall comply with items (a) through (d) [20:9.2.3.1]
(a) *Features and Location.* The disconnecting means shall comply with all of the following:
(1) Be identified as suitable for use as service equipment
(2) Be lockable in the closed position
(3) Not be located within equipment that feeds loads other than the fire pump
(4) Be located sufficiently remote from other building or other fire pump source disconnecting means such that inadvertent operation at the same time would be unlikely
Exception to (B)(3)(a)(4): Where a fire pump has an On-Site Standby GeneratorM as the alternate source o(power, the alternate. source disconnecting means shall be permitted to be located within equipment that teeds other Article 700 loads. [20:9.3.6l].
Substantiation: The proposed exception provides relief to the requirements in 695.4(B)(3)(a)(4) for disconnecting means derived from an on-site standby generator where the generator serves other Emergency Systems. Emergency power for egress lighting, smoke control systems, etc. is just as essential to safeguard life and property as a fire pump, therefore the requirements of Article 700 should be the basis for emergency power to a fire pump. The proposed 2010 version of NFPA 20 (9.3.6) indicates that conductors and disconnecting means from a second source of power (such as an on-site standby generator) are not required to meet the stricter requirements of 20.9.2. Also, this exception provides additional validity to Fine Print Note No. 3 of Article 700.1 which references fire pumps as equipment that emergency systems normally serve.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
(3) Disconnecting Means. All disconnecting devices that are unique to the fire pump loads shall comply with items (a) through (d). [~~**20**:9.2.3.1~~]
(a) Features and Location
(1) The disconnecting means for the normal power source shall comply with all of the following [**20**:9.2.3.1]:
a. Be identified as suitable for use as service equipment
b. Be lockable in the closed position
c. Not be located within equipment that feeds loads other than the fire pump
d. Be located sufficiently remote from other building or other fire pump source disconnecting means such that inadvertent operation at the same time would be unlikely
(2) The disconnecting means for an on-site standby generator(s) used as the alternate power source shall be installed in accordance with 700.9 (B)(5) for emergency circuits and shall be lockable in the closed position.
No changes to (b), (c), and (d) in Proposal 13-77a.
Panel Statement: The intent of the recommendation has been satisfied, in that, the disconnecting means from an on-site standby generator used as the alternate source no longer must comply with the requirements for the normal power disconnecting means. The panel has separated the alternate standby generator source disconnect from the requirements for the normal disconnect to correlate with NFPA 20 Section 9.2.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 17 Negative: 1
Explanation of Negative:
ODE, M.: The Section of Article 695 being affected by this Comment is extracted from Section 9.2.3.1 of NFPA 20. Such extract text is under the jurisdiction of the NFPA 20 Committee. The comment should be rejected to be consistent with the panel action on other Comments affecting extract material such a 13-80, 13-86 and 13-87.

13-97 Log #287 NEC-P13 **Final Action: Accept**
(695.6)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 13-95a
Recommendation: The Technical Correlating Committee directs that the panel clarify the location of the Fine Print Note from existing 695.6(B).
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the TCC direction for clarification. The panel requests that the FPN remained as located in the NEC draft after 695.6(A)(2)(d)(3).
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-98 Log #1595 NEC-P13 **Final Action: Reject**
(695.6)

Submitter: Jim Pauley, Schneider Electric
Comment on Proposal No: 13-95a
Recommendation: Change the reference from 695.3(B)(2) to 695.3(C).
Substantiation: The provision is intended to apply to the multi-building campus style arrangements. These were moved from 695.3(B)(2) to 695.3(C) in the ROP draft.
Panel Meeting Action: Reject
Panel Statement: The panel action to accept Comment 13-100 negates the need to revise the reference.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-99 Log #444 NEC-P13 **Final Action: Reject**
(695.6(A))

Submitter: James W. Wilson, III, Consulting Electrical Engineer
Comment on Proposal No: 13-95a
Recommendation: Revise text to read as follows:
In the proposed new 695.6(A)(3), change the first sentence as follows: "Where a fire pump is wired under the provision of ~~695.3(B)(2)~~ 695.3(C), all supply...".
Substantiation: This proposed addition is affected by Proposal 13-60a's changes to 695.3 in which provisions for "Multi-building Campus-Style Complexes" are placed under 695.3(C).
Panel Meeting Action: Reject
Panel Statement: The panel action to accept Comment 13-100 negates the need to revise the reference.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-99a Log #CC1300 NEC-P13 **Final Action: Accept**
(695.6(A)(2)(d))

Submitter: Code-Making Panel 13,
Comment on Proposal No: 13-95a
Recommendation: Revise 695.6(A)(2)(d) as to read:
Inside of a Building. ~~When~~ Where routed through a building, the conductors shall be installed using one of the following methods:
Substantiation: This recommendation makes editorial corrections to the recommended text of Proposal 13-95a.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-100 Log #593 NEC-P13 **Final Action: Accept**
(695.6(A)(3))

Submitter: Daniel J. Caron, Bard, Rao + Athanas Consulting Engineers, LLC
Comment on Proposal No: 13-95a
Recommendation: Delete the following text:
~~(3) Multi Building Campus Style Complexes. Where a fire pump is wired under the provisions of 895.3(B)(2), all supply conductors on the load side of the service disconnecting means that constitute the normal source of supply to that fire pump shall be physically routed outside a building(s) and shall be installed as outside feeder conductors in accordance with Article 225. Where the feeder conductors cannot be physically routed outside of buildings, they shall be permitted to be routed through the building(s) where installed in accordance with 230.6(1) or 230.6(2).~~
~~Exception to (A)(3): Where there are multiple sources of supply with means for automatic connection from one source to the other, the requirement for routing outside of the building(s) shall apply only to those conductors on the load side of that point of automatic connection between sources.~~

Substantiation: In multi-building campus style complexes, where the normal power source(s) to a fire pump is a feeder as allowed in 695.3(C), the language in 695.6(A)(3) is unnecessarily restrictive and contradictory. It should be deleted for the following reasons:

1. 695.6(A)(3) requires the normal power feeder to be encased in concrete from the disconnecting device all the way to the fire pump controller. In many situations, this would require a concrete ductbank to be installed within a building (as opposed to buried in the ground) which is extremely difficult.
2. 695.3(C) allows connections to fire pumps to be feeders and, in addition, requires that 2 or more feeders be provided. Since there are at least 2 independent feeder sources provided to the fire pump, there is no added benefit of making one or both of these feeders encased in concrete.
3. The requirements in 695.6(A)(2) are sufficient for the feeder conductors.
4. The exception states "Where there are multiple sources of power... " which is always the case as the Article specifically references 695.3(B)(2), so the exception always applies.
5. The exception states that the requirement is for the feeder on the load side of the transfer switch. In almost all applications, the fire pump transfer switch is part of the fire pump controller and NFPA 20 requires (basically) the controller to be in the same room as the fire pump. So this is referring to a very small length of cable.
6. The exception to 695.6(A)(2)(d) states that the feeder within the fire pump room is exempt from fire rating requirements, so the Code has already acknowledged that this part of the cable does not need to meet the fire rating in other applications.

Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 17 Negative: 1
Explanation of Negative:
ODE, M.: The proposed deletion of (3) for multi-building campus-style introduces new material that has not had public review. The submitter's comment on Affirmative did not mention deleting the entire subsection as a recommended fix to his problem. This Comment should be held for the 2014 NEC cycle.

13-101 Log #811 NEC-P13 **Final Action: Reject**
(695.6(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-103
Recommendation: Accept the proposal and revise text to read as follows:
They shall be permitted to be routed through a building(s) or other structure(s) only if using one or more of the following methods:
(1) be encased in a minimum of 50 mm (2 in) of cement concrete.
Substantiation: "Permitted" without a conditional "only" does not impose a requirement per 90.5(B). More than one method should be permitted. Cement concrete should be specified; asphalt concrete is flammable.
Panel Meeting Action: Reject
Panel Statement: There was no technical substantiation provided to justify this proposed change. The introductory text provides sufficient limitation on the alternative methods of routing conductors through a building. Concrete is a well understood term and is used throughout the NEC. The recommended text does not improve understanding of the material that is required.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-102 Log #1642 NEC-P13 **Final Action: Hold**
(695.6(B))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Hold" as it introduces new material and is not in accordance with 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.
The concept of 4 inches of concrete equated to a 2 hour fire-rating has not had public review.
Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 13-102
Recommendation: Accept proposal 13-102 with the following additional fine print note:
695.6(B) Circuit Conductors. Fire pump supply conductors on the load side of the final disconnecting means and overcurrent device(s) permitted by 695.4(B) shall be kept entirely independent of all other wiring. They shall supply only loads that are directly associated with the fire pump system, and they shall be protected to resist potential damage by fire, structural failure, or operational accident. They shall be permitted to be routed through a building(s) using one of the following methods:
(1) Be encased in a ~~minimum 50 mm (2 in.) of~~ concrete with a sufficient thickness to achieve a minimum 2 hour fire rating.
FPN 1: A typical 2-hour construction is 100 mm (4 in.) thick concrete.
FPN 2: See section 19 of the NFPA Fire Protection Handbook 20th edition for minimum slab thickness for fire resistance ratings. This provides thickness for various types of concrete.
(2) Be protected by a fire-rated assembly listed to achieve a minimum fire rating of 2 hours and dedicated to the fire pump circuit(s).
(3) Be a listed electrical circuit protective system with a minimum 2-hour fire rating
FPN: UL guide information for electrical circuit protective systems (FHIT) contains information on proper installation requirements to maintain the fire rating.
Exception: The supply conductors located in the electrical equipment room where they originate and in the fire pump room shall not be required to have the minimum 1-hour fire separation or fire resistance rating, unless otherwise required by 700.9(D) of this Code.
Substantiation: Although 2 inches of concrete served the industry well for a 1 hour fire rating, the requirement is now for a 2 hour fire rating. To satisfy the panels request for more prescriptive information on the thickness of the concrete, fine print note 1 has been added. The NEC currently has fine print notes that state typically 150 mm (6 inch) thickness of concrete is used for a 3-hour rating in section 450.42. This note was also added to 110.31A. Since 2 inches of concrete was previously used as acceptable for 1-hour, 100 mm (4 inches) was added in the fine print note for the requirement of 2-hours.
Additionally since concrete thickness may vary based on the type of concrete, fine print note 2 was added to provide information on this.
Panel Meeting Action: Accept in Principle
Revise existing code text as follows:
695.6(B) Circuit Conductors. Fire pump supply conductors on the load side of the final disconnecting means and overcurrent device(s) permitted by 695.4(B) shall be kept entirely independent of all other wiring. They shall supply only loads that are directly associated with the fire pump system, and they shall be protected to resist potential damage by fire, structural failure, or operational accident. They shall be permitted to be routed through a building(s) using one of the following methods:
(1) Be encased in a minimum of ~~50~~ 100 mm (~~24~~ in.) of concrete.
Panel Statement: The panel action provides a prescriptive value for the thickness of concrete that allows for objective enforcement.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
ODE, M.: The Panel statement did not provide any technical substantiation for the change from 2 inches of concrete in the existing NEC text to 4 inches of concrete. There are many different factors that can affect heat transfer, other than the thickness of concrete. Pre-stressed concrete has a different heat transfer ratio than lightweight concrete, steel reinforcement within concrete will affect heat transfer, and the type of aggregate used within the concrete will also affect heat transfer. The NFPA Fire Protection Handbook states the following: "Reinforcing steel can also affect the amount of heat transfer that can occur within the concrete floor or wall." Concrete has a low thermal conductivity and a low thermal capacity. One of the more significant factors in determining the thermal characteristics of reinforced concrete is the type of aggregate used in the concrete and the type of aggregate used in the concrete can vary throughout the United States. Concrete in direct contact with earth will have a different heat transfer than concrete installed as a wall or floor ceiling installation for multiple floor locations. Moisture content of the concrete will affect heat transfer. Furthermore, lightweight concrete has much different heat transfer rates than regular, reinforced, or pre-stressed concrete. The submitter should have provided a Fact Finding Study on the different types of concrete that could be used, the recommended thickness, and addressed the variables with the amount of heat transfer for each application so the Panel could act on the technical merits for this change, rather than just guessing at a depth of concrete. The 2-inch concrete thickness has been used for many NEC cycles and should not be changed without proper technical substantiation for this change.
SPINA, M.: Although information was received with these comments this information was new material which has not had opportunity for adequate public review and comment.

13-103 Log #2459 NEC-P13 **Final Action: Accept in Principle**
(695.6(B)(3))

Submitter: Edward Walton, WC Services
Comment on Proposal No: 13-105
Recommendation: Revise wording as follows:
695.6(B)(3) Be a listed electrical circuit protective system with a minimum 2-hour fire rating.
Electrical circuit protective system installation shall comply with any restrictions provided by the manufacturer's instructions or in the listing of the electrical circuit protective system used ~~and~~ or the following:
(1) As required by NFPA-20, a junction box shall be installed ahead of the fire pump controller a minimum of 12 in. beyond the fire-rated wall or floor bounding the fire zone.
~~(2) The raceway between the junction box and the fire pump controller shall be sealed at the junction box end with an identified compound in accordance with the instructions of the manufacturer of the electrical circuit protective system.~~
(2) Where required by the manufacturer of a listed electrical circuit protective system or by the listing, or as required elsewhere in this Code, the raceway between a junction box and the fire pump controller shall be sealed at the junction box end as required and in accordance with the instructions of the manufacturer.

(3) Standard wiring between the junction box and the controller is acceptable.
Substantiation: 1. Manufacturer's instructions should be part of any installation procedure.

2. Per NFPA-20, a separate junction box only applies where single conductors (individual conductors) are used because single conductors (individual conductors) shall not enter the fire pump enclosure separately.

3. (a), As written, the raceway seal would be required by this paragraph even though it is not required by the manufacturer or the electrical circuit protective system or anywhere else in the code. The revised writing is the same as other accepted proposals addressing this requirement.

(b) Prior attempts to require a seal for non MI cables (2005 NEC) were rejected for lack of substantiation beyond the above referenced manufacturer or electrical circuit protective system requirements.
Panel Meeting Action: Accept in Principle
Panel Statement: The intent of the recommendation is met by the panel action on Proposal 13-97 in the 2011 NEC ROP.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:

ODE, M.: The action on this Comment should have been to accept in part since the text in the Comment in (2) is exactly word for word with the accepted text in the Action in Proposal 13-97 so any further revision is unnecessary. Inserting the phrase "by the manufacturer's instructions or" is unnecessary since this is already located in 110.3(B) and inserting the phrase "As required by NFPA 20" does not comply with Section 4.2 of the NEC Style Manual which prohibits references to other standards in NEC mandatory text.

13-104 Log #2779 NEC-P13 **Final Action: Accept**
(695.6(D))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 13-111
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-105 Log #692 NEC-P13 **Final Action: Reject**
(695.6(D) Exception No. 1)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-112
Recommendation: Accept the proposal and revise as follows:

Conductors supplying battery power for starting of fire pump engines shall be protected only against short-circuit.
Substantiation: "Shall not require" does not prohibit overcurrent protection in accordance with conductor ampacity, where starting current may cause opening of the overcurrent device and prevent starting. Without short-circuit protection a short circuit could cause fire and disfunction of fire pumps.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided technical substantiation to support his recommendation. See the panel statement on Proposal 13-112.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:

ODE, M.: There was no technical substantiation provided to take the text from permissive to mandatory. Section 240.21(H) text in the 2008 NEC is non-mandatory or permissive text for overcurrent protection for battery cables that permits but does not require overcurrent protection of the cables.

13-106 Log #691 NEC-P13 **Final Action: Reject**
(695.6(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-117
Recommendation: Accept the proposal.
Substantiation: "Impervious" as used in 330.10(A)(1) has nothing to do with physical damage; it relates to moisture, whereas used in this section implies the cable is not capable of sustaining damage, which is covered by 330.12.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the original panel action on Proposal 13-117. The panel disagrees that "impervious" used in this section implies not capable of sustaining damage. Two types of liquidtight flexible conduit are also permitted by this section making it clear that "impervious" as used in this section is with regard to protection from corrosion and other deleterious effects.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:

ODE, M.: MC cable for applications relating to fire pump wiring must be impervious to moisture similar to the requirements in 430.11 for dripping oil or spraying oil, water, or other liquids in the fire pump room. If the area is considered a wet location and a corrosive area, compliance with 330.10(A)(11) and 330.12(2) must apply. Section 90.3 states that Chapters 1 through 4 apply generally, with Chapters 5, 6 and 7 supplementing or amending the requirements in the general chapters. Section 695.6(E) provides the acceptable wiring methods from the fire pump controller to the fire pump and, unless amended or supplemented, all the requirements in 330.10 and 330.12 also apply.

13-107 Log #2368 NEC-P13 **Final Action: Reject**
(695.6(E))

Submitter: James S. Nasby, Skokie, IL
Comment on Proposal No: 13-115
Recommendation: Reject this proposal
Substantiation: EMT (electrical metallic tubing) is not adequate protection for the critical path wiring to the fire pump motor in the pump room. It does not provice the physical protection nor does it adequately protect the motor and the controller from water entering into the raceway. Most pump rooms are sprinklerd and are also subject to splashing and spraying water. Also, the motor conduit (raceway) may be overhead or run across the floor. Serviceing the motor, the pump and associated hydraulic components (valves and etc.) do regularly subject the motor raceway to stress due to the weight of the components involved (hundreds of pounds, if not tons).

Any cost savings are small, especially compaired to the installationi and the risk (live and property) being protected.
Panel Meeting Action: Reject
Panel Statement: Section 358.10 permits the use of EMT in wet locations and typically the sprinkling of the room or splashing and spraying water do not warrant classification as a wet location. The proposal submitter correctly stated that Article 358 allows the use of electrical metallic tubing in areas where it is not exposed to severe physical damage whereas MC cable, which is allowed in 695.6(E), is not allowed where subject to any physical damage. The physical properties of EMT are more robust than those of MC cable so if MC can withstand the pump room environment, EMT should be sufficient.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-108 Log #2369 NEC-P13 **Final Action: Reject**
(695.6(E))

Submitter: James S. Nasby, Skokie, IL
Comment on Proposal No: 13-116
Recommendation: Reject this proposal.
Substantiation: EMT (electrical metallic tubing) is not adequate protection for the critical path wiring to the fire pump motor in the pump room. It does not provice the physical protection nor does it adequately protect the motor and the controller from water entering into the raceway. Most pump rooms are sprinklerd and are also subject to splashing and spraying water. Also, the motor conduit (raceway) may be overhead or run across the floor. Serviceing the motor, the pump and associated hydraulic components (valves and etc.) do regularly subject the motor raceway to stress due to the weight of the components involved (hundreds of pounds, if not tons).

Any cost savings are small, especially compaired to the installationi and the risk (live and property) being protected.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 13-107.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-109 Log #810 NEC-P13 **Final Action: Reject**
(695.6(G))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-135
Recommendation: Accept the proposal and revise text to read as follows:

(G) Protection. All wiring associated with the fire pump system, including batteries, shall be protected by approved means and shall be installed in accordance with manufacturers' instructions.
Substantiation: Protection can be by location or physical means and should apply to all wiring associated with the system.
Panel Meeting Action: Reject
Panel Statement: The existing text does not restrict the method used to provide physical protection for wiring from controllers and batteries. Location or physical means of protection may be used where the wiring is installed in accordance with the controller and engine manufacturer's instructions.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-110 Log #812 NEC-P13 **Final Action: Reject**
(695.6(J)(5))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-97
Recommendation: Revise (J)(5) as follows:
Terminals, junction blocks, wire connectors, and splicing devices, shall be listed.
Substantiation: Soldered splices are not listed; "where used" is superfluous, the provision only applies if used.
Panel Meeting Action: Reject
Panel Statement: The text is extracted from NFPA 20 and is under the purview of that committee. The panel suggests submitting this recommendation to the NFPA 20 committee for action.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-111 Log #2370 NEC-P13 **Final Action: Accept**
(695.7)

Submitter: James S. Nasby, Skokie, IL
Comment on Proposal No: 13-121a
Recommendation: Delete the 2nd exception.
Substantiation: The 5% maximum allowed motor voltage drop absolutely does apply whether or not the Mechanical Manual (Emergency) Operator is used or not. This requirement is covered by Clause 9.4.4 (Old 9.4.3) with no exceptions. The exceptions apply only to the 15% Starting Voltage Drop.
Panel Meeting Action: Accept
Panel Statement: The panel notes that the exception applies only to 695.7(A) shown in the panel action on Proposal 13-121a and should be moved to follow 695.7(A).
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-112 Log #690 NEC-P13 **Final Action: Reject**
(695.12(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-124
Recommendation: Accept the proposal and revise as follows:
Storage batteries used for fire pump engine drives shall be supported above the floor, secured against displacement and vibration, and located where there are no likely to be subject to physical damage, flooding with water, and temperatures for which they are not approved.
Substantiation: If located in the same area as fire pump system piping, it is always possible batteries can be flooded, especially if located underground. If secured to the mounting base of engine drives, they will not be subject to excessive (not defined) vibration due to shock-absorbing mountings for the engines. "Excessive" temperatures are not defined. "Likely" is a term used in many sections of the NEC and was accepted fin Proposal 4-272, 705.22(4) FPNs 2 through 4 in the 2010 ROP.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original action and statement. The recommended text does not provide additional clarity and the substantiation has no technical merit.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:
ODE, M.: The section reference in the Comment is incorrect and should be 695.12(C), not 695.12(E).

13-113 Log #813 NEC-P13 **Final Action: Reject**
(695.12(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-125
Recommendation: Accept the proposal and revise text to read as follows:
Fire pump controllers, transfer switches, and other associated controls, and other wiring and equipment shall be located or enclosed by approved means so as to be protected from damage or malfunction due to escaping water from fire pumps or piping.
Substantiation: Other controls than those of the fire pump system that can malfunction or be damaged should be included.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original action and statement. The recommended text does not provide additional clarity and the substantiation has no technical merit. Multiple changes have been recommended within the text with any supporting substantiation.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:
ODE, M.: The Panel statement for this Comment should have been as follows: "The Panel reaffirms its original action and statement. The recommended text does not provide additional clarity and the substantiation has no technical merit. Multiple changes have been recommended within the text with no supporting substantiation."

13-114 Log #1643 NEC-P13 **Final Action: Accept in Principle in Part**
(695.14(F))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 13-131
Recommendation: Accept 695.14(F)(1)with the additional fine print notes. Continue to accept the balance of the proposal.
695.14(F) Generator Control Wiring Methods**.** Control conductors installed between the fire pump power transfer switch and the standby generator supplying the fire pump during normal power loss shall be kept entirely independent of all other wiring. They shall be protected to resist potential damage by fire or structural failure. They shall be permitted to be routed through a building(s) using one of the following methods:
(1) Be encased in 50 mm (2 in.) of concrete with a sufficient thickness to achieve a minimum 2 hour fire rating.
FPN 1: A typical 2-hour construction is 100 mm (4 in.) thick concrete.
FPN 2: See section 19 of the NFPA Fire Protection Handbook 20th edition for minimum slab thickness for fire resistance ratings. This provides thickness for various types of concrete.
(2) Be protected by a fire-rated assembly listed to achieve a minimum fire rating of 2 hours and ~~or within enclosed construction~~ dedicated to the fire pump circuits ~~and having a minimum 1-hour fire resistance rating~~,
(3) Be a listed electrical ~~or~~ circuit protective systems with a minimum of **2**~~1~~-hour fire rating resistance. The installation shall comply with any restrictions provided in the listing of the electrical circuit protective system used.
FPN: UL guide information for electrical circuit protective systems (FHIT) contains information on proper installation requirements to maintain the fire rating.
Substantiation: Although 2 inches of concrete served the industry well for a 1 hour fire rating, the requirement is now for a 2 hour fire rating. To satisfy the panels request for more prescriptive information on the thickness of the concrete, fine print note 1 has been added. The NEC currently has fine print notes that state typically 150 mm (6 inch) thickness of concrete is used for a 3-hour rating in section 450.42. This note was also added to 110.31A. Since 2 inches of concrete was previously used as acceptable for 1-hour, 100 mm (4 inches) was added in the fine print note for the requirement of 2-hours.
Additionally, since concrete thickness may vary based on the type of concrete, fine print note 2 was added to provide information on this. **.**
Panel Meeting Action: Accept in Principle in Part
Revise text to read as follows:
695.14(F) Generator Control Wiring Methods**.** Control conductors installed between the fire pump power transfer switch and the standby generator supplying the fire pump during normal power loss shall be kept entirely independent of all other wiring. They shall be protected to resist potential damage by fire or structural failure. They shall be permitted to be routed through a building(s) using one of the following methods:
(1) Be encased in a minimum of ~~50~~ 100 mm (~~2~~ 4 in.) of concrete ~~with a sufficient thickness to achieve a minimum 2 hour fire rating.~~
~~FPN 1: A typical 2-hour construction is 100 mm (4 in.) thick concrete.~~
~~FPN 2: See section 19 of the NFPA Fire Protection Handbook 20th edition for minimum slab thickness for fire resistance ratings. This provides thickness for various types of concrete.~~
(2) Be protected by a fire-rated assembly listed to achieve a minimum fire rating of 2 hours and ~~or within enclosed construction~~ dedicated to the fire pump circuits. ~~and having a minimum 1-hour fire resistance rating~~,
(3) Be a listed electrical ~~or~~ circuit protective systems with a minimum of **2**~~1~~-hour fire rating. ~~resistance.~~ The installation shall comply with any restrictions provided in the listing of the electrical circuit protective system used.
FPN: UL guide information for electrical circuit protective systems (FHIT) contains information on proper installation requirements to maintain the fire rating.
Panel Statement: The panel action provides a prescriptive value for the thickness of concrete that allows for objective enforcement and has made editorial revisions for consistency with similar requirements. The panel rejects the addition of the term "resistance" in (3) as this was changed to "fire rating" by the panel action on Proposal 13-131. In comparing this action to the ROP Draft, the panel notes that there is an omission of text in (F)(2) and it is necessary to restore the words "dedicated to the fire pump circuit" accepted by the panel action on Proposal 13-131.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2

Explanation of Negative:

ODE, M.: The Panel Action should have been to reject the Comment and continue accepting the proposal in part. See my negative statement in Comment 13-102.

SPINA, M.: Although information was received with these comments this information was new material which has not had opportunity for adequate public review and comment.

ARTICLE 700 — EMERGENCY SYSTEMS

13-115 Log #1866 NEC-P13 **Final Action: Accept in Principle**
(700)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 13-138
Recommendation: Accept the Proposal.
Substantiation: The proposal has merit and should be accepted. The present inclusion of the definition of "Emergency System" in the scope of Article 700 is a violation of the NEC Style Manual Section 2.2.2.2 which reads as follows: **"2.2.2.2 Definitions in Other Articles.** If an article contains one or more definitions, the definition(s) shall be in the second section, shall be listed in alphabetical order, and shall be styled as shown in the following examples.

Examples:

280.2 Definition.
Surge Arrester. A protective device for limiting surge voltages by discharging or bypassing surge current, and it also prevents continued flow of follow current while remaining capable of repeating these functions.
318.2 Definition.
Cable Tray System. A unit or assembly of units or sections and associated fittings forming a rigid structural system used to securely fasten or support cables and raceways."

Following the NEC Style Manual with consistent organization and numbering should make this article more "User Friendly" and show wisdom on the part of CMP-13.

The Panel's statement in rejecting the proposal that there are too many definitions of "emergency systems" makes no sense. Let's face it – the definition of "emergency system" resides in 700.1 and is misplaced according to the NEC Style Manual. Other articles can contain a definition that suits their purpose without creating a conflict in the NEC. See 90.3. After all, we can't pretend the definition of "emergency system" is not in 700.1 It's there for all to see!

Article 701 includes the definition of "Legally Required Standby System" in the appropriate Section 701.2. Why not a similar definition location for Article 700? Article 702 includes the definition of "Optional Standby Systems" in 702.2. Why not a similar definition location for Article 700?
Panel Meeting Action: Accept in Principle

Revise the recommendation in Proposal 13-138 as follows:

700.2 Emergency Systems. ~~Emergency systems are~~ Those systems legally required and classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction. These systems are intended to automatically supply illumination, power, or both, to designated areas and equipment in the event of failure of the normal supply or in the event of accident to elements of a system intended to supply, distribute, and control power and illumination essential for safety to human life.

Panel Statement: The panel action to the definition of emergency system is for compliance with the NEC Style Manual. No other changes in the original recommendation are deemed necessary relative to the arrangement and organization of Article 700.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-116 Log #2456 NEC-P13 **Final Action: Accept**
(700.2.Relay, Automatic Load Control (New))

Submitter: John R. Kovacik, Underwriters Laboratories Inc.
Comment on Proposal No: 13-145
Recommendation: Add a new FPN after the proposed new definition as follows:

FPN: For requirements covering automatic load control relays, see ANSI/UL 924, Emergency Lighting and Power Equipment.
Substantiation: The addition of the new FPN will provide guidance for Code users regarding requirements for automatic load control relays.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-117 Log #809 NEC-P13 **Final Action: Reject**
(700.5)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-148
Recommendation: Accept the proposal.
Substantiation: Conductors, terminals, overcurrent devices, switches, don't have capacity, they have ampacity or ratings. "Rating" covers ampacity, voltage, temperature, current, wet conditions, etc.
Panel Meeting Action: Reject
Panel Statement: The provisions of this section apply to the entire emergency system which includes the alternate source and all equipment and conductors supplying emergency loads. The terms "capacity" and "rating" are correctly used in 700.5(A).
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-118 Log #814 NEC-P13 **Final Action: Reject**
(700.8(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-155
Recommendation: Accept the proposal.
Substantiation: The panel statement states that all sources other than emergency are "normal" sources. 701.1 indicates a legally required standby system is not a normal source. Storage batteries and generator sets for emergency systems are not normal sources. A generator for a fire pump system is not a normal source. A fuel cell system grounded per 624.42 is not a normal source. A solar photovoltaic system grounded per 692.41 is not a normal source. Normal sources in the NEC usually refer to utilities.
Panel Meeting Action: Reject
Panel Statement: The recommendation does not clarify the current requirement. See the panel action and statement on Comment 13-119.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:

ODE, M.: Normal sources could include photovoltaic systems, generators, fuel cell systems, wind turbines, utility supplied sources, or any other normal source of power that is not emergency. There are emergency sources and then there are all other sources. The suggested change in text is unnecessary.

13-119 Log #2676 NEC-P13 **Final Action: Accept in Principle**
(700.8(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 13-156
Recommendation: Accept the proposal.
Substantiation: The requirement is clearly stated, and the need for the clarification is compelling. The existing wording is being commonly read to require the sign at the point of connection of the grounding electrode conductor to the grounding electrode, because that is certainly a "grounding location" on the premises. The NFPA NEC Handbook explanation for this section uses the wording "requires a sign at the grounding location" to explain this requirement, which can be taken the same way. I happen to know that NFPA staff is aware of the intent and this is not literally an error, but it can be easily taken that way. The supportive comment in the voting came from someone who has to explain this to electricians, so her comments deserve special consideration.
Panel Meeting Action: Accept in Principle

Revise 700.8(B) to read as follows:

Where removal of a grounding or bonding connection in normal power source equipment interrupts the grounding electrode conductor connection to the alternate power source(s) grounded conductor, a warning sign shall be installed at the normal power source equipment stating:

Warning: Shock Hazard Exists if Grounding Electrode Conductor or Bonding Jumper Connection in this Equipment is Removed while Alternate Source(s) is Energized.

Panel Statement: The panel recognizes the need to clarify the requirement of this section and to also provide prescriptive wording on what the sign should convey.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-120 Log #2379 NEC-P13 **Final Action: Reject**
(700.9(B))

Submitter: James E. Degnan, Sparling
Comment on Proposal No: 13-160
Recommendation: The panel should accept my original proposal.
Substantiation: The panel's statement in reply to my proposal appears to be unjustified.

The language of 700.9(B)(5) began with ROP A2007 13-118, the substantiation for ROP A2007 13-118 was as follows:

"Substantiation: The separation of emergency system wiring from all other wiring is required by NEC 700.9, and is clearly understood. Just where the separate emergency, legally required standby, or optional standby systems feeders originate at or near the generator is less well defined. The supply tap box on generators equipped with disconnects with or without overcurrent protection is not generally designed or manufactured for installation of multiple devices to serve separate circuits for emergency loads, fire pumps, legally required standby loads, and optional standby loads, although AHJs have interpreted the mandated separation of wiring to require just that. In addition, such an interpretation does not consider parallel operation of multiple generators, which require some type of distribution to separate the systems downstream of the paralleling bus. The recommended revisions clarify that, for both single generator and parallel generator installations, separation of the circuits served by an emergency generator(s) source may be accomplished using a single feeder from the generator to separately mounted enclosed overcurrent devices or a distribution switchboard that separates emergency circuits in different vertical sections from other loads. Separately enclosed overcurrent devices or overcurrent devices mounted in separate vertical sections of a distribution switchboard will provide physical separation of the different systems or branches and define that the origin of the emergency, legally required standby, and optional standby systems is at the feeder overcurrent protection device, not the generator terminals. This proposal was developed by the Task Group directed by the TCC to consider comments 13-6 and 13-71 and if appropriate to develop proposals for the 2008 NEC. The task group consisted of the following: Thomas H. Wood; Chair (Chair NFPA-70, panel 13), Hugh O. Nash; (Chair NFPA 99), Douglas S. Erickson; (Chair NFPA 110), James Costley; and Herb Whittall.**"**

I have contacted Nash and Erickson, and they both deny any involvement in the subcommittee. I have contacted NFPA, and they have verified that there is no other backup substantiation associated with the original A2007 proposal. In short, CMP 13's statement that the A2007 subcommittee (exactly what subcommittee?) substantiated an issue with feeders supplying a switchboard cannot be verified.

There is no data from industry resources such as IEEE Std 493(Gold Book) or the Up Time Institute that indicates there is a reliability problem with devices in a common vertical section.

Until it can be verified that 700.9(B)(5) increases reliability it should be deleted, as the present language suffers from the following shortcomings:

1. Between 700.9 and 700.9(B)(5)(a) "from' appears three times and "to" twice. B says from emergency source to emergency load, 5 says from emergency source to a combination of loads. The first two "from, to" pairs are congruous, however (a) is supposed to be a subset of 5 and it says "from switchboard" so is 'from switchboard" the same as "from emergency source" or is it intended to be from emergency source "to" a switchboard? Or?

2. In 5(b) "common bus", "separate sections of the switchboard", and "the individual enclosures" are each separated by "or" making them a list of three items, hence what is meant by "The common bus" is not clear, as there is no previous discussion of a common bus. The text may have require a comma after "switchboard", but that begets the question: How(or why) would you supply separate sections of a switchboard with a single feeder, and is this possible within UL 891? There's also the possibility that the individual disconnects could be served by a bussed gutter that is a "common bus" but that leads to additional confusion that is not explainable.

3. (5)b Exception: If (5) b's "shall be permitted" is permissive language per 90.5, then why is an exception needed? The exception says that you can supply OCP at the source if it is selectively coordinated, but 700.27 would require selective coordination in any case. I think this exception could be deleted and the code wouldn't change.

4. (5)c Says "…panelboard enclosure…" how does "panelboard enclosure" play into this when it's not previously mentioned in (5)? (5) identifies this as from source to "any combination" if you have a combination going to the panelboard how are the branches suppose to "not originate" there?

5. Many large campus facilities with multiple buildings such as medical centers, colleges/universities, prisons, shopping malls, etc rely on central generation of emergency power. The present language does not make it clear that feeders serving combinations of emergency, legally required standby, and optional standby loads can run from a central plant to a building, and then be separated at individual buildings into the appropriate load types. Discussion of this common design practice is conspicuously absent from the substantiation, the language only discusses feeders from an emergency source to terminate at a switchboard or group of disconnects. Consideration of design issues with hospitals and central generating plants challenge the logic behind the requirement for separate vertical sections:

a. Most emergency power systems fail because of problems at the generator: fail to start, poor fuel, loss of support systems, etc. The frequency of failures and subsequent loss of life that can be prevented by placing overcurrent devices into separate sections is very, very small, if it even exists. The cost to accomplish separate vertical sections is significant. If remodels are considered, the cost of adding additional vertical sections to existing central plants is very, very large, and may result in canceling projects that would otherwise be able to offer significant benefit to the public welfare.

b. If a central plant serves multiple building is it acceptable to put the life safety feeder to each building in the same vertical section? The code answer to this question appears to be yes, but if it is unacceptable to have a LRS device affect an adjacent emergency device, why is it acceptable to have one emergency device affect another?

c. Consider hospitals. If placing overcurrent devices in a separate vertical section improves reliability, and a patient bed is fed by two critical transfer switches and feeders, the feeder overcurrent devices should be in separate vertical sections not the same! It becomes clear that if a hospital central plant is serving multiple wings and many transfer switches (some hospitals have over twenty) that separate vertical sections becomes impractical.

d. Consider hospitals again: If there is a statistically significant number of failures that would benefit from placing overcurrent devices into separate vertical sections, why stop at the feeders to the ATSs? The code requirement would logically extend to panels serving operating rooms. If there was failure data associated with the original code proposal the logical stopping point could be assessed, but none is available. Where should this stop? It probably should have never started!

Panel Meeting Action: Reject

Panel Statement: The recommendation of this comment and the associated proposal completely eliminates valuable installation/separation requirements for emergency systems that helps delineate where the main requirement of 700.9(B) applies. This recommendation will result in confusion in the industry on how and where to apply 700.9(B) in electrical distribution systems.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 17 Negative: 1

Explanation of Negative:

DEGNAN, J.: There is no substantiation supporting the 2008 addition of 700.9(B)(5) into the NEC. Prior to requiring this additional construction expense there should be some effort to obtain field records that demonstrate that not placing overcurrent devices in separate enclosures or in separate vertical sections creates a hazard.

13-121 Log #2371 NEC-P13 **Final Action: Hold**
(700.9(B)(5))

Submitter: James E. Degnan, Sparling

Comment on Proposal No: 13-160

Recommendation: Revise (5) to read as follows:

(5) Wiring from an emergency source shall be permitted to supply any combination, legally required, or optional loads. A feeder supplying combinations of emergency and legally required or optional loads is an emergency feeder. A feeder serving a combination of emergency and legally required or optional loads shall separate the loads at a switchboard or at taps from the feeder to individual disconnects mounted in separate enclosures. Legally required and optional standby circuits shall not originate from the same vertical switchboard section, or individual disconnect enclosure as emergency circuits.

Substantiation: I have submitted another comment suggesting that 700.9(B)(5) be deleted and replaced with: "It shall be permissible to utilize single or multiple feeders to supply distribution equipment between an emergency source and the point where the combination of emergency, legally required, or optional loads are separated." I prefer that the panel accept that comment over this one, however if the panel finds statistically significant substantiation to retain the requirements for separate vertical sections and is interested in improving the language, this comment provides the appropriate opportunity.

Many large campus facilities with multiple buildings such as medical centers, colleges/universities, prisons, shopping malls, etc rely on central generation of emergency power. The present code language does not make it clear that feeders serving combinations of emergency, legally required standby, and optional standby loads can run from a generator switchboard to a remote building, and then be separated into the appropriate load types at the building. The statement "From separate vertical switchboard sections, with or without common bus, or from individual disconnects mounted in separate enclosures." can be interpreted to require separation of emergency, legally required standby and options standby systems at the first switchboard downstream of the generators. If applied to campus type power systems this interpretation would triple the amount of feeders run around a site, and double the amount of manholes. It would also ignore the common use of medium voltage system designs such as primary selective systems or loops with sectionalizing provisions. It would require complete rebuilding of many substantial and reliable emergency power distribution systems across the country.

Panel Meeting Action: Hold

The panel action holds only Comment 13-121.

Panel Statement: The panel concludes that the issues associated with eliminating the exception currently contained in 700.9(B)(5) cannot be resolved within the time frame allotted to the panel and therefore has made the decision to hold this recommendation for the 2014 NEC revision cycle.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 18

13-122 Log #2373 NEC-P13 **Final Action: Accept**
(700.9(B)(5))

Submitter: James E. Degnan, Sparling
Comment on Proposal No: 13-162
Recommendation: Revise text as follows:

(5) Wiring from an emergency source to supply any combination of emergency, legally required, or optional loads in accordance with (a), (b), & (c,) & (d):

a. From separate vertical switchboard sections, with or without a common bus, or from individual disconnects mounted in separate enclosures.

b. The common bus or separate sections of the switchboard or the individual enclosures shall be permitted to be supplied by single or multiple feeders without overcurrent protection at the source.

Exception to (5)b: Overcurrent protection….at the source.

c. Legally required and optional standby circuits shall not originate from the same vertical switchboard section, panelboard enclosure, or individual disconnect enclosure as emergency circuits.

d. It shall be permissible to utilize single or multiple feeders to supply distribution equipment between an emergency source and the point where the combination of emergency, legally required, or optional loads are separated.

Substantiation: I submitted two other comments on proposals to 700.9(B), which I would prefer to see the panel accept instead of this comment. If the panel does not agree with the other comments please consider this one, I think it is entirely in agreement with the panel's statement on the original proposal.

This code language makes it clear that feeders serving combinations of emergency, legally required standby, and optional loads can run from a source to one or more remote buildings, and then be separated into the appropriate load types at the building.

Many large campus facilities with multiple buildings such as medical centers, colleges/universities, prisons, shopping malls, etc rely on central generation of emergency power. Without this change, the statement "From separate vertical switchboard sections, with or without common bus, or from individual disconnects mounted in separate enclosures." can be interpreted to require separation of emergency, legally required standby and optional standby systems at the first switchboard downstream of the generators. If applied to campus type power systems this interpretation would triple the amount of feeders run around a site, and double the amount of manholes. It would also ignore the common use of medium voltage system designs such as primary selective systems or loops with sectionalizing provisions. It could require complete rebuilding of many extensive and reliable emergency power distribution systems across the country.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 17 Negative: 1
Explanation of Negative:

ODE, M.: The Comment action should have been a hold since it introduces new material that has not had public review.

Comment on Affirmative:

DEGNAN, J.: Paragraph 700.9(B)(5)(d) makes it clear that feeders serving combinations of emergency, legally required standby, and optional loads can run from a source to one or more remote buildings, and then be separated into the appropriate load types at the building.

OLSON, G.: The changes in this comment and those in 13-13 greatly clarify long-standing questions relating to generator applications. In particular, where multiple generators serve a common bus, there have often been questions as to how rules associated with feeders, taps, disconnects, and separation requirements should be applied. As noted in the substantiation, strictly interpreted, previous rules result in unnecessary overbuilding of a system that does not improve reliability. In essence, the revised requirement leaves the designer open to understanding the bus of a multiple generator system to be the source, rather than the individual machines.

13-123 Log #2378 NEC-P13 **Final Action: Reject**
(700.9(B)(5))

Submitter: James E. Degnan, Sparling
Comment on Proposal No: 13-164
Recommendation: The submitter's proposal should be accepted in part, recognizing the panel statement noting that separation of legally required standby and optional loads is not required.
Substantiation: . The submitter's proposal will provide a more reasonable construction alternative and achieve substantially the same end result as separate vertical sections.

The panel has asked for technical substantiation from the submitter. I have requested substantiation from NFPA documenting the need for separate vertical sections in the original proposal to the 2008 NEC and have received nothing. NFPA has not provided any data identifying failures, or more specifically a statistically significant number of failures, that justifies this magnitude of a change in the 2008 NEC. It is unreasonable of CMP 13 to request that modifications to this Section be supported by technical data when there is none justifying its original placement in the code! Because there is no data detailing the specific nature of the failures it cannot be determined that separate vertical sections will solve whatever the original problem was thought to be.

The conceptual justification for vertical sections is that if an overcurrent protective device is in the same vertical section as other overcurrent protective devices, its failure can cause adjacent devices to fail. Devices in adjacent, but separate vertical sections will not fail or at least be less likely to fail.

My conversations with peers in the industry indicate that if there is a problem regarding reliability of distribution equipment in emergency systems it is probably related to propagation of failures among group mounted circuit breakers. Typically a cable lug is loose, overheats and the heating leads to a fault. In group mounting of circuit breakers, phase A of one circuit breaker is immediately adjacent to phase C of another circuit breaker, and there is a chance that the fault will propagate from one circuit breaker to another. If this is the original problem, prevention of propagation will be solved by the submitter's proposal. Note that a loose lug is an installation problem, not a code mandated design problem, and superior construction diligence and yearly maintenance could do more to prevent reliability issues in the first place and thereby stop them from propagating.
Panel Meeting Action: Reject
Panel Statement: The comment does not comply with Section 4.4.5(c) of the NFPA Regulations Governing Committee Projects because the submitter has not provided a clear recommendation containing proposed text.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:

DEGNAN, J.: I look forward to future discussions that will determine if there is merit behind utilizing separate vertical sections to separate emergency, standby, and optional standby loads.

13-124 Log #2372 NEC-P13 **Final Action: Hold**
(700.9(B)(5)(b))

Submitter: James E. Degnan, Sparling
Comment on Proposal No: 13-163
Recommendation: Delete the exception to 700.9(B)(5)(b).

~~Exception: Overcurrent protection….at the source.~~

Substantiation: 700.9(B)(5)(b) contains the phrase "shall be permitted". According to 90.5 (B) the phrase "shall be permitted" makes 700.9(B)(5)(b) an action that is allowed, but not required. Therefore an Exception is not needed for a rule that is not a mandatory rule. Additionally, an Exception that refers to another part of Article 700 is not necessary, because the complete requirements of Article 700 are always applicable.
Panel Meeting Action: Hold

The panel action is to hold only Comment 15-124.

Panel Statement: The concept of completely eliminating this exception was not discussed in any of the panel's actions on this section in the ROP phase of 2011 NEC revision. This concept needs to be subjected to public review and input, hence the action to hold this comment.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-125 Log #1644 NEC-P13 **Final Action: Hold**
(700.9(D)(1))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Hold" as it introduces new material and is not in accordance with 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.

The concept of 4 inches of concrete equated to a 2 hour fire-rating has not had public review.

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 13-172
Recommendation: Accept 700.9 (D)(1)(5) with the additional fine print notes. Continue to accept the balance of the proposal.

(5) Be embedded in ~~not less than 50 mm (2 in.) of~~ concrete with a sufficient thickness to achieve a minimum 2 hour fire rating
FPN 1: A typical 2-hour construction is 100 mm (4 in.) thick concrete.
FPN 2: See section 19 of the NFPA Fire Protection Handbook 20th edition for minimum slab thickness for fire resistance ratings. This provides thickness for various types of concrete.

Substantiation: Although 2 inches of concrete served the industry well for a 1 hour fire rating, the requirement is now for a 2 hour fire rating. To satisfy the panels request for more prescriptive information on the thickness of the concrete, fine print note 1 has been added. The NEC currently has fine print notes that state typically 150 mm (6 inch) thickness of concrete is used for a 3-hour rating in section 450.42. This note was also added to 110.31A. Since 2 inches of concrete was previously used as acceptable for 1-hour, 100 mm (4 inches) was added in the fine print note for the requirement of 2-hours.

Additionally, since concrete thickness may vary based on the type of concrete, fine print note 2 was added to provide information on this.
Panel Meeting Action: Accept in Principle
Revise existing 700.9(D)(1)(5)as follows:
(5) Be ~~embedded~~ encased in a minimum of ~~not less than 50~~ 100 mm (~~24~~ in.) of concrete

Panel Statement: The panel action provides a prescriptive value for the thickness of concrete that allows for objective enforcement and has made editorial revisions for consistency with similar requirements in Articles 695 and 708.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
ODE, M.: See my negative statement in Comment 13-102.
SPINA, M.: Although information was received with these comments this information was new material which has not had opportunity for adequate public review and comment.

13-126 Log #2381 NEC-P13 **Final Action: Accept in Part**
(700.12, FPN (New))

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facility Executives
Comment on Proposal No: 13-177
Recommendation: Accept the Proposal in Principal in Part. Consolidate Fine Print Notes 2 with Proposed Note 3 as shown below:
~~FPN No. 2: Assignment of degree of reliability of the recognized emergency supply system depends on the careful evaluation of the variables at each particular installation.~~
FPN No. 2: Assignment of degree of reliability of the recognized emergency supply system depends on the careful evaluation of the variables at each particular installation. Quantitative methods provide more consistent results in reliability studies. For further information see ANSI/IEE Standard 493: Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems.
Substantiation: The electrical industry has evolved from a point where the presence of electricity was a fire hazard, to a point where the greater hazard lies in the absence of electricity. Friends of the NEC need a broader vocabulary to discuss our safety choices and that vocabulary needs to be "numerate" i.e., probabilistically/statistically, informed. The comprehensiveness of the phrase "degree of reliability…careful evaluation of the variables…" needs to be expanded into a realm in which variables are no longer variables, where variables are constants and vice-versa, and where we argue about whether the Weibull or log-normal distribution is the most appropriate hazard function to use. Way out there where the buses don't run yet.
For the convenience of the panel, I have provided one of the failure rate tables from the IEEE Gold Book.
While it may be too early for tables like these to show up in the NEC, we ought to at least reference the document that contains them. With gathering pace, information like this ought to inform decisions such as the following:
- whether designers select fuses, molded case breakers, or steel frame breakers;
- whether a bus tie made in the field with cable is more reliable than a factory assembled duct;
- whether the second source of power to a fire pump ought to be provided by a utility overhead line or an on-site generator.
- - how we develop the last mile of distribution to residential and small commercial districts, if, for example, our mass personal transportation system can morph into a backup power system because electric vehicles and the utility can transfer energy bi-directionally
IEEE Gold Book data will help our electrical and safety professionals assess and scale risk based upon quantitative information that might challenge design approaches that are built upon anecdotes rather than statistical likelihoods. The Owner will have data that will determine whether the electrical professionals are overbuilding in one area (because the voices are more numerous and louder) and under-building in another.
I do not think we can avoid failure rate data in the next leg of development of our industry. The airline and automobile industries, informed by Total Quality Management practices and the reliability methods NASA used for the space program, increased product and mission reliability by rolling in new failure rate data on a near-continual basis. The electrical industry needs to be doing this, too; and it has already started with most state public utility commissions now requiring annual system, momentary, and customer outage data. Chapter 7 would be a natural place to see the first footprint of this document because it is in Chapter 7 where the all the big ideas about the relationship between the normal and backup power system come to be discussed.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Part
Revise Fine Print Note No. 2 in the 2008 NEC to read:
FPN No. 2: Assignment of degree of reliability of the recognized emergency supply system depends on the careful evaluation of the variables at each particular installation. For further information see ANSI/IEEE Standard 493-2007: *Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems.*
Panel Statement: Adding only the reference to the IEEE standard is sufficient to augment the usefulness of this fine print note. The recommended second sentence is not necessary information.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-127 Log #2089 NEC-P13 **Final Action: Reject**
(700.12(B)(6))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because the submitter has failed to provide proposed text in compliance with 4.4.5(c) of the NFPA Regulations Governing Committee Projects.
Submitter: Joseph A. Ross, Ross Electrical Assessments
Comment on Proposal No: 13-180
Recommendation: Accept Proposal No. 13-180 in Principle using the common sense logic of panelist Mr. C. Mouton's Negative Vote.
Substantiation: See Mr. C. Mouton's Negative Comment on Page 945, 2010 ROP.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 13-129.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 17 Negative: 1
Explanation of Negative:
ODE, M.: The Panel Action should have been to reject since the submitter did not provide a recommendation based on Section 4.4.5(C) of the NFPA Regulations Governing Committee Projects.

13-128 Log #469 NEC-P13 **Final Action: Hold**
(700.12(B)(6), 701.11(B)(5), 702.11, 225.36, and 225.38)

Submitter: Lawrence W. Forshner, Cummins Northeast, Inc.
Comment on Proposal No: 13-180
Recommendation: Recommendation: Delete existing text and Replace 700.12(B)(6); 701.11(B)(5); and 702.11 as follows:
Where an outdoor housed generator set is equipped with a readily accessible disconnecting means meeting the requirements of 445.18, and the installation meets the requirements of 250.32(D), an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure served. All installations permitted by this section, unless meeting the requirements of 225.32 Exceptions 1, 2, 3, or 4, shall have the generator disconnecting means located within sight of the building or structure served.
Recommendation: Add exception to 225.36 and 225.38 as follows:
Exception: Outdoor housed generator set disconnecting means shall meet the requirements of 445.18.
Substantiation: Also submit the recommendations to CMP 4 for consideration, and information.
Also submit to CMP 5 for information.
I believe these recommendations are consistent with the panel statement and address the concerns identified by the submitter.
The construction requirements of the disconnecting means should be consistent with those recognized in 445.18., and described in UL2200. If 445.18 describes an acceptable disconnecting means for a generator, it should be acceptable when applying 700.12(B)(6); 701.11(B)(5); and 702.11. A "break glass" lockable mushroom button, for example, serving as the disconnect for the generator and the feeder, meets the requirements of all the rules, in that it is recognized per 445.18 and described in UL2200 section 11.
With the new rule changes to 250.32(D) in the last two code cycles, the grounding requirements and conditions specified in 250.32(D) are what are important. Listed generators have provisions for installing bonding jumpers and a neutral disconnecting means in the generator terminal box if required and as described in UL2200 section 14. Suitable for use as service equipment has become a moot point, and has created confusion in the field when referring to the disconnecting means at the generator location. ((see 2001 ROP 4-30 that was accepted and later rejected via ROC, 4-13 Log #1769), the substantiation for the rejection did not address disconnects at a generator, it only referred to the disconnect inside or outside of a building that had to be constructed to open under load, and also referenced the confusion the rule change would create with other rules, such as, how to apply the "two to six disconnect rule" at the building.) When AHJs are asking for additional NEMA 3 fused disconnects or breaker enclosures at the generator, it adds cost and reduces reliability. When the generator is shut down via its own controls, annunciation and fire alarm supervision as required per NFPA 110 and NFPA 72 alert the building occupants of an inoperable life safety system, or essential electrical system in a health care application. Additional breakers hinder coordination and create a single point of failure, without required annunciation. Isolating the generator feeder also gives someone working on or around a generator, a false assurance, that the generator cannot start.
Allowing 225.32 Exceptions No. 1 and No. 2 address the submitter's concerns and provides the relief he is asking for. Why should a generator source have different rules than those of a feeder from a building or structure? Is an "Integrated Electrical System" requiring an "Orderly shutdown"... with "Effective safeguards acceptable to the AHJ", not to incorporate onsite generators?
In summary, my comments keep the disconnecting means in sight, defines the construction of the feeder disconnect, when located at the generator, consistent with the rules in Article 445 and UL2200, and provides needed relief by allowing the existing rules as to the location of the generator/disconnect to be applied when applicable.

Panel Meeting Action: Hold
The panel action holds only Comment 13-128.
Panel Statement: The proposed exception introduces new material that has not had public review by adding requirements in 700.12(B)(6), 701.11(B)(5), 702.11, 225.36, and 225.38. This Comment is held for the 2014 NEC cycle and should also be submitted to CMP 4 because they have responsibility for Article 225.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-129 Log #1805 NEC-P13 **Final Action: Accept**
(700.12(B)(6) Exception)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 13-180
Recommendation: The panel action on this proposal should have been to accept the proposal in principle and include only the exception revised as indicated below:
Exception: For installations under single management, where conditions of maintenance and supervision ensure that only qualified persons will monitor and service the installation and where documented safe switching procedures are established and maintained for disconnection, the generator set disconnecting means shall not be required to be located within sight of the building or structure served.
Substantiation: This comment is a modification to the original Proposal 13-180, which intends to provide the same exception for installations under single management to outdoor housed generator sets, as provided by Exception 1 of 225.32 for other types of outside feeders. The proposed exception should have been accepted in principle and modified to replace the wording "generator set" in the Exception with "generator disconnecting means". This change will correctly identify the exception as applying to the disconnecting means and not the generator set. As indicated in the panel statement, the intent of the referenced 700.12(B)(6) is for the disconnecting means to be in line of sight of the building. As allowed by Exception 1 of 225.32, the additional disconnecting means should not be required to be within site of the building or structure served, and can be located " elsewhere on the premises". The application of this exception to an outdoor housed generator set is technically no different than any other type of outside feeder to the building. The exception provides the condition upon which the installation can be operated and maintained safely, i.e., the use of qualified persons for the maintenance and supervision and documented safe switching procedures are established and maintained. Similar installations of outdoor feeders serving a building or structure, without the installation of a disconnect device installed either inside or outside of the building or structure and not within site of the building or structure, are operated and maintained safely when the conditions stated in the exception are present.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-130 Log #2236 NEC-P13 **Final Action: Reject**
(700.17)

Submitter: Mark R. Hilbert, State of New Hampshire
Comment on Proposal No: 13-187
Recommendation: Accept the proposal in principle and revise 700.17 as follows:
700.17 Circuits for Emergency Lighting.
(A) System. ~~Branch circuits~~ Circuits that supply emergency lighting shall be installed to provide service from a source complying with 700.12 when the normal supply for lighting is interrupted. Such installations shall provide either of the following:
(1) An emergency lighting supply, independent of the ~~general~~ normal lighting supply, with provisions for automatically transferring the emergency lights upon the event of failure of the ~~general~~ normal lighting system supply.
(2) Two or more separate and complete systems with independent power supply, each system providing sufficient current for emergency lighting purposes. Unless both systems are used for regular lighting purposes and are both kept lighted, means shall be provided for automatically energizing either system upon failure of the other. Either or both systems shall be permitted to be a part of the ~~general~~ normal lighting system of the protected occupancy if circuits supplying lights for emergency illumination are installed in accordance with other sections of this article.
(B) Branch Circuits. Branch Circuits supplying emergency lighting shall by installed so the failure of an individual branch circuit cannot leave in total darkness any area that requires emergency illumination. They shall be arranged in accordance with either of the following:
(1) To automatically transfer the emergency lights in the event of a failure of the normal lighting branch circuit; or,
(2) To consist of two or more branch circuits supplied from separate systems with independent sources. One of the two branch circuits shall be part of the emergency system and the other shall be permitted to be part of the normal lighting system.
Substantiation: As I reviewed and discussed Proposal 13-187, I realized the section as currently written has language on how the "system" is intended to operate. That is, to provide a system that will either act automatically when the normal system fails or to provide two independent systems. I am afraid the basic requirements for the "emergency system" operation will be lost as proposed at the ROP stage. Accepting the proposal in principle and revising 700.17 as proposed in this comment will carry over the original intent to clarify the installation of branch circuits supplying emergency lighting while retaining the language on how the emergency system is to be arranged.
Panel Meeting Action: Reject
Panel Statement: The panel action on Proposal 13-187 meets the intent of this recommendation without requiring multiple levels of redundancy.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-131 Log #404 NEC-P13 **Final Action: Accept**
(700.26)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 13-189
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-132 Log #1572 NEC-P13 **Final Action: Accept**
(700.26)

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 13-191
Recommendation: Continue to reject this proposal
Substantiation: This proposal should continue to be rejected because it jeopardizes life-safety. The reasons for utilizing ground-fault protection of equipment in certain applications are well documented. The damage than can result from a ground fault on such a system may render a substantial portion of the system inoperative, resulting in a lengthy outage potentially worse than that envisioned by the submitter, or worse yet start a life threatening fire. Further, restraint of the GFPE may increase the downstream arc flash hazard for maintenance workers.
The late J.R. Dunki-Jacobs, a recognized authority on ground-fault protection, stated in his book *Industrial Power System Grounding Design Handbook* (pages 186, 189) that, "If an arcing line-to ground fault is initiated in a solidly grounded system on one of three bare buses in a metal enclosure, the hot ionized gases that are developed by the fault can be expected to cause escalation to an arcing multi-phase fault within 1 or 2 cycles (0.0167 to 0.033 sec) of time." He went on to state, "Escalating arcing-ground faults have shown themselves to be extremely devastating…" and "Unquestionably then, engineering attention to their immediate suppression must be proactive and immediate, rather than reactive. Not only for reason of minimizing the released arc energy to maximize personnel safety, but also to avert arcing-fault escalation." The suggestion that an audible and visual signal device would be of any value is ludicrous.
System reliability and blackout prevention can be achieved by proper system design, equipment selection and coordination. The GFPE restraint called for in this proposal is unnecessary and a potential threat to life-safety.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-133 Log #1614 NEC-P13 **Final Action: Reject**
(700.26)

Submitter: Christopher G. Walker, Eaton Corp.
Comment on Proposal No: 13-190
Recommendation: (A) Alternate Power Source. The alternate source for emergency systems shall not be required to have ground-fault protection of equipment.
(B) Normal Power Source. For the normal source of emergency systems, where ground-fault protection has been provided for the operation of the service disconnecting means or feeder disconnecting means as specified by 230.95 or 215.10, an additional step of ground-fault protection shall be provided in all next level feeder disconnecting means downstream toward the load.
Such protection shall consist of overcurrent devices, current transformers, or other equivalent protective equipment that shall cause the feeder disconnecting devices to open.
The additional levels of ground-fault protection shall NOT be installed as follows:

1. On electrical systems that are not solidly grounded wye systems with greater that 150 volts to ground, but not more than 600 volts phase-to-phase.
2. On electrical systems where a non-orderly shutdown of power will introduce additional or increased hazards.

Substantiation: While the Panel's response was to point out that 700.26 permits the alternate source for Emergency Systems to not have ground-fault protection of equipment with automatic disconnecting means, and that Emergency Systems remain selectively coordinated for all fault conditions, it is evident that the intent of this proposal was not clear originally. The intent of this proposal relates only to the Normal source of Emergency Systems, and the proposal is focused on requiring an additional step of ground-fault protection in all next level feeder disconnecting means downstream toward the load, when connected to the Normal source. I have modified the wording to help clarify this important distinction.

Ground faults are typically believed to be the most common type of fault experienced in operating energized electrical systems, per ANSI/IEEE Std 242-1986 Buff book, Chapter 7. Professional design engineers tell of experiences with ballast or small motor failures that have caused main or feeder devices to open. Why is this so? In some instances, a ground fault condition existed that went undetected and precipitated the protective device to open. In other cases, ground fault protective devices were improperly set, or not set at all. In others yet, a selective coordination study may not have been done, or may have been done improperly.

The NEC has for many years required ground fault protection of equipment, but only at the service disconnect level (with noted special exceptions), per 230.95. With a goal in mind of maximizing the reliability and up-time of electrical systems, and giving consideration that the most common types of faults are ground fault related, it becomes a reasonable approach that the requirements for ground fault protection of equipment are extended to all appropriate areas in the electrical system, beyond just the service level.

This Proposal is therefore to require additional levels of ground fault protection of equipment below the service level on the normal source of an electrical system. This Proposal's language mirrors a similar requirement for ground fault protection of equipment that currently exists in NEC 708.52 for Critical Operations Power Systems (COPS). This proposal therefore recommends enhancing the reliability of the electrical system by requiring ground fault protection of equipment in all appropriate levels of the system.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided any technical substantiation to justify requiring an additional level of ground fault protection on the feeder downstream from the normal service main. The reason for an emergency system is to provide power within 10 seconds whenever the utility source or other source of power is lost.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 18

13-134 Log #2226 NEC-P13 **Final Action: Reject**
(700.26)

Submitter: Malcolm Allison, Ferraz Shawmut / Rep. National Electric Fuse Association

Comment on Proposal No: 13-191

Recommendation: Modify the proposed text by adding a new second paragraph to read as follows:

Normal Source ground fault protection on the line side of a transfer switch supplying emergency systems shall be permitted to be restrained for ground faults on the loadside of the transfer switch, provided that audible and visual signal devices indicate whenever a ground fault relay has been restrained, and instructions on the course of action to be taken in the event of an indicated ground fault are located at or near the sensor location.

Substantiation: The designer may be required by 230.95 and 210.15 to use ground fault protection on the main or feeder on the normal side of a transfer switch feeding emergency systems. A ground fault relay sensor can be put at the transfer switch, which, when a ground fault occurs on the load side of the transfer switch, sends a signal to the normal side ground fault relay to restrain the operation of the disconnecting means.

This additional text allows designers to be able to utilize ground fault protection for the normal source, and provide selective coordination for emergency devices and all overcurrent devices on their line side, without endangering any equipment protection on the normal source side of the transfer switch. This can best be accomplished by allowing the normal side ground fault protection to be restrained for ground faults on the load side of the transfer switch (on the emergency system side). While 700.26 permits ground fault protection to be totally omitted on the alternate source side of emergency systems, this text simply allows the ground fault protection on the normal source side to be restrained for ground faults on the load side of the transfer switch for the emergency systems. The requirement for indication is included to correlate with the requirement found in 700.7(D).

Panel Meeting Action: Reject

Panel Statement: The substantiation associated with this comment does not provide the panel with any additional technical justification for the recommended provision. The panel reaffirms its action and statement on Proposal 13-191.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 18

13-135 Log #608 NEC-P13 **Final Action: Reject**
(700.27)

Submitter: Daniel J. Caron, Bard, Rao + Athanas Consulting Engineers, LLC

Comment on Proposal No: 13-203

Recommendation: Revise text to read as follows:

700.27 Coordination. Emergency system(s) overcurrent protective devices shall be coordinated in accordance with 700.27(A) or (B):

(A) Coordination to 0.01 seconds. Emergency system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.

(B) Engineering Supervision. For new and existing installations, where the emergency system design is under the control of a licensed professional engineer engaged in the design or maintenance of electrical installations, the selection of overcurrent protective devices shall be permitted to coordinate to the extent practicable. The design shall be documented, stamped by the professional engineer and made available for review by the authority having jurisdiction.

Exception: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

FPN: Overcurrent protective devices used for emergency system circuit protection, where coordinated to optimize selective operation of the circuit overcurrent protective devices when a short circuit or ground fault occurs. increase overall reliability of the system.

Substantiation: Panel 13 is urged to reevaluate their decision regarding selective coordination. Proposal 203 was accepted in principal, in part during the ROP, but was overturned in the final vote by less than 1/2, of the panel members.

The proposed rewording of Proposal 203 above, reflects the Panel discussions during the ROP that preferred positive code language vs. an additional exception. "Coordination to 0.01 seconds" was added to clarify that the instantaneous portion of the overcurrent time/current curve must also be considered when coordinating devices. The title "Engineering Supervision" was added to reflect similar instances in the NEC, such as 240.86 and is used extensively in the National Electrical Code in no less than 20 other instances.

The panel also rejected the word "practicable" stating it "....is not defined and subjective." However, this same Panel defended the term "practicable" in Proposal 13-151 stating "'Where practicable' leaves the decision up to the authority having jurisdiction...." The word "practicable" appears in the National Electrical Code in no less than 70 other instances.

Authors of Proposal 10-82, who also defend selective coordination as currently written, have, apparently recognized that a selectively coordinated system increases arc-flash energy, thus the proposal to require a means of reducing arc flash energy will be required in the proposed 240.87.

A system that is coordinated by an Engineer engaged in the business of designing these systems, understands the balance required between coordination, arc flash energy, safety and reliability. The idea that Engineers are opposed to coordinated power systems is incorrect. Engineers are opposed to the strict interpretation that system coordination takes precedence over all other issues within a power system design. The engineering community has been balancing coordination and safety in electrical distribution systems quite effectively for decades. There is little justification to defend the strict requirement for selective coordination.

In many situations, it is impossible to add to an existing distribution system and achieve full coordination without jeopardizing the existing system. The proposed language provides some relief to the strict interpretation, while maintaining a safe and reliable system.

The NEC seeks to provide a nationally recognized standard. Proposal 203, as originally written, is part of the 2008 Massachusetts Electrical Code. Relief to this strict requirement is being granted, in varying forms, in many other jurisdictions.

Panel Meeting Action: Reject

Panel Statement: "Coordinate to the extent practicable" or "coordinate to the level required" are not needed since selective coordination for the full range of overcurrents is achievable. The proposed language "Coordinate to the extent practicable" or "coordinate to the level required" do not provide sufficient specificity as to what constitutes an acceptable selectively coordinated installation and would permit systems to cascade overcurrent protective devices for any level of overcurrent for any reason, such as cost, effort, expertise, or space. Selective coordination for the full range of overcurrents is required.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 16 Negative: 2

Explanation of Negative:

CARON, D.: An electrical distribution system, for an emergency power system (as well as a normal power system), should take into account all of the factors that result in properly designed, coordinated, safe and reliable system including coordination, component selection, arc flash energy, efficiency, etc. Although coordination is achievable, as indicated in the Panel Statement, in many instances, especially larger systems where the use of circuit breakers is preferred, additional components (such as 1:1 transformers) and/or oversized components are required, thus compromising the reliability and efficiency of the system, as the additional components result in additional points of potential

failure and consume more energy.

This Comment should have been Accepted as it addresses the concerns in the ROP Panel Response to the original Proposal 203.

-It revises the original Proposal into positive Code language (vs. an exception).

-It defends the term "practicable" (and "impracticable") as it is used extensively throughout the code and includes potential safety concerns such as 450.41 where a transformer vault is not required to be ventilated where it is not practicable.

Since the inception of selective coordination in the 2005 NEC, many facilities that do not meet the letter of the code based on the current definition of selective coordination in Article 100 have been issued occupancy permits. An overwhelming majority of these facilities however, do meet the requirement to the extent practicable. In general, AHJ's are either not enforcing or ignoring this requirement, or are relying on the Engineer's design judgment. This practice (non-enforcement) shows no signs of reversing. In addition, many jurisdictions, including Massachusetts and Florida have recognized that this requirement is too strict and have responded with local rulings that provide relief. The non-enforcement and application of inconsistent regional rulings could result in undermining the integrity of the NEC.

DEGNAN, J.: See my reply to comment 13-140.

13-136 Log #1084 NEC-P13 **Final Action: Reject**
(700.27)

Submitter: James H. Costley, Jr., Newcomb & Boyd Consultants & Engineers
Comment on Proposal No: 13-195
Recommendation: Accept the proposal.
Substantiation: The submitter's substantiation is sound and correct. The blanket requirement for complete selectivity is impossible to design using available engineering tools for generic devices. Specific manufacturer's test data for uniquely specified equipment is required, and even then any one manufacturer's options are limited. The number of sequential overcurrent protection devices in any design must be minimized, reducing the segmentation and isolation capabilities of distribution systems, which also reduces operational safety and reliability that multiple switching levels affords. In order to provide selectivity, upstream devices must be intrinsically slower in operation, or be substantially oversized for the actual load. Paradoxically, since one of the reasons often quoted for selective coordination is safety in an accident, the arc flash energy for a given point in a system will increase in almost every system design because of the mandate to selectively coordinate every level of the overcurrent protection.
Panel Meeting Action: Reject
Panel Statement: This comment and associated proposal reduces the level of safety and is not needed because selective coordination for the full range of overcurrents is achievable. Selective coordination only "for faults with duration of 0.1 seconds and longer" permits installations where overcurrent protective devices would be coordinated for primarily overloads and a few low-level phase-phase and phase-ground faults. Arc flash hazards are not necessarily greater for selectively coordinated systems. For circuit breakers, there are circuit breaker options whereby selective coordination can be achieved without increased arc flash hazards, such as arc reduction maintenance switches and zone selective interlocking.
In addition, there are other design options that can be used to achieve selective coordination and acceptable levels of incident energy.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-137 Log #1806 NEC-P13 **Final Action: Reject**
(700.27)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 13-194
Recommendation: The panel action on this proposal should have been to accept the proposal in principle and revise the proposed text as follows:
Overcurrent devices shall be selected by a qualified person to optimize selective coordination between equipment protection, service continuity, and arc flash protection.
Substantiation: The recommended wording for the balance of the first two sometimes opposing criteria is taken from Chapter 15 of IEEE 242 (the Buff Book), the IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems. As stated in IEEE 242 on page 607 in Section 15.7.1, "complete selective coordination may not be achieved in all systems". The current language of 700.27, 701.18, and 708.54 does not allow the flexibility for a qualified person to make the compromise between these two criteria, which has been the common practice in selective protective device coordination for decades. Additional substantiation for this rewording of the proposal comes from NFPA 110 which says in Article 6.5.1 that "The overcurrent protective devices in the EPSS shall be coordinated to optimize selective tripping of the circuit overcurrent protection devices when a short circuit occurs". The current language in these NEC Articles for 100% coordination has had the affect of inappropriately restricting the options available for a qualified person, and has led to the use of a limited set of options to achieve 100% coordination, giving a windfall advantage to a certain specific class of equipment. The recommended change would make the necessary adjustment in the language to allow more flexible coordination in accordance with the methodology recommended in IEEE 242. In addition, the addition of the wording "a qualified person" will incorporate the panel judgment from Proposal 13-203 which was to accept in principle in part, additional language to indicate the qualifications of persons performing the coordination.
Panel Meeting Action: Reject
Panel Statement: This comment and associated proposal reduces the level of safety. "Optimize selective coordination" is not needed since selective coordination for the full range of overcurrents is achievable. The proposed language does not provide sufficient specificity as to what constitutes an acceptable selectively coordinated installation and would permit systems to cascade overcurrent protective devices for any level of overcurrent for any reason such as cost, effort, expertise, or space.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 15 Negative: 3
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.
MOUTON, C.: The panel action for this Comment should have been Accepted in Principle. The proposal would not reduce the level of safety. Quite to the contrary, several comments indicated that actually the current language will in some cases reduce the level of safety. As stated in other Comments (13-136 and 13-148), 100% selective coordination is achievable, but at the cost of overly restrictive selection of equipment, and to the detriment of arc flash protection. The language selected is similar to other language provide in NFPA 110 and in technical guidelines of IEEE 242. The check and balance for integrity of optimized protective device coordination is the same as it has been done for decades. 100% coordination is the new and overly specified requirement.

13-138 Log #2237 NEC-P13 **Final Action: Accept**
(700.27)

Submitter: Malcolm Allison, Ferraz Shawmut / Rep. National Electric Fuse Association
Comment on Proposal No: 13-198
Recommendation: The Panel should continue to reject this proposal.
Substantiation: Continue to reject this proposal since the Panel Action and Panel Statement clarifies that the existing 700.27 text already requires selective coordination **for the full range** of overcurrents. The first sentence of the Panel Statement reads: "The existing text of 700.27 already requires selective coordination for the full range of overcurrents, from overloads through the available short-circuit current, with all upstream devices."

By the nature of business, many systems are merely designed and installed to the minimum required by the Code. If the requirement for selective coordination were to be changed to only times greater than 0.1 second, then the effective result is that many systems will be designed and installed per the Code minimum and yet the coordination will essentially only be for overloads (and some low level faults). With a requirement for only times greater than 0.1 second and designed to the minimum, then low level to high level faults will be permitted to cascade (trip or open) multiple levels of overcurrent protective devices(branch, feeder, and main). The result will be emergency loads being unnecessarily interrupted due to a lack of selective coordination even though compliant with a requirement for times only greater than 0.1 second.

To illustrate this, Graphs have been provided that depict the time-current curves of the same 30A, 200A, and 800A systems.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-139 Log #2265 NEC-P13 **Final Action: Reject**
(700.27)

Submitter: Greg Batie, Sparling
Comment on Proposal No: 13-195
Recommendation: The original proposal 13-195 should be accepted by the panel.
Substantiation: The proposed change is closely aligned with NFPA 70-2008 comment #13-187 which proposed a similar modification to NFPA 70's requirements for selective coordination. The comment received a vote to accept by a majority of the panel members, however the vote was overruled by the TCC because it fell short of the 2/3 requirements for implementation.

In healthcare facilities it is often necessary to work on energized equipment

to avoid power shutdowns in the hospital. The proposed language would make these systems safer to work on by reducing the amount of arc flash energy that is delivered to a fault.

There has not been any substantiation that a selectively coordinated system improves the level of safety by reducing the extent of the power outage to the closest protective device. By defining the requirement for selective coordination to 0.1 seconds and longer would allow engineers to design systems with balance between the potential extent of a power outage and increased arc flash hazard.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-136.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-140 Log #2377 NEC-P13 **Final Action: Reject**
(700.27)

Submitter: James E. Degnan, Sparling
Comment on Proposal No: 13-195
Recommendation: My original proposal 13-195 should be accepted by the panel.
Substantiation: It is irresponsible of the panel to ignore the increasing arc flash hazard associated with selectively coordinated systems.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-136.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: Reducing arc flash hazards is a more viable safety concern than improving the reliability of emergency distribution systems through selective coordination. While there are no records of lives being lost because of a lack of complete selective coordination there are numerous records of injuries from arc flash hazards. The panel's statement cites ZSI as a means to mitigate arc flash hazards, but this technology has limited applications in multi panel distribution systems and is not reasonable to apply to when the downstream panel has thirty or more circuits. Any of the 2011 NEC proposals that permitted consideration of arc flash hazards on an equal or better basis with selective coordination have merit.

13-141 Log #1573 NEC-P13 **Final Action: Reject**
(700.27, FPN)

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 13-201
Recommendation: Accept this proposal
Substantiation: A lack of coordination between standard overcurrent protective devices and ground fault protection for equipment (GFPE) may be one of the most frequent coordination errors made by engineers. A FPN would help in pointing out the need to consider coordination between these devices as well. While it is true that Article 700 does not require GFPE, it does not prohibit it either. Indeed, coordination may actually be enhanced by the use of GFPE at lower levels in the system and can improve life safety by preventing catastrophic equipment burn-downs, ignition of combustible materials and reduction in the arc flash hazard.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on Proposal 13-201.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
CZARNECKI, N.: NEMA disagrees with the panel action. The panel did not address the concerns presented by the proposal submitter as noted in the NEMA ROP ballot. Guidance in the methods and selection of devices to ensure selective coordination is critical to a selective system. The proposal would simply remind the designer to include ground fault protective devices in the device analysis.

13-142 Log #2692 NEC-P13 **Final Action: Reject**
(700.27 Exception and FPN (New))

Submitter: Frederic P. Hartwell, Rep. Massachusetts Electrical Code Advisory Committee
Comment on Proposal No: 13-203
Recommendation: Accept the proposal as submitted.
Substantiation: When CMP 13 removed the word "practicable" it gutted the proposal. The entire concept was that under the conditions specified in an exception, and it absolutely should be an exception, an alternate procedure could be followed. This procedure invoked the word "practicable", and because that involves considerable technical judgment, the requirement was for a professional engineer to be involved. In a sense we agree with the comment in the voting that the PE is excessive, but only because the panel continued to leave the requirement totally prescriptive. In the real world these applications cannot be made completely prescriptive, and the approach followed in Massachusetts comports with NFPA 110.

CMP 13 need not go very far to find one of the some 70 instances of the use of a "where practicable" provision. It appears in 700.7, in the very same article as this proposal addresses. As noted in the voting, CMP 13 not only knows about this provision, it declined to remove it in this very code cycle. After extensive conversations with all interests involved, it is increasingly clear to us that this proposal would go a very long way towards building a consensus around one of the most contentious code issues in recent memory. CMP 13 should take this opportunity to create that consensus.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-143 Log #1085 NEC-P13 **Final Action: Reject**
(700.27 Exception No. 2 and FPN (New))

Submitter: James H. Costley, Jr., Newcomb & Boyd Consultants & Engineers
Comment on Proposal No: 13-203
Recommendation: Support the TCC Action of "Reject" for the Proposal as AIPIP by the CMP 13.

I agree with the original submitter's proposal, but disagree with the CMP 13 amended version of the proposal.
Substantiation: The design and specification of electrical construction work is typically done by or under the supervision of a Professional Engineer, and sealed and signed when submitted for construction permit. Final provision of selectively coordinated overcurrent protection devices is accomplished by a Contractor in most cases, and is based on the specific testing and published certification by the manufacturer of those products in the absence of an industry standard testing procedure. The Engineer (and ultimately the owner) must rely on the manufacturer's certification of performance, and such certifications cannot be stamped or further certified by the Engineer when such product testing is outside of his supervision.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135. The panel recognizes that this recommendation is confusing and affirms that this reject action also rejects Proposal 13-203 as amended by CMP 13.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-144 Log #1606 NEC-P13 **Final Action: Reject**
(700.27 Exception No. 2 and FPN (New))

Submitter: Thomas A. Domitrovich, Eaton Corp.
Comment on Proposal No: 13-203
Recommendation: Accept the proposal
Substantiation: There are relatively simple electrical power systems that can meet the requirements for selective coordination by simply using the basic information readily available from equipment manufacturers. However, more involved electrical systems, which typically include complicated sub-systems, are best designed by a professional engineer.

Therefore, depending on the complexity of the design, this proposal provides the option that the design of safe and reliable power systems may be done by a licensed professional engineer. The National Electrical Code recognizes the capabilities of the professional engineer, and being able to meet the requirements of selective coordination demonstrates the capabilities of professional engineers.

Allowing this exception in this section provides the opportunity for the licensed professional engineer to design a safe and reliable power system and ensures the electrical inspector has the clear direction for approval.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-145 Log #1763 NEC-P13 **Final Action: Reject**
(700.27 Exception No. 2 and FPN (New))

Submitter: Thomas A. Domitrovich, Eaton Corp. / Rep. American Circuit Breaker Manufacturers Assoc.
Comment on Proposal No: 13-203
Recommendation: Accept the proposal as submitted.
Substantiation: The American Circuit Breaker Manufacturers Association (ACBMA), headquarters in Washington, D.C., is an association of American manufacturers of circuit breakers to represent and promote the mutual interests of American circuit breaker manufacturers in areas of codes and standards, applications, safety, and education. Members of the Association include Eaton Corporation, General Electric Company, Siemens Industry, Inc., and Square D/ Schneider Electric.

To address the panel's objection to the word "practicable" as not being defined and being subjective, we offer the fact that this word, the word Practicable, is used throughout many NFPA documents as follows:

NFPA 70 "National Electrical Code", 2008 edition: Practicable appears 71 times. The phrase "where practicable" is used 22 times in this same document.

NFPA 99 "Standard for Healthcare Facilities", 2005 Edition: Practicable appears 6 times. The phrase "extent practicable" is used once.

NFPA 110 "Standard for Emergency and Standby Power Systems", 2010 Edition: Practicable appears 3 times.

The panel, in other areas of the code, supports the use of the word "Practicable" as in 700.7. Also, this panel has demonstrated the acceptance of this word through supporting its use as part of Proposals 13-151, 13-60a, 13-63 and 13-214.

Accepting the original proposal provides the option to enable the licensed professional engineer to engineer a solution.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-146 Log #1882 NEC-P13 **Final Action: Reject**
(700.27 Exception No. 2 and FPN (New))

Submitter: Jason D'Antona, Partners HealthCare System Inc.
Comment on Proposal No: 13-203
Recommendation: Proposal 13-203 should be accepted as originally worded by the author.
Substantiation: This proposal will allow the responsible design engineer to be the arbiter of the safest design to suit varying design conditions.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-147 Log #1912 NEC-P13 **Final Action: Reject**
(700.27 Exception No. 2 and FPN (New))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 13-203
Recommendation: Accept the proposal in principle, revising the exception as follows:

Exception No. 2: Where the emergency system design is under the control of a licensed professional engineer engaged in the design or maintenance of electrical installations, the selection of overcurrent protective devices shall be permitted to coordinate to the ~~extent practicable~~ level required. The design shall be documented, stamped by the professional engineer, and made available for review by the authority having jurisdiction.
Substantiation: This proposal should be accepted in principle for a number of reasons:

1. The objective of the proposal has been completely missed and text has been inserted with an entirely different meaning.

2. Achieving selective coordination has been made even more difficult for no substantive reason. A PE license is not necessary to determine if two overcurrent protective device (OCPD) time-current curves cross or overlap one another, nor is a license required to determine if two OCPDs will coordinate by reading a manufacturer's coordination table. No longer will a contractor, for example, be able to call an OCPD manufacturer to find out what size upstream OCPD he needs to coordinate a small emergency power system. The manufacturer will not be able to answer the question unless they are a licensed PE in that state.

3. It is suggested that where a PE license is necessary is to optimize protection and coordination as recommended in the various IEEE *Color Books* that address the issue of coordination and as is allowed in NFPA 110, Phoenix, Wisconsin and Massachusetts,

4. The actions of the panel seem inconsistent. In the revised text of this proposal, only licensed professional engineers are allowed to design selectively coordinated emergency power systems, but unlicensed facility operators are allowed to defeat that coordination at will while live work is performed, a time when the likelihood of a power disrupting incident occurring is probably at its highest (see the panel statement on ROP 13-199 and the statements of other panels on ROPs 10-26 and 12-37).

5. The use of an incident energy reduction system (see ROP 13-199) requires engineering. A maintenance switch type system requires a second coordination study to determine if the system can still operate properly at the lower instantaneous trip setting. If it is acceptable for an engineer to coordinate the system to the level required under maintenance conditions, why is it not also permitted under normal operating conditions?

Finally, the panel should note that the text of this exception is similar to that in 240.86(A).
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135. The phrase "level required" is not clear as to the desired result.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 17 Negative: 1
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
Comment on Affirmative:
DEGNAN, J.: I agree with the panel's statement that the proposed language lacked clarity. See my reply to comment 13-140.

13-148 Log #2453 NEC-P13 **Final Action: Reject**
(700.27 Exception No. 2 and FPN (New))

Submitter: Paul Konz, RG Vanderweil Engineers
Comment on Proposal No: 13-203
Recommendation: Accept Proposal 13-203.
Substantiation: Selective coordination in emergency systems presents several competing compromises which have a negative impact on overall system design, reliability, and safety. Overcurrent protection device coordination is a complex set of decisions where the design engineer must analyze the benefits of each decisions. Acceptance of this proposal gives the design engineer the flexibility to analyze the application and select the solution which best applies. Mandating selective coordination introduces compromises to the design of the emergency system which may actually cause more harm than intended by mandating complete coordination.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 15 Negative: 3
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
CZARNECKI, N.: The comment should be accepted in principle and revised to be worded similarly to the panel ROP action.
Exception No.2: The selection of overcurrent protection devices, in order to achieve selective coordination, shall be permitted by a licensed professional engineer engaged primarily in the design and maintenance of electrical installations. The design shall be documented, stamped by the professional engineer, and made available for review by the authority having jurisdiction." The NEMA ROP Ballot Comment - "The Panel should revisit this proposal and consider the merits of wording in an Exception versus a main rule.
DEGNAN, J.: See my reply to comment 13-140.

ARTICLE 701 — LEGALLY REQUIRED STANDBY SYSTEMS

13-149 Log #1867 NEC-P13 **Final Action: Accept**
(701)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 13-205
Recommendation: Accept the Proposal.
Substantiation: This proposal makes a lot of sense and should be accepted.

There does not seem to be any logical reason for not having parallel numbering, to the extent practicable, for Articles 700, 701 and 702. Other Code Panels have done so with other articles and the Code users enjoy the improved "User Friendliness."
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-150 Log #816 NEC-P13 **Final Action: Reject**
(701.6)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-210
Recommendation: Accept the proposal and revise text to read as follows:
A legally required standby system shall have ratings not less than required for the supply of all equipment intended to be operated simultaneously, and to withstand available fault current at its terminals.
Substantiation: "At one time" can be 1 pm on Monday and 1 pm on Tuesday. "Simultaneously" is the term usually used in the NEC. "Ratings" include current, voltage, conductor ampacity, overcurrent devices, and other components.
Panel Meeting Action: Reject
Panel Statement: The intent of 701.6 addresses the "legally required standby system" and is not limited to devices and switches etc. The submitter has not provided adequate technical substantiation to support the proposed revision.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-151 Log #815 NEC-P13 **Final Action: Reject**
(701.7(A) and (B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-213
Recommendation: Accept the proposal and revise text to read as follows:
(A) Transfer equipment shall be designed and installed to prevent the unintended transfer of normal and alternate sources of supply in any operation of the transfer equipment.
(B) Bypass Operation Switching. Approved means to bypass and isolate the transfer equipment shall be permitted. Where such bypass isolation switching is provided, approved means to prevent unintentiaonal parallel operation shall be provided.
Substantiation: Devices other than switches, e.g., circuit breakers may be used.
Panel Meeting Action: Reject
Panel Statement: The proposed revision does not add clarity or improve usability.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:
ODE, M.: Legally required standby power sources can be connected to the utility company power grid as interconnected electric power production sources in accordance with Article 705. The word "inadvertent" emphasizes that the power source must not be inadvertently connected in a parallel with the normal source, unless the system is designed as an interconnected electric power production source. Bypass switches are specifically listed as transfer switch accessories and are intended for use in conjunction with transfer switches but are not intended to modify the function or construction of the transfer switch itself. A circuit breaker is not listed as a transfer switch accessory. "Approved identified means" is unnecessary since 110.2 requires approval and 110.3(A) requires compliance with all of the suitability requirements for strength, durability, and similar conformity issues.

13-152 Log #805 NEC-P13 **Final Action: Reject**
(701.9(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-220
Recommendation: Accept the proposal.
Substantiation: The panel statement for Proposal 13-155 states that all sources other than legally required standby systems are "normal". Generator sets, batteries, separate sources for emergency systems are not "normal" sources which is usually applied to the lighting and power services. Individual dedicated services and generators for fire pumps are not "normal" sources. Location of other sources grounded at the location should be noted.
Panel Meeting Action: Reject
Panel Statement: The recommendation does not clarify the current requirement. See the panel action and statement on Comment 13-153.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:
ODE, M.: There are legally required standby sources and other sources supplying the transfer switch are considered normal sources. Normal sources could include photovoltaic systems, utility supplied sources, or any other normal source of power that is not legally required. The suggested change in text is unnecessary.

13-153 Log #2677 NEC-P13 **Final Action: Accept in Principle**
(701.9(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 13-221
Recommendation: Accept the proposal.
Substantiation: The requirement is clearly stated, and the need for the clarification is compelling. The existing wording is being commonly read to require the sign at the point of connection of the grounding electrode conductor to the grounding electrode, because that is certainly a "grounding location" on the premises. The NFPA NEC Handbook explanation for this section uses the wording "requires a sign at the grounding location" to explain this requirement, which can be taken the same way. I happen to know that NFPA staff is aware of the intent and this is not literally an error, but it can be easily taken that way. The supportive comment in the voting came from someone who has to explain this to electricians, so her comments deserve special consideration.
Panel Meeting Action: Accept in Principle
Revise 701.9(B) to read:
Where removal of a grounding or bonding connection in normal power source equipment interrupts the grounding electrode conductor connection to the alternate power source(s) grounded conductor, a warning sign shall be installed at the normal power source equipment stating:
Warning: Shock Hazard Exists if Grounding Electrode Conductor or Bonding Jumper Connection in this Equipment is Removed while Alternate Source(s) is Energized.
Panel Statement: The panel recognizes the need to clarify the requirement of this section and to also provide prescriptive wording on what the sign should convey.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-154 Log #804 NEC-P13 **Final Action: Reject**
(701.11(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-225
Recommendation: Accept the revised text as follows:
The legally required standby service shall be separated from all other services to minimize simultaneous interruption of supply...
Substantiation: The proposed wording is sufficient to include inadvertent, simultaneous operation by personnel, accident, physical damage; locations cannot prevent interruption by fire or other occurrences whether or not in buildings or other structures, or outside. Interruptions can be minimized, but not prevented when due to utility power outage.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the recommended editorial changes. Section 701.11(E) covers the allowance for a connection ahead of the normal supply service disconnecting means where not located in the same cabinet, enclosure, or vertical switchboard section as the normal service disconnect. The existing text is clear that from this connection point the legally required standby source must be separated from the normal service disconnect. The recommended text would imply that the legally required standby service must be separated from the normal service which would prevent the connection allowed by this section.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-155 Log #1574 NEC-P13 **Final Action: Accept**
(701.17)

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 13-232
Recommendation: Continue to reject this proposal
Substantiation: This proposal should continue to be rejected because it jeopardizes life-safety. The reasons for utilizing ground-fault protection of equipment in certain applications are well documented. The damage than can result from a ground fault on such a system may render a substantial portion of the system inoperative, resulting in a lengthy outage potentially worse than that envisioned by the submitter, or worse yet start a life threatening fire. Further, restraint of the GFPE may increase the downstream arc flash hazard for maintenance workers.
The late J.R. Dunki-Jacobs, a recognized authority on ground-fault protection, stated in his book *Industrial Power System Grounding Design Handbook* (pages 186, 189) that, "If an arcing line-to ground fault is initiated in a solidly grounded system on one of three bare buses in a metal enclosure, the hot ionized gases that are developed by the fault can be expected to cause escalation to an arcing multi-phase fault within 1 or 2 cycles (0.0167 to 0.033 sec) of time." He went on to state, "Escalating arcing-ground faults have shown themselves to be extremely devastating…" and "Unquestionably then, engineering attention to their immediate suppression must be proactive and immediate, rather than reactive. Not only for reason of minimizing the released arc energy to maximize personnel safety, but also to avert arcing-fault escalation." The suggestion that an audible and visual signal device would be of any value is ludicrous.

System reliability and blackout prevention can be achieved by proper system design, equipment selection and coordination. The GFPE restraint called for in this proposal is unnecessary and a potential threat to life-safety.
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-156 Log #1615 NEC-P13 **Final Action: Reject**
(701.17)

Submitter: Christopher G. Walker, Eaton Corp.
Comment on Proposal No: 13-229
Recommendation: (A) Alternate Power Source. The alternate source for legally required standby systems shall not be required to have ground-fault protection of equipment.

(B) Normal Power Source: For the normal source of legally required standby systems, where ground-fault protection has been provided for the operation of the service disconnecting means or feeder disconnecting means as specified by 230.95 or 215.10, an additional step of ground-fault protection shall be provided in all next level feeder disconnecting means downstream toward the load.

Such protection shall consist of overcurrent devices, current transformers, or other equivalent protective equipment that shall cause the feeder disconnecting devices to open.

The additional levels of ground-fault protection shall NOT be installed as follows:

1. On electrical systems that are not solidly grounded wye systems with greater than 150 volts to ground, but not more than 600 volts phase-to-phase.

2. On electrical systems where a non-orderly shutdown of power will introduce additional or increased hazards.

Substantiation: While the Panel's response was to point out that 700.26 permits the alternate source for Legally RequiredEmergency Systems to not have ground-fault protection of equipment with automatic disconnecting means, and that Legally Required Emergency Systems remain selectively coordinated for all fault conditions, it is evident that the intent of this Proposal was not clear originally. The intent of this Proposal relates only to the Normal source of Emergency Systems, and the proposal is focused on requiring an additional step of ground-fault protection in all next level feeder disconnecting means downstream toward the load, when connected to the Normal source. I have modified the wording to help clarify this important distinction.

Ground faults are typically believed to be the most common type of fault experienced in operating energized electrical systems, per ANSI/IEEE Std 242-1986 Buff book, Chapter 7. Professional design engineers tell of experiences with ballast or small motor failures that have caused main or feeder devices to open. Why is this so? In some instances, a ground fault condition existed that went undetected and precipitated the protective device to open. In other cases, ground fault protective devices were improperly set, or not set at all. In others yet, a selective coordination study may not have been done, or may have been done improperly.

The NEC has for many years required ground fault protection of equipment, but only at the service disconnect level (with noted special Exceptions), per 230.95. With a goal in mind of maximizing the reliability and up-time of electrical systems, and giving consideration that the most common types of faults are ground fault related, it becomes a reasonable approach that the requirements for ground fault protection of equipment are extended to all appropriate areas in the electrical system, beyond just the service level.

This proposal is, therefore, to require additional levels of ground fault protection of equipment below the service level on the normal source of an electrical system. This Proposal's language mirrors a similar requirement for ground fault protection of equipment that currently exists in NEC 708.52 for Critical Operations Power Systems (COPS). This Proposal, therefore, recommends enhancing the reliability of the electrical system by requiring ground fault protection of equipment in all appropriate levels of the system.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any technical substantiation to justify requiring an additional level of ground fault protection on the feeder downstream from the normal service main. The reason for an emergency system is to provide power within 10 seconds whenever the utility source or other source of power is lost.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18
Comment on Affirmative:

ODE, M.: The Panel Statement was inadvertently cut and pasted from a comment dealing with emergency systems and should have been as follows: "The submitter has not provided any technical substantiation to justify requiring an additional level of ground fault protection on the feeder downstream from the normal service main. The reason for a legally required standby system is to provide power within 60 seconds whenever the normal source of power is lost."

13-157 Log #2231 NEC-P13 **Final Action: Reject**
(701.17)

Submitter: Malcolm Allison, Ferraz Shawmut / Rep. National Electric Fuse Association
Comment on Proposal No: 13-232
Recommendation: Modify the proposed text by adding a new second paragraph to read as follows:
Normal Source ground fault protection on the line side of a transfer switch supplying legally required standby systems shall be permitted to be restrained for ground faults on the loadside of the transfer switch, provided that audible and visual signal devices indicate whenever a ground fault relay has been restrained, and instructions on the course of action to be taken in the event of an indicated ground fault are located at or near the sensor location.
Substantiation: The designer may be required by 230.95 and 210.15 to use ground fault protection on the main or feeder on the normal side of a transfer switch feeding a legally required standby system. A ground fault relay sensor can be put at the transfer switch, which, when a ground fault occurs on the load side of the transfer switch, sends a signal to the normal ground fault relay to restrain the operation of the disconnecting means.

This additional text allows designers to be able to utilize ground fault protection for the normal source, and provide selective coordination for legally required standby devices and all overcurrent devices on their line side, without endangering any equipment protection on the normal source side of the transfer switch. This can best be accomplished by allowing the normal side ground fault protection to be restrained for ground faults on the load side of the transfer switch (on the legally required standby system side). While 701.17 permits ground fault protection to be totally omitted on the alternate source side of legally required standby systems, this comment simply allows the ground fault protection on the normal source side to be restrained for ground faults on the load side of the transfer switch for legally required standby systems.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-134.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-158 Log #609 NEC-P13 **Final Action: Reject**
(701.18)

Submitter: Daniel J. Caron, Bard, Rao + Athanas Consulting Engineers, LLC
Comment on Proposal No: 13-240
Recommendation: Revise text to read as follows:

701.18 Coordination. Legally required standby system(s) overcurrent protective devices shall be coordinated in accordance with 701.18(A) or (B):
(A) Coordination to 0.01 seconds. Legally required standby system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.

(B) Engineering Supervision. For new and existing installations, where the legally required standby system design is under the control of a licensed professional engineer engaged in the design or maintenance of electrical installations, the selection of overcurrent protective devices shall be permitted to coordinate to the extent practicable. The design shall be documented, stamped by the professional engineer and made available for review by the authority having jurisdiction.

Exception: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

FPN: Overcurrent protective devices used for legally required standby system circuit protection, where coordinated to optimize selective operation of the circuit overcurrent protective devices when a short circuit or ground fault occurs, increase overall reliability of the system.
Substantiation: Panel 13 is urged to reevaluate their decision regarding selective coordination. Proposal 240 was accepted in principal, in part during the ROP, but was overturned in the final vote by less than 1/2, of the panel members.

The proposed rewording of Proposal 240 above, reflects the Panel discussions during the ROP that preferred positive code language vs. an additional exception. "Coordination to 0.01 seconds" was added to clarify that the instantaneous portion of the overcurrent time/current curve must also be considered when coordinating device,s. The title "Engineering Supervision" was added to reflect similar instances in the NEC, such as 240.86 and is used extensively in the National Electrical Code in no less than 20 other instances.

The panel also rejected the word "practicable" stating it "....is not defined and subjective." However, this same Panel defended the term "practicable" in Proposal 13-151 stating "'Where practicable' leaves the decision up to the authority having jurisdiction...." The word "practicable" appears in the National Electrical Code in no less than 70 other
instances.

Authors of Proposal 10-82, who also defend selective coordination as currently written, have, apparently recognized that a selectively coordinated system increases arc-flash energy, thus the proposal to require a means of reducing arc flash energy will be required in the proposed 240.87.

A system that is coordinated by an Engineer engaged in the business of designing these systems, understands the balance required between coordination, arc flash energy, safety and reliability. The idea that Engineers are opposed to coordinated power systems is incorrect. Engineers are opposed to the strict interpretation that system coordination takes precedence over all other issues within a power system design. The engineering community has been balancing coordination and safety in electrical distribution systems quite effectively for decades. There is little justification to defend the strict requirement for selective coordination.

In many situations, it is impossible to add to an existing distribution system and achieve full coordination without jeopardizing the existing system. The proposed language provides some relief to the strict interpretation, while maintaining a safe and reliable system.

The NEC seeks to provide a nationally recognized standard. Proposal 240, as originally written, is part of the 2008 Massachusetts Electrical Code. Relief to this strict requirement is being granted, in varying focus, in many other jurisdictions.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-159 Log #1086 NEC-P13 **Final Action: Reject**
(701.18)

Submitter: James H. Costley, Jr., Newcomb & Boyd Consultants & Engineers
Comment on Proposal No: 13-233
Recommendation: Accept the proposal.
Substantiation: The submitter's substantiation is sound and correct. The blanket requirement for complete selectivity is impossible to design using available engineering tools for generic devices. Specific manufacturer's test data for uniquely specified equipment is required, and even then any one manufacturer's options are limited. The number of sequential overcurrent protection devices in any design must be minimized, reducing the segmentation and isolation capabilities of distribution systems, which also reduces operational safety and reliability that multiple switching levels affords. In order to provide selectivity, upstream devices must be intrinsically slower in operation, or be Paradoxically, since one of the reasons often quoted for selective coordination is safety in an accident, the arc flash energy for a given point in a system will increase in almost every system design because of the mandate to selectively coordinate every level of the overcurrent protection.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-136.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-160 Log #1807 NEC-P13 **Final Action: Reject**
(701.18)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 13-230
Recommendation: The panel action on this proposal should have been to accept the proposal in principle and revise the proposed text as follows:
Overcurrent devices shall be selected by a qualified person to optimize selective coordination between equipment protection, service continuity, and arc flash protection.
Substantiation: The recommended wording for the balance of the first two sometimes opposing criteria is taken from Chapter 15 of IEEE 242 (the Buff Book), the IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems. As stated in IEEE 242 on page 607 in Section 15.7.1, "complete selective coordination may not be achieved in all systems". The current language of 700.27, 701.18, and 708.54 does not allow the flexibility for a qualified person to make the compromise between these two criteria, which has been the common practice in selective protective device coordination for decades. Additional substantiation for this rewording of the proposal comes from NFPA 110 which says in Article 6.5.1 that "The overcurrent protective devices in the EPSS shall be coordinated to optimize selective tripping of the circuit overcurrent protective devices when a short circuit occurs". The current language in these NEC Articles for 100% coordination has had the affect of inappropriately restricting the options available for a qualified person, and has led to the use of a limited set of options to achieve 100% coordination, giving a windfall advantage to a certain specific class of equipment. The recommended change would make the necessary adjustment in the language to allow more flexible coordination in accordance with the methodology recommended in IEEE 242. In addition, the addition of the wording "a qualified person" will incorporate the panel judgment from Proposal 13-203 which was to accept in principle in part, additional language to indicate the qualifications of persons performing the coordination.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-137.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 15 Negative: 3
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.
MOUTON, C.: See explanation for negative vote on Comment 137.

13-161 Log #2690 NEC-P13 **Final Action: Reject**
(701.18)

Submitter: Frederic P. Hartwell, Rep. Massachusetts Electrical Code Advisory Committee
Comment on Proposal No: 13-240
Recommendation: Accept the proposal as submitted.
Substantiation: When CMP 13 removed the word "practicable" it gutted the proposal. The entire concept was that under the conditions specified in an exception, and it absolutely should be an exception, an alternate procedure could be followed. This procedure invoked the word "practicable", and because that involves considerable technical judgment, the requirement was for a professional engineer to be involved. In a sense we agree with the comment in the voting that the PE is excessive, but only because the panel continued to leave the requirement totally prescriptive. In the real world these applications cannot be made completely prescriptive, and the approach followed in Massachusetts comports with NFPA 110.

CMP 13 need not go very far to find one of the some 70 instances of the use of a "where practicable" provision. It appears in 700.7, in the very same article as this proposal addresses. As noted in the voting, CMP 13 not only knows about this provision, it declined to remove it in this very code cycle. After extensive conversations with all interests involved, it is increasingly clear to us that this proposal would go a very long way towards building a consensus around one of the most contentious code issues in recent memory. CMP 13 should take this opportunity to create that consensus.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-162 Log #1575 NEC-P13 **Final Action: Reject**
(701.18, FPN)

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 13-238
Recommendation: Accept this proposal
Substantiation: A lack of coordination between standard overcurrent protective devices and ground fault protection for equipment (GFPE) may be one of the most frequent coordination errors made by engineers. A FPN would help in pointing out the need to consider coordination between these devices as well. While it is true that Article 701 does not require GFPE, it does not prohibit it either. Indeed, coordination may actually be enhanced by the use of GFPE at lower levels in the system and can improve life safety by preventing catastrophic equipment burn-downs, ignition of combustible materials and reduction in the arc flash hazard.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-141.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 15 Negative: 3
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
CZARNECKI, N.: NEMA disagrees with the panel action. The panel did not address the concerns presented by the proposal submitter as noted in the NEMA ROP ballot. Guidance in the methods and selection of devices to ensure selective coordination is critical to a selective system. The proposal would simply remind the designer to include ground fault protective devices in the device analysis.
DEGNAN, J.: See my reply to comment 13-140.

13-163 Log #1087 NEC-P13 **Final Action: Reject**
(701.18 Exception No. 2 and FPN (New))

Submitter: James H. Costley, Jr., Newcomb & Boyd Consultants & Engineers
Comment on Proposal No: 13-240
Recommendation: Support the TCC Action of "Reject" for the Proposal as AIPIP by the CMP 13.

I agree with the original submitter's proposal, but disagree with the CMP 13 amended version of the proposal.

Substantiation: The design and specification of electrical construction work is typically done by or under the supervision of a Professional Engineer, and sealed and signed when submitted for construction permit. Final provision of selectively coordinated overcurrent protection devices is accomplished by a Contractor in most cases, and is based on the specific testing and published certification by the manufacturer of those products in the absence of an industry standard testing procedure. The Engineer (and ultimately the owner) must rely on the manufacturer's certification of performance, and such certifications cannot be stamped or further certified by the Engineer when such product testing is outside of his or her supervision.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135. The panel recognizes that this recommendation is confusing and affirms that this reject action also rejects Proposal 13-240 as amended by CMP 13.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-164 Log #1764 NEC-P13 **Final Action: Reject**
(701.18 Exception No. 2 and FPN (New))

Submitter: Thomas A. Domitrovich, Eaton Corp. / Rep. American Circuit Breaker Manufacturers Assoc.
Comment on Proposal No: 13-240
Recommendation: Accept the proposal as submitted.
Substantiation: The American Circuit Breaker Manufacturers Association (ACBMA), headquarters in Washington, D.C., is an association of American manufacturers of circuit breakers to represent and promote the mutual interests of American circuit breaker manufacturers in areas of codes and standards, applications, safety, and education. Members of the Association include Eaton Corporation, General Electric Company, Siemens Industry, Inc., and Square D/ Schneider Electric.

To address the panel's objection to the word "practicable" as not being defined and being subjective, we offer the fact that this word, the word Practicable, is used throughout many NFPA documents as follows:

NFPA 70 "National Electrical Code", 2008 edition: Practicable appears 71 times. The phrase "where practicable" is used 22 times in this same document.

NFPA 99 "Standard for Healthcare Facilities", 2005 Edition: Practicable appears 6 times. The phrase "extent practicable" is used once.

NFPA 110 "Standard for Emergency and Standby Power Systems", 2010 Edition: Practicable appears 3 times.

The panel, in other areas of the code, supports the use of the word "Practicable" as in 700.7. Also, this panel has demonstrated the acceptance of this word through supporting its use as part of Proposals 13-151, 13-60a, 13-63 and 13-214.

Accepting the original proposal provides the option to enable the licensed professional engineer to engineer a solution.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.
DEGNAN, J.: See my reply to comment 13-140.

13-165 Log #1913 NEC-P13 **Final Action: Reject**
(701.18 Exception No. 2 and FPN (New))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 13-240
Recommendation: Accept the proposal in principle, revising the exception as follows:

Exception No. 2: Where the legally required standby system design is under the control of a licensed professional engineer engaged in the design or maintenance of electrical installations, the selection of overcurrent protective devices shall be permitted to coordinate to the ~~extent practicable~~ level required. The design shall be documented, stamped by the professional engineer, and made available for review by the authority having jurisdiction.
Substantiation: This proposal should be accepted in principle for a number of reasons:

1. The objective of the proposal has been completely missed and text has been inserted with an entirely different meaning.

2. Achieving selective coordination has been made even more difficult for no substantive reason. A PE license is not necessary to determine if two overcurrent protective device (OCPD) time-current curves cross or overlap one another, nor is a license required to determine if two OCPDs will coordinate by reading a manufacturer's coordination table. No longer will a contractor, for example, be able to call an OCPD manufacturer to find out what size upstream OCPD he needs to coordinate a small emergency power system. The manufacturer will not be able to answer the question unless they are a licensed PE in that state.

3. It is suggested that where a PE license is necessary is to optimize protection and coordination as recommended in the various IEEE *Color Books* that address the issue of coordination and as is allowed in NFPA 110, Phoenix, Wisconsin and Massachusetts,

4. The actions of the panel seem inconsistent. In the revised text of this proposal, only licensed professional engineers are allowed to design selectively coordinated emergency power systems, but unlicensed facility operators are allowed to defeat that coordination at will while live work is performed, a time when the likelihood of a power disrupting incident occurring is probably at its highest (see the panel statement on ROP 13-199 and the statements of other panels on ROPs 10-26 and 12-37).

5. The use of an incident energy reduction system (see ROP 13-199) requires engineering. A maintenance switch type system requires a second coordination study to determine if the system can still operate properly at the lower instantaneous trip setting. If it is acceptable for an engineer to coordinate the system to the level required under maintenance conditions, why is it not also permitted under normal operating conditions?

Finally, the panel should note that the text of this exception is similar to that in 240.86(A).
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135. The phrase "level required" is not clear as to the desired result.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.

CZARNECKI, N.: The comment should be accepted in principle and revised to be worded similarly to the panel ROP action.
Exception No.2: The selection of overcurrent protection devices, in order to achieve selective coordination, shall be permitted by a licensed professional engineer engaged primarily in the design and maintenance of electrical installations. The design shall be documented, stamped by the professional engineer, and made available for review by the authority having jurisdiction." The NEMA ROP Ballot Comment - "The Panel should revisit this proposal and consider the merits of wording in an Exception versus a main rule."
Comment on Affirmative:
DEGNAN, J.: See my reply to comment 13-147.

ARTICLE 702 — OPTIONAL STANDBY SYSTEMS

13-166 Log #1868 NEC-P13 **Final Action: Accept**
(702)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 13-241
Recommendation: Accept the Proposal.
Substantiation: This proposal makes a lot of sense and should be accepted.

There does not seem to be any logical reason for not having parallel numbering, to the extent practicable, for Articles 700, 701 and 702. Other Code Panels have done so with other articles and the Code users enjoy the improved "User Friendliness."
Panel Meeting Action: Accept
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-167 Log #1259 NEC-P13 **Final Action: Reject**
(702.5)

Submitter: Chris Turner, Generac Power Systems
Comment on Proposal No: 13-247
Recommendation: 702.5 (B) System Capacity. ~~The calculations of load on the standby source shall be made in accordance with Article 220 or by another approved method.~~ An optional standby system shall have adequate capacity and rating for the supply of all equipment intended to be operated at one time. The user of the optional standby system shall be permitted to select the load connected to the system.
~~**(1) Manual Transfer Equipment**. Where manual transfer equipment is used, an optional standby system shall have adequate capacity and rating for the supply of all equipment intended to be operated at one time. The user of the optional standby system shall be permitted to select the load connected to the system.~~

~~**(2) Automatic Transfer Equipment**. Where automatic transfer equipment is used, an optional standby system shall comply with (2)(a) or (2)(b).~~
~~(a) Full Load. The standby source shall be capable of supplying the full load that is transferred by the automatic transfer equipment.~~
~~(b) Load Management. Where a system is employed that will automatically manage the connected load, the standby source shall have a capacity sufficient to supply the maximum load that will be connected by the load management system.~~
(1) Automatic Transfer Systems. Where automatic transfer equipment is used, it is recommended required that the optional standby system incorporate internal protective systems that monitor prevent against overload conditions. These systems shall either automatically manage the load or shutdown the system. Systems that do not incorporate overload protections prevention, must be sized per article 220.
Substantiation: The code panel rejection of this proposal refers to the safety provisions for Feeders and Branch circuits in Articles 210, 215 & 240. The rejection also suggests that in an automatic transfer of the building load to the generator there in an intentional overload of the generator and the feeder circuit.
In no way shape or form did we propose an intentional overload of the generator. Instead we provided data from utilities across the country showing the max power demand in typical residential homes is very low. This information was summarily dismissed by the panel and yet no data contradicting our claims was provided.
It should be taken into account that optional stand by generators are exactly that "STANDBY" they run and provide backup power in the event of a utility loss. This happens very infrequently and usually for short periods of time.
The NEC accepts the occasional and unintentional overload of a branch circuit because you cannot control the equipment a home owner may apply to a single branch circuit. The branch circuit is protected by a circuit breaker that when sufficiently overloaded will trip. The consequence of that will be for the user to reset the breaker. If no load had been removed the breaker will likely trip again. This is the indication the user needs to remove some load from the circuit in order for the breaker to stay reset.
In the unlikely and unintentional event that an optional stand by generator becomes overloaded the circuit breaker will trip or the overload prevention systems will shut the unit down. As with the branch circuit the user can reset the breaker or restart the unit but if no load has been removed the same result will occur. Again this is the indication to the user to manage the load such that the generator is no longer overloaded.
If the home owner is not home at the time of the power outage the connected load to the generator will be minimal at best. In the unintentional event that the home owner left all possible connected loads on the circuit breaker on the generator will trip or the overload prevention systems will shut the unit down eliminating any overload situation.
In both instances there is no inherent risk of electrocution or fire hazard created by this occasional and unintentional event.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the recommendation based on the lack of substantiation and loss of clarity. The system capacity reference to Article 220 is valid regardless of the choice of manual, automatic, or automatic with load management transfer equipment. Nowhere in the NEC is it permissible to intentionally overload a feeder or a branch circuit.

Feeder circuits supplying panelboards and branch circuits supplying loads of all kinds must be calculated based on their anticipate usage based on Parts I and II of Article 220 (for branch circuits) and Parts I and III of Article 220 (for feeders) or the optional calculations based on Parts I and IV of Article 220. Section 90.3 requires compliance with Chapters 1 through 4 unless specifically modified by Chapter 7 (Article 702) in this case. Even if the existing first sentence was deleted as indicated in the recommendation, feeders and branch circuits must still comply with Article 220 as the proposal text is written.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-168 Log #803 NEC-P13 **Final Action: Reject**
(702.6)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-249
Recommendation: Accept the revised text as follows:

Transfer equipment shall be approved for the intended use and designed and installed so as to prevent unintentional interconnection of other sources of supply in any operation of the transfer equipment.
Substantiation: The proposed wording is sufficient to include inadvertent connection to other sources whether "normal" or emergency, fire pump systems, etc.
Panel Meeting Action: Reject
Panel Statement: The submitter has not addressed any of issues raised by the Panel in the panel statement in the proposal. Optional standby power sources can be connected to the utility company power grid as interconnected electric power production sources in accordance with Article 705. The word "inadvertent" emphasizes that the power source must not be inadvertently connected in a parallel with the normal source, unless the system is designed as an interconnected electric power production source. In addition, the submitter has introduced new material that has not had public review.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-169 Log #2678 NEC-P13 **Final Action: Accept in Principle**
(702.8(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 13-252
Recommendation: Accept the proposal.
Substantiation: The requirement is clearly stated, and the need for the clarification is compelling. The existing wording is being commonly read to require the sign at the point of connection of the grounding electrode conductor to the grounding electrode, because that is certainly a "grounding location" on the premises. The NFPA NEC Handbook explanation for this section uses the wording "requires a sign at the grounding location" to explain this requirement, which can be taken the same way. I happen to know that NFPA staff is aware of the intent and this is not literally an error, but it can be easily taken that way. The supportive comment in the voting came from someone who has to explain this to electricians, so her comments deserve special consideration.
Panel Meeting Action: Accept in Principle

Revise 702.8(B) to read:

Where removal of a grounding or bonding connection in normal power source equipment interrupts the grounding electrode conductor connection to the alternate power source(s) grounded conductor, a warning sign shall be installed at the normal power source equipment stating:

Warning: Shock Hazard Exists if Grounding Electrode Conductor or Bonding Jumper Connection in this Equipment is Removed while Alternate Source(s) is Energized.

Panel Statement: The panel recognizes the need to clarify the requirement of this section and to also provide prescriptive wording on what the sign should convey.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-170 Log #2254 NEC-P13 **Final Action: Reject**
(702.11)

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 13-257
Recommendation: 702.11 Outdoor Housed Generator Sets

(A) Permanently Installed and Portable Generators Greater Than 15KW. Where an outdoor housed generator set is equipped with a readily accessible disconnecting means located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure. The disconnecting means shall meet the requirements of 225.36.

(B) Portable Generators 15 KW or Less. Where a portable generator that is rated 15 KW or less is installed using a flanged inlet or other cord and plug type connection, a disconnecting means shall not be required where ungrounded conductors serve or pass through a building or structure.
Substantiation: When portable generators was added to the scope of Article 702, consideration should have been given to whether a small portable generator that was connected by means of a flanged inlet a flexible cord requires a disconnecting means at the building or other structure. As noted in the panel's substantiation for Proposal 13-257, "A suitable disconnecting device is always available with a portable generator—the act of shutting it down." These portable generators typically are installed without a disconnecting means where a flanged inlet and flexible cord is used as the connection means. Revising this section as recommended will bring the requirements in line with typical installation practices and the panel statement.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the concern that the existing text does not address permanently installed and portable generators regardless of the generator size. The allowance in 702.11 is based on the general requirement in 225.32 and applies regardless of the generator used. The definition of a disconnecting means in Article 100 would allow for a cord and plug disconnect where the device was evaluated for such use. A disconnecting means is required when the generator is not in sight whether it is permanent or portable.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-171 Log #2413 NEC-P13 **Final Action: Reject**
(702.11)

Submitter: Brian E. Rock, Hubbell Inc.
Comment on Proposal No: 13-257
Recommendation: Revise Panel Statement on Proposal P13-257 to read:
A suitable disconnecting device is always available with a portable generator – the act of shutting it down. When the prime mover rolls to a stop, it is "off" more reliably than can be done with any other form of disconnect. Many plug and receptacle combinations are listed with horsepower ratings and are acceptable as disconnecting means for motors up to and including 60 amperes 3-phase at 120/208 volts. Pin and sleeve combination units are rated for much higher ampacities with at least one type that has an internal switch combination that switches the load off before the ~~twist-lock~~ locking-type cord cap can be removed. There are many different methods that can be utilized to disconnect the portable generator than the method suggested in the proposed recommendation.
Substantiation: "Twist-Lock" is a registered trademark (U.S. Patent & Trademark Office Nos. 565,872, 1,800,509, and 1,845,454) of Hubbell Incorporated for receptacles, attachment plugs, cable connectors, and inlets (motor attachment plug caps) of the locking-blade construction, and for enclosures employing similar. It shoyuld not be used as a generic adjective.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the comment because the recommendation does not concern new, revised or deleted text for the 2011 NEC. The panel understands the concern expressed in the submitter's recommendation and substantiation and will be cognizant about not using the cited term in future panel actions or statements.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-172 Log #1609 NEC-P13 **Final Action: Reject**
(702.11 and 702.12)

Submitter: Thomas A. Domitrovich, Eaton Corp.
Comment on Proposal No: 13-257
Recommendation: Accept this proposal
Substantiation: Based on the wording of the Panel Statement, it is evident that the intent of this proposal was not clear.
This proposal is not intended to address the generator, but rather the cabinet that is meant for portable generator connection. The portable generator may not be in close proximity to the connection cabinet where the danger resides. If a person at the cabinet cannot visibly see the generator to which it is connected, disconnecting the temporary cabinet connection under load can present a hazard.
This proposal acknowledges the fact that devices up to 60 Amps can be rated as disconnecting means.
The intent of this proposal was to add a level of protection for the installation of a cabinet for portable generator connections. Presently, these connection cabinets are being installed for the connection of portable generators up to 4000 amperes. These cabinets are being installed with cam-type connectors and others that are not load-break rates, and may not be within sight of the generator when the generator is connected. Moreover, these temporary connections have no safety interlocks to prevent access to the connection under load.
The intent of the proposal is to either require:
· Receptacles to be load break rated (product available as noted by the panel but not currently required to be used)
OR
· Require the connection cabinet to be interlocked with a disconnect to ensure that the disconnect is opened prior to accessing the receptacles. This would prevent someone from disconnecting the non load-break devices under load. This could be done with a mechanical or electrical interlock, or by installing devices available in the market from several manufacturers that accomplish the same function.
Since there is no present requirement to place these non load-break devices in an inaccessible environment, the current practice of simply making these connections accessible under load may result in injury or death.
The images I have provided will illustrate that the cabinets for connecting portable generators are typically found in public settings. Anyone has access to disconnect these connections as they are typically un-supervised and currently not required to be interlocked or rated as a disconnecting means.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement in rejecting Proposal 13-257. The submitter has not provided any technical documentation for the suggested changes or how the suggested text would be utilized. The substantiation submitted with the Comment alludes to connection cabinets without any explanation of the construction of a connection cabinet.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

ARTICLE 705 — INTERCONNECTED ELECTRIC POWER PRODUCTION SOURCES

4-124a Log #CC400 NEC-P04 **Final Action: Accept**
(705.2)

Submitter: Code-Making Panel 4,
Comment on Proposal No: 4-264
Recommendation: Include the following text in 705.2 Definitions.
Power Production Equipment. The generating source, and all distribution equipment associated with it, that generates electricity from a source other than a utility supplied service.
Substantiation: The term "Power Production Equipment" is used in 705.21. This is the only use of this term in the Code. This definition, if accepted, should be placed in Article 705 per NEC Style Manual 2.2.2.1 (In general, Article 100 shall contain definitions of terms that appear in two or more other articles of the NEC.).
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-125 Log #1782 NEC-P04 **Final Action: Accept**
(705.6 (New))

TCC Action: The Technical Correlating Committee directs that the Informational Note be revised to read as follows:
"Informational Note: See Article 100 for the definition of "qualified person".
Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 4-266
Recommendation: Accept the proposal in principle and revise as follows:
705.6 System Installation. Installation of one or more electrical power production sources operating in parallel with a primary source(s) of electricity shall be installed only by qualified persons. ~~with documented training and experience in the installation of such equipment. The name(s) of the qualified person(s) shall be kept in a permanent record at the office of the establishment in charge of the completed installation.~~
Informational Note: The defined term qualified person indicates that knowledge related to construction and operation of equipment and installations is necessary along with a safety training to recognized and avoid hazards to persons and property.
Substantiation: There were several key points made by the submitter that members of CMP-4 agreed with as indicated in the ballot statements. In fact, the panel statement indicates that the "panel supports installations of these systems by qualified workers." The NEC is an installation Code and defines the term "qualified person" which is definitely necessary for these types of installations as indicated in the submitter's substantiation. This is specialized work and requires significant training and knowledge (including basic NEC knowledge). This comment attempts to preserve the points made by the submitter by retaining the concepts proposed while addressing the concerns of CMP-4 expressed in the panel statement. The NEC should require more specific qualifications for special equipment and systems requiring highly trained and knowledgeable workers and draw specific attention to it again within this article. Knowledge of the general requirements in the NEC (Chapters 1-4) is essential in addition to any specialty certification for installers of this type of equipment, yet in the field more of these installations are being performed by workers and firms without the minimum qualifications of an electrician. The evidence is mounting. These types of installations and systems qualify for the expertise of trained electrical workers and contractors that also obtain specialty certifications beyond the minimum requirements to satisfy the criteria of qualified persons as defined in Article 100. Including the requirement that only qualified workers perform and be responsible for such installations as an NEC requirement supports what is anticipated as a general provision in the Code anyway, while at the same time helps support local regulation of qualified persons and contractors whether or not the electrical worker and contractor licensing and qualifications is regulated at the state and local levels.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BOWER, W.: I agree with the panel action to strike the language "with documented training and experience in the installation of such equipment. The name(s) of the qualified person(s) shall be kept in a permanent record at the office of the establishment in charge of the completed installation" as it was proposed for 705.6. That was an overzealous proposal to begin with, and would set a precedent that every section of the code dealing with installations has similar requirements for qualified installation personnel spelled out.
Note that this code is written to cover installations from a few watts to multi-megawatts. Per Article 90.1(C) stating "This code is not intended as a design specification or an instruction for untrained persons," implies trained (qualified) persons are doing the work. I can't imagine AHJ personnel running around every small utility interactive installation to be assured qualified persons are making every connection and running every inch of wire.

The proposed language for 705.6 is "**System Installation.** Installation of one or more electrical power production sources operating in parallel with a primary source(s) of electricity shall be installed only by qualified persons.

Informational Note: The defined term qualified person indicates that knowledge related to construction and operation of equipment and installations is necessary along with a safety training to recognized and avoid hazards to persons and property."

The addition of 705.6 as accepted by the panel may appear to improve the safety of installed utility interactive systems, and I agree safety is paramount, but this is a dangerous precedent. NOWHERE ELSE IN THE NEC IS THERE SUCH UNENFORCABLE LANGUAGE FOR INSTALLATION OF HARDWARE BY QUALIFIED PERSONNEL. NOT FOR THE INSTALLATION OF BATTERIES, EMERGENCY SYSTEMS, EQUIPMENT IN HAZARDOUS LOCATIONS, BULK STORAGE FACILITIES, X-RAY INSTALLATIONS, AMBULATORY CARE UNITS, FIREPUMPS, SERVICE PANELS, SERVICE CONDUCTORS, TRANSFORMERS, MOTOR GENERATORS, UNINTERRUPTIBLE POWER SUPPLIES, ELEVATORS, COORDINATION EQUIPMENT, COMMUNICATIONS EQUIPMENT AND MANY MORE.

Note: I recognize there are many instances in the code where equipment shall be accessible ONLY by qualified personnel or be serviced IN INDUSTRIAL SETTINGS OR THEATERS by qualified personnel, but nowhere is the installation of equipment or systems by qualified personnel CALLED OUT! **THIS PROPOSAL SHOULD BE REJECTED.** UTIILTY INTERACTIVE SYSTEM INSTALLATIONS ARE NO MORE COMPLEX THAN INSTALLATIONS SUCH AS ELEVATORS WITH REGENERATIVE BRAKING (ALSO INTERATIVE), UPS SYSTEMS TO BACK UP CRITICAL LOADS and in the future to interact with the Smart Grid, OR THE MANY OTHERS MENTIONED ABOVE.

The "Informational Note" proposed in the comment does not meet the requirements of the style manual for the NEC. This could have been a fine print note but no mandatory language should have been included. The "Informational Note" should not be allowed and the proposal/comment should be "REJECTED".

If this proposal is not rejected then ONLY QUALIFIED personnel should be called out for the installation of ALL electrical equipment. The current language in Article 705.4 already covers the requirement for hardware to be identified and listed for the application, and that does not need to change. Mechanisms to assure good workmanship and assuring hardware meets all the physical requirements of the code are already in place through licensing, permitting and inspections.

WILLS, R.: This language falls outside the scope of the NEC.

ZINNANTE, V.: While I agree that "qualified persons" should install these systems, I do not feel it is necessary to redefine the term "qualified person" as an informational note in this article. The definition is clearly defined in Article 100 and needs no further clarification.

Comment on Affirmative:

ROGERS, J.: The Panel should continue to accept this comment. The submitter has presented a very good and workable solution to referencing a requirement for "Qualified Persons" performing work on one or multiple power production sources and the interface to the serving utility if utilized. Each of these power production sources has their own unique installation criteria and associated hazards. When interfacing these systems with other systems and/or the serving utility the hazards increase and the requisite knowledge level must also increase. Some are viewing this as a restriction for those already performing these installations, it clearly is not, it is just a baseline statement that workers should be safe for their own good and for the good of the people whose property they are working on. This basic minimum level of competency goes to the very basic purpose of the NEC, the practical safeguarding of people and property. This basic premise starts with protecting the worker by making sure they are qualified to recognize and avoid any hazards they may encounter while performing their work. Having qualified persons perform these installations is the minimum assurance that the industry owes to the consumers who own the properties where these installations are being made.

4-126 Log #1727 NEC-P04 **Final Action: Reject**
(705.12(A))

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 4-267
Recommendation: The PV Industry Forum requests that CMP 4 review the additional substantiation below and consider accepting the original proposal as written.
Substantiation: 705.12(A)(2) The service conductor connection shall comply with the requirements established for services in Article 230.
Section 230.2(A) and 230.82(6) allow the service entrance connection of parallel power production PV sources. There is no specific section of Art 230 that requires that these PV service entrance connections be treated a service entrance conductors. Section 240.21(D) points to the over current protection requirements of service entrances. This would seem to eliminate the common use of applying the load side "tap rules" of Art 240 to the service entrance tap, but frequently, does not in field installations. That connection is unprotected from high available fault currents from the utility, just as any service entrance conductor is, and should be treated accordingly as a service entrance conductor in all aspects—routing, overcurrent protection, cable type, etc. This proposal addresses that requirement.
705.12(A)(3) The Tap Rules of Section 240.21 shall not be applied.
The only part of Art 240 that deals with service entrance conductors is 240.21(D), which is a permissive requirement, suggesting that other parts of art 240 may be applied. This is not true and the specific prohibition should be in Section 705.12(A)(3) as proposed to highlight the danger of improperly using the tap rules on service entrance conductors.
705.12(A)(4) Where a main-lug-only main service panel is used, the sum of the ratings of all overcurrent devices in the panel connected to power production sources shall not exceed the rating of the service panel.
Panelboards usually have a defined supply side input and multiple load output circuits. A main-lug-only panelboard is assumed to have the supply connections made to the main lugs and Section 408.36 is written and interpreted with that assumption. Section 408.36 does not directly address the PV inverter connections where the normal load circuits may now be supply circuits. There is no other prohibition of this connection in either 480 or 705. This addition to the Code is required to prevent PV installations from potentially having overload main lug panels where these panelboads are used in electrical services with multiple main disconnects.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on Proposal 4-267.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-127 Log #2679 NEC-P04 **Final Action: Reject**
(705.12(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-268
Recommendation: Accept the proposal.
Substantiation: The contents of (C) are indeed a list of items, all of which must be complied with. So should this fourth list item as proposed. It has the same safety function as 690.64 in the current code, particularly 690.64(B)(2) and (7). These rules are in the NEC because a second power source injecting current into a panel from a location other than the main creates the real possibility that the busbars will be overloaded. If this remains rejected, we are left with the anomalous condition that the typically low-power PV current injections will remain tightly controlled and limited by the 120% parameter, but a serious cogeneration facility producing in excess of 100 kW (the minimum size to access this subsection) will be free to inject that into any panel however the busbars are sized, and at any relative location on that bus. It is difficult to defend 705.12(D)(2) or 705.12(D)(7) when a power injection over 100 kW can proceed at any subpanel in the system with no limitations whatsoever.
Panel Meeting Action: Reject
Panel Statement: This section permits interconnection of power production systems at locations other than the service, where a high voltage service has been installed.

These systems are more likely to be engineered with short circuit studies and load flow studies being performed.

The panel reaffirms its action and statement on Proposal 4-268.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

ROGERS, J.: This comment should have been accepted. This is a very basic requirement that allows some review and enforcement criteria. To rest on the likelihood that these systems are performed under some undefined engineering supervision leaves the AHJ with no enforcement capabilities over these installations. I understand that many of these larger systems are installed with some type of cogeneration agreement with the serving utility and are installed under utility supervision, engineering supervision or both and that's fine. However, all this proposal does is to allow some set of installation criteria for installations that are not performed in this matter. The submitter is correct in his concerns and the Panel should accept the comment and referenced proposal. The issue of potential overheating of panelboard bussing needs to be addressed here as well by both manufacturers and testing agencies.

4-128 Log #1726 NEC-P04 **Final Action: Hold**
(705.12(D))

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 4-269
Recommendation: The PV Industry Forum requests that CMP 4 revisit this proposal in its original form, consider the additional substantiation below, and accept it as submitted with a slight correction (with double underlines) in 705.12(D)(2) in the following section that is substantiated below. We have repeated the proposed language for Panel ease in reviewing the substantiations.
Substantiation: The PV Industry Forum offers the following additional substantiation: Please keep in mind that where Article 690 and another article conflicted, Article 690 took precedence (see Section 690.3). Aside from minor

changes in the *2008 NEC*, Section 690.64(B)(now 705.12(D)) has remained largely unchanged since 1984, the first year PV was in the code. The initial requirement was based on the principle submitted as 705.12(D)(2)(a) and the FPN below it. This is a solid, but overly restrictive requirement. If applied, it offers unrestricted protection for a busbar or conductor with any number and location of connected sources or loads. However, the requirement is not well understood by all PV installers, electricians, and electrical inspectors and these groups are sometimes mistakenly applying less restrictive interpretations to the requirements that have resulted in unsafe electrical systems.

For example, some systems are installed using the tap rules of Art 240, that were developed for load circuits with only one source (the utility), instead of applying the sum of the overcurrent devices required to the ampacity of the conductor. See definition of taps and that they apply only to load circuits in 240.2. Other systems are being installed and passing inspections in such a manner that loads could be added to panelboards that allow the internal busbar to be overloaded with no breakers tripping. The requirement needs revision for clarity (for example, read 705.12(D)(7) in the 2008 NEC) and safety.

705.12(S)(2) Bus or Conductor Ampere Rating. The continuous current output of the inverter(s) shall not exceed the ampere rating of the busbar or conductor to which they are connected. In systems where panelboards are connected in series, the ampere rating of the first overcurrent device connected directly to the inverter(s) shall be permitted to be used in the calculations for all busbars and conductors. The busbar or conductor shall be sized for the loads connected in accordance with Article 220. One of the methods in (a)-(e) shall be used to determine the ratings of busbars in panelboards or the ampacity of conductors:

705.12(D)(2). The addition of the permissive requirement in this sentence is to allow this requirement to be used optionally where panelboards are connected in series. In a new installation where PV ac combing panelboards (with no loads are connected), the downstream (toward the utility) overcurrent device actually provides better and lower overcurrent protection than an overcurrent device that would be calculated from the ratings of overcurrent devices connected directly to the inverter outputs. In either case, the calculations resulting from using or not using the ratings of the breakers connected directly to the inverters results in protected busbars and conductors.

Example:

A dwelling has a 200-amp main service panel with a 200-amp main breaker and there is an empty 2-pole breaker position at the bottom of the panel. The utility requires an external disconnect switch and it is desired to install a PV system that has a 3500-watt and a 4500-watt inverter. A PV ac panel will be used to combine the outputs of the two inverters and the output of that PV ac panel will be routed through the utility disconnect and then to a single backfed breaker in the main service panel.

The ratings of the output circuits of each inverter are:

3500/240 = 14.58 amps, 1.25 x 14.58 = 18.2 amps; use a 20-amp breaker and 12 AWG conductors.

4500/240 = 18.75 amps, 1.25 x 18.75 = 23.43 amps; use a 25-amp breaker and 10 AWG conductors.

The 20 and 25-amp breakers are mounted in the bottom of a PV main-lug only ac panel. Normally, no loads will be connected to this subpanel. It will be dedicated to the PV system.

The next step is to calculate the backfed breaker that must be placed in the main service panel to handle the combined output of both inverters from the PV ac subpanel and to protect the conductor carrying those combined outputs under fault conditions from high utility currents.

The combined currents from both inverters are: 14.58 + 18.75 = 33.33 and the overcurrent device (OCPD) should be 35 amps.

The ratings of OCPD ***supplying*** the conductor from the PV ac subpanel to the 35-amp breaker, the utility disconnect switch, and supplying that PV ac panel are now defined as 35, 20, and 25 amps.

The existing (as written) 705.12(D)(2) requires that the breakers connected directly to the inverter outputs (20 and 25 amps) be used in calculating the minimum size of the main panel. These total 45 amps, which exceeds the allowance of 40 amps (120% of the 200 amp panel rating =40 amps).

However, the proposed change to a permissive requirement for how the series panel connection requirements are calculated allows the 35-amp breaker to be used and this is less than 40 amps allowed by the 120% allowance.

The ac inverter panel rating and the ampacity of the conductor are controlled by 705.12(D)(2) and it would be incorrect to guess that the answer might be 35 amps as it would be a in a normal load subpanel.

35 + 20 + 25 <= 120% R where R is the panel rating or the ampacity of the conductors. 80 <= 1.2 R, R >= 80/1.2 = 66.67 amps.

The panel and conductor to the main panel must have at least this rating and this is an example of the restrictive nature of the first requirement in 705.12(D)(2)(a) that is addressed by the proposed 705.12(D)(2)(b).

705.12(D)(2)(a) The sum of the ampere ratings of the overcurrent devices supplying power to the busbar or conductor shall not exceed the ampacity of the busbar or conductor.

FPN: This general rule assumes no limitation in the number of the loads or sources applied to a busbar or their locations.

This is based on the original (1984) requirements and was the essence of D(2) in the 2008 NEC and no changes were proposed other than the addition of the FPN.

705.12(D)(2)(b) Where two sources are located at opposite ends of a conductor that contains no taps, the ampere rating of the largest overcurrent device supplying power to the conductor shall not exceed the rating of the conductor. Permanent warning labels shall be applied to conductor access points, and at 2.8m (10 ft) intervals along raceways, with the following or equivalent wording:

WARNING THIS EQUIPMENT FED BY MULTIPLE SOURCES DO NOT TAP CONDUCTOR.

If we apply the general requirement of (a) to a conductor with a source at each end protected by overcurrent devices, the ampacity of the conductor must be the sum of the two over current protective device (OCPD) ratings. See Figure 1 below. If the two OCPD were 50 amps connected to a PV inverter and 60 amps from the utility, the conductor would have to have an ampacity of 110 amps to comply with 705.12(D)(2)(a). It should be evident, that if the conductor has no other connected sources or load taps, the maximum current that can flow through it under fault conditions would be 60 amps, the higher of the two OCPD. This requirement modifies the more stringent requirement in 705.12(D)(2)(a) in a safe and understandable manner. It cannot be applied to a busbar in panelboards because numerous load/supply taps (breakers) are allowed.

705.12(D)(2)(c). Where two sources, one utility and the other an inverter, are located at opposite ends of a busbar or conductor that contains loads, the sum of the ampere ratings of the overcurrent protection supplying power to the busbar or conductor shall not exceed 120% the ampacity of the busbar or conductor. A permanent warning label shall be applied to the distribution equipment with the following or equivalent wording:

WARNING INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

Exception: Panelboards with multiple ampacity buswork are not addressed by this provision.

This requirement (a combination of 705.12(D)(2) and 705.12(D)(7) for clarity) modifies 705.12(D)(2)(a) primarily for panelboard busbars, but can also be applied to conductors with taps. The total of load OCPD in a typical residential or commercial load center will normally be significantly larger than the rating of the busbar. The main breaker protects the busbar from over loads. This modification of (a) is based on the calculations and modifications done by CMP 5 for 690.64(B)/705.12(D) in the 2008 NEC. In Figure 2a below, the utility source breaker (100A) is located at one end of a panelboard and a PV source (50A) is located adjacent to it. There is no restriction on the number of load taps or the magnitude of the loads. If the loads were sufficient, the busbar at A (rated at 100A) could be carrying the sum of currents from both sources (150A) and no breaker would trip. The busbar would be overloaded.

In Figure 2b, the PV breaker is at the opposite end of the busbar from the main breaker. Since any one section of the bus bar or conductor can carry current from only one source or the other source, the two sources do not combine in any one section of the bus bar or conductor as they would if the two sources were side by side as shown in Figure 2a. CMP 5, using the diversity of residential and commercial loads, established that it was safe to allow the sum of the ratings of the two OCPD to not exceed 120% of the busbar or conductor ampacity. However, as shown on the left, if the two sources are not at opposite ends of the busbar or conductor, there is the possibility that the busbar at A can be overloaded if the loads exceed the rating of the busbar. In the case where the two sources cannot be placed at opposite ends of the busbar, then the requirement reverts back to the general requirement in (a).

The Exception indicates that multiple ampacity busworks are too complex to be handled with this simple provision.

705.12(D)(2)(d). The sum of the ampere ratings of all overcurrent devices on panelboards, both load and supply devices, excluding the main supply overcurrent device, shall not exceed the ampacity of the busbar. The ampere rating of the main supply overcurrent device shall not exceed the rating of the busbar. Permanent warning labels shall be applied to distribution equipment with the following or equivalent wording:

WARNING THIS EQUIPMENT FED BY MULTIPLE SOURCES
TOTAL RATING OF ALL OVERCURRENT DEVICES, EXCLUDINGMAIN SUPPLY OVERCURRENT DEVICE, SHALL NOT EXCEED AMPACITY OF BUSBAR.

This new requirement is based on the simple fact that as long as the sum of the ratings of all OCPD in panelboad, not counting the main breaker, do not exceed the rating of the busbar in the panelboard, then it is not possible to overload the panelboard. This requirement will be used to combine the ac outputs of several utility-interactive inverters in a single panelboard and not have the panelboard rated excessively high due to the general requirement. If we had a panelboard with six 50 amp breakers from utility-interactive inverters connected to the bus bar and a 300 amp main breaker, 705.12(D)(2)(a) would require the panelboard to be rated at 600 amps (6 x 50 + 300 = 600). If we assume no load breakers, the panel board busbar would be asked to handle no more than 300 amps and that 300 amps should be the rating. If the total of load and supply breakers (excluding the main breaker) does not exceed the panel busbar rating, then there is no positioning of load and PV breakers that can result in overloading

the panel. In all cases the main breaker would be rated no higher than the busbar rating. Another extreme example would be a 400-amp panel with a 400 amp main. 300 amps of load breakers are located near the bottom of the panel and this requirement would limit any installed source breaker to100 amps. Under full the full load of 300 amps, the busbar between the main breaker and the source breaker would see the 300 amps load current, well within its 400-amp rating. Note that this requirement would primarily apply to new panels used for combining the outputs of PV utility interactive inverters since existing panels are typically loaded (sum of the ratings of load breakers) above the bus bar rating.

705.12(D)**(3) Ground-Fault Protection.** The interconnection point shall be on the line side of all ground-fault protection equipment.

Exception: Connection shall be permitted to be made to the load side of ground-fault protection, where, ~~provided that there is ground-fault protection for equipment from all ground-fault current sources. Ground-fault protection devices used with supplies connected to the load-side terminals~~ those devices are identified and listed as suitable for backfeeding.

A recent (August 2009), unpublished study/survey by Salt River Project (SRP), a Phoenix, AZ area utility, was unable to identify any manufacturers of ground fault protection main circuit breakers (200A and up) that were willing or able to certify that the ground fault device attached to those circuit breakers was suitable and had been listed for back feeding. The breakers were not marked "Line and Load" and had been evaluated for current flow in both directions, but the action of the attached ground fault detectors is apparently uncertain. In utility-interactive PV applications, both the line and load terminals of a ground-fault breaker may be energized for a short period after the breaker has opened. The durability of the ground fault detector/device under these conditions does not seem to have been evaluated. UL has not responded to a query on this subject. As a minimum, the Code requirement, as written, to have these devices identified and listed for backfeed is necessary. Based on this uncertainty, Phoenix area utilities, both SRP and Arizona Public Service, are allowing only supply side connections (705.12(A)) to the service entrance where main ground fault breakers are involved.

The deleted text should be removed, because there is no clear understanding in the engineering community of how ground fault currents sourced from multiple supplies (utility and PV inverters) divide between the two sources and how the separate ground fault sensors will respond to that current division.

Examples and Figures for 4-269, 705.12(D)

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Hold

Panel Statement: The panel "Holds" this comment, and Proposal 4-269 remains Rejected, under 4.4.6.2.2 and 4.4.6.2.3 of the NFPA Regulations Governing Committee Projects.

The panel notes that the Chair of Code-Making Panel 4 will appoint a Task Group to review the material, and take the appropriate actions, related to Comment 4-128 and Proposal 4-269 prior to the next code cycle.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

BOWER, W.: It is extremely unfortunate that this comment to change the reject of the original proposal to accept with minor changes to clarify the existing code for connecting utility interactive inverters to the load side distribution equipment was put on hold. The panel was given a full detailed explanation of the changes proposed along with calculated maximum currents associated with each type of installation and should have at least attempted to better understand the material presented. The presenter was willing to answer questions about the presentation and the proposal/comment. PV systems are already being installed that are basically following the proposed changes. The proposal and comment should be reconsidered for inclusion at least in Principle in Part for the 2011 NEC with a task group continuing work on all details of both the proposal and the comment followed by suggestions to the voting panel.

The PV industry and commercial installations are growing at an exponential rate in the United States and today one single manufacturer has a giga-watt per year manufacturing capacity. With PV installation growth rates continuing to increase, with imports (sometimes substandard even with listings) from China and other aggressive exporters, the cumulative PV installation power ratings (by the time the next code is published (2014)) will likely number in the hundreds of giga-watts and this part of the code will provide totally inadequate interconnect requirements for the many of those installations.

Given that a task group will still LIKELY be appointed to study the proposal and comment, it is suggested that the task group include experts from outside the panel along with members of the PV and distributed generation industry.

WILLS, R.: While a technically complex subject, the suggestions of the working group at the ROC meeting should have been accepted. This is an important area for the interconnection of all forms of renewable energy. Open issues should not remain till the next code cycle.

Comment on Affirmative:

ROGERS, J.: The Panel made the correct decision in holding this comment and associated proposal the submitter and the presenter at the ROC meeting are correct in their concerns relative to clarifying these connection methods where power production systems interface with the premises electric supply system. During these discussions other concerns arose that could not be addressed due to the fact that they did not have any public review. These issues need to be addressed as these systems are being installed utilizing inventive techniques that are not adequately covered by the NEC. The Panel Chair has already committed to forming a task group to look at these issues and come back to the 2011 NEC cycle with a new proposal that addresses the additional concerns.

4-129 Log #2120 NEC-P04 **Final Action: Reject**
(705.12(D))

Submitter: Michael A. Anthony, University of Michigan
Comment on Proposal No: 4-269
Recommendation: Accept in Part. Retain the simplification of ground fault protection (the strikethrough) as suggested by the submitter. For the convenience of the Committee here is the part to retain:

(3) Ground-Fault Protection. The interconnection point shall be on the line side of all ground-fault protection equipment.

Exception: Connection shall be permitted to be made to the load side of ground-fault protection, where, ~~provided that there is ground-fault protection for equipment from all ground-fault current sources. Ground-fault protection devices used with supplies connected to the load-side terminals~~ those devices are identified and listed as suitable for backfeeding.

Substantiation: This looks like the committee is throwing the baby out with the bath water. For the convenience of the Committee, the submitter's substantiation is reproduced below:

(3) The ground-fault requirement is modified to address the unique characteristics of utility-interactive inverters where the tripping of a ground fault protected main breaker will turn off, not only the connected loads, but also the load-side connected utility-interactive inverter. This automatically provides protection from ground-fault currents from all sources

The submitter has provided adequate substantiation in my view.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 4-128.

The panel notes that the revision shown in Proposal 4-269 is also shown in Comment 4-128 that was "held".

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

4-130 Log #288 NEC-P04 **Final Action: Accept**
(705.12(D) Exception)

TCC Action: The Technical Correlating Committee directs that the text of 705.12(D) Exception be revised to read as follows:

"Exception: Where the photovlotaic system has...".

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-270
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal pertaining to the use of the word "When" since "when" is a condition of time rather than a location or situation.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel agrees that the wording should be changed from "if" to "when".

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

4-131 Log #801 NEC-P04 **Final Action: Hold**
(705.22)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-272
Recommendation: Accept the proposal with the following revisions:

The disconnecting means for ungrounded conductors shall be a manually or power operable switch(es) or circuit breaker(s) in accordance with the following:

(1) Readily accessible.
(2) Externally manually operable.
(3) Plainly marked with an open (off) and closed (on) position.
(4) Rated not less than the load and the available fault current at its terminals.
(5) If backfed, plainly and durably marked to indicate such connection.

FPN No.1 to (5): No change

FPN No. 2 to (4): No change

(6) Simultaneous disconnection of all ungrounded conductor of the circuit it controls.

(7) Having approved permanent integral means for locking in the open (off) position.

Substantiation: Externally manually operable should apply whether or not there is a power failure. "Backfed" is more specific than "both sides" (usual connections are at top and bottom not sides).

Panel Meeting Action: Hold

Panel Statement: The comment introduces new material that has not had public review.

The panel notes that Proposal 4-272 remains Accepted.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

4-132 Log #289 NEC-P04 **Final Action: Accept**
(705.32)

TCC Action: The Technical Correlating Committee directs that the text of 705.32 be revised to read as follows:
"Where ground-fault protection is used...".
Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 4-274
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal pertaining to the use of "When" since "when" is a condition of time rather than a location or situation.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel agrees that the wording should be changed from "if" to "when".
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-133 Log #2223 NEC-P04 **Final Action: Accept**
(705.95)

Submitter: Robert H. Wills, Intergrid, LLC / Rep. American Wind Energy Association
Comment on Proposal No: 4-242
Recommendation: Move text from 690.62 and 694.62 to 705.95 as follows:
705.95 Ampacity of Neutral Conductor. The ampacity of the neutral conductors shall comply with either (A) or (B).
(A) If a singlephase, 2-wire inverter output is connected to the neutral and one ungrounded conductor (only) of a 3-wire system or of a 3-phase, 4-wire, wye-connected system, the maximum load connected between the neutral and any one ungrounded conductor plus the inverter output rating shall not exceed the ampacity of the neutral conductor.
(B) A conductor used solely for instrumentation, voltage detection, or phase detection and connected to a single-phase or 3-phase utility-interactive inverter, shall be permitted to be sized at less than the ampacity of the other current-carrying conductors and shall be sized equal to or larger than the equipment grounding conductor.
Delete text of 690.62 entirely.
Delete text of 694.62 entirely.
Substantiation: The first paragraph (A) in 690.62 and 694.62 is also stated in 705.95.
The second paragraph (B) is common to 690.62 and 694.62. It belongs in 705.95.
Both 690.62 and 694.62 (694.64 in re-numbered version) can then be deleted entirely as 690.61 and 694.61 (the section before) state that compliance with Article 705 is required.
Panel Meeting Action: Accept
Panel Statement: The panel understands that the titles as shown in the 2011 Draft will be retained.
The panel notes that the deletion of 694.62 is 694.64 in the renumbered version accepted by the panel action taken on Comment 4-121.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 708 — CRITICAL OPERATIONS POWER SYSTEMS (COPS)

13-173 Log #646 NEC-P13 **Final Action: Reject**
(708.2)

Submitter: Robert Schuerger, EYP Mission Critical Facilities, Inc.
Comment on Proposal No: 13-263
Recommendation: A gradient scale of "how critical" a critical facility is has been used very successfully in the data center industry for almost 20 years now (the Tier Classifications presented by the Uptime Institute). It proves a platform for both the end user and designers to work from and provides general guidelines that have been agreed upon. In this case, it would help the "municipal, state, federal, or other codes by any government agency" systemically determine not only which buildings they considered "critical," but also would give each a ranking so the most critical received the most resources.
Substantiation: Unlike the rest of the NEC, the text of Article 708 is too general for the engineer doing the design, the electrician performing the installation, or the AHJ to know whether the sections are being complied with or not. Article 310 does not say "ensure no conductors are overloaded," it specifies exactly how much load is acceptable for each type of conductor and each type of installation. I have spent many years now doing testing and maintenance, risk assessments, and commissioning of various types of facilities, both critical and non-critical. I have also spent many years working on the IEEE Color books on those subjects. What I proposed is in alignment with both what the data center industry already uses and what the IEEE Color Books for those areas would recommend.
Panel Meeting Action: Reject
Panel Statement: The comment does not comply with Section 4.4.5(c) of the NFPA Regulations Governing Committee Projects because the submitter has not provided a recommendation containing proposed text.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-174 Log #647 NEC-P13 **Final Action: Reject**
(708.4(A))

Submitter: Robert Schuerger, EYP Mission Critical Facilities, Inc.
Comment on Proposal No: 13-268
Recommendation: "Risk Assessment" means many different things to many different people. Annex F was inserted in the 2008 edition to provide some guidance as to what probabilistic risk assessment is, but as an Annex is unenforceable. With the current text in Article 708, a single sheet of paper documenting a cursory observation of the obvious complies with the requirements of 708.4.
Substantiation: Unlike the rest of the NEC, the text of Article 708 is too general for the engineer doing the design, the electrician performing the installation or the AHJ to know whether the sections are being complied with or not. Article 310 does not say "ensure no conductors are overloaded," it specifies exactly how much load is acceptable for each type of conductor and each type of installation. The information in the existing Annex F came from some of the same people who are part of the IEEE Power System Reliability Working Group which developed and revised IEEE Standard 493-2007, Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems. I was the Chair for the "7X24 Continuous Power Facilities" chapter of IEEE 493-2007 and have been doing risk assessments for critical facilities for years now.
Panel Meeting Action: Reject
Panel Statement: The comment does not comply with Section 4.4.5(c) of the NFPA Regulations Governing Committee Projects because the submitter has not provided a recommendation containing proposed text.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 18

13-175 Log #1954 NEC-P13 **Final Action: Reject**
(708.4(A) and Annex F)

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facilities Professionals
Comment on Proposal No: 13-268
Recommendation: Accept in Principle. Use the core text of proposals 13-263, 13-268, 13-269 and 13-291 for a **new Section III of Annex F.** The text of the following have been taken from the submitter's original proposals
III. Risk Assessment and Commissioning based on the criticality of the facility. For critical operations power systems, risk assessment should be performed to identify hazards, the likelihood of their occurrence, and the vulnerability of the electrical system to those hazards. The thoroughness of the risk assessment should be appropriate to the level of criticality of the facility. One method, though not the only method for determining the criticality of the COPS to the protection of life and property is to group them into categories as follows:
(1) Definitions
Category I – Systems that have been designated to remain operational for emergency services to function. These facilities are required to remain operational during the event or be immediately restorable after the event. "Immediately restorable" is to means no significant repair required, just manual switching or similar operational procedures are required to restore the system to operation.
Category II – Systems that have been designated to significantly contribute to the delivery of emergency services or are essential for disaster recovery. These facilities are required to be restorable to operation within 4 hours after the event. Therefore any repair required to get the system back into service would have to be able to be accomplished by on-site personnel with on-site parts and equipment.
Category III – Systems that have significant impact on the protection of life and property, but are not immediately essential for providing emergency services. Category III systems are typically restorable to operation within 24 hours after the event. Repairs may require the assistance of off-site parts and service personnel.
Category IV – Critical systems that have significant impact on the protection of life and property, but are not immediately essential, as there are multiple facilities providing the same function. Category IV systems are typically restorable to operation within 24 hours of the time utility power, water and sewage disposal are available to the facility.
(2) Risk Assessments
(a) Category I risk assessment should include probabilistic modeling, such as fault tree or reliability block diagram (RBD) for the electrical power to the Category I systems to verify an availability of 0.9999 and a mean time to repair of less than 1.0 hours. The probabilistic modeling should also include naturally occurring hazards, such as earthquakes, floods, hurricanes and snow/ice storms

to the extent that weather data is available. For hazards listed in 708.4 (B) for which there is no data available, such as human-caused events, the risk assessment should include a systematic method analysis, such as a fault tree. The analysis should include what types of human-caused events are most likely to cause the COPS to be taken out of service with a mitigation strategy to minimize the probability of it occurring.

(b) Category II risk assessment should include probabilistic modeling, such as fault tree or reliability block diagram (RBD) for the electrical power to the Category I systems to verify an availability of 0.9995 and a mean time to repair of 4.0 hours or less. The probabilistic modeling should also include naturally occurring hazards, such as earthquakes, floods, hurricanes and snow/ice storms to the extent that weather data is available. For hazards listed in 708.4 (B) for which there is no data available, such as human-caused events, the risk assessment should include a systematic method analysis, such as a fault tree. The analysis should include what types of human-caused events are most likely to cause the COPS to be taken out of service with a mitigation strategy to minimize the probability of it occurring.

(c) Category III risk assessment should include probabilistic modeling, such as fault tree or reliability block diagram (RBD) for the electrical power to the Category I systems to verify an availability of 0.9973 and a mean time to repair of 24.0 hours or less. For hazards listed in 708.4 (B) the analysis should include what types of events are most likely to cause the COPS to be taken out of service with a mitigation strategy to minimize the probability of it occurring.

(d) Category IV risk assessment should include what types of events are most likely to cause the COPS to be taken out of service with a mitigation strategy to minimize the probability of it occurring. Probabilistic modeling is not required.

(3) Commissioning

(a) Category I shall include the performance and documentation of electrical acceptance testing of the components in the critical electrical distribution system, startup and functional testing of the major subsystems such as generators, automatic transfer switches, UPS systems and the mechanical equipment for the cooling system of the critical load. An Integrated Systems Test shall also be performed in which load banks are connected to the critical distribution panels and the operation of the electrical and mechanical systems are verified under critical electrical design load conditions.

(b) Category II shall include the performance and documentation of electrical acceptance testing of the components in the critical electrical distribution system, startup and functional testing of the major subsystems such as generators, automatic transfer switches, UPS systems and the mechanical equipment for the cooling system of the critical load.

(c) Category III shall include the performance and documentation of startup and functional testing of the major subsystems such as generators, automatic transfer switches, UPS systems and the mechanical equipment for the cooling system of the critical load.

(d) Category IV shall include the performance and documentation of startup and functional testing of the major components in the critical electrical distribution system and the mechanical equipment for the cooling system of the critical load.

Substantiation: To make Article 708 a more effective tool, we need broaden the vocabulary and provide technical direction for the agencies who are responsible for its implementation.

The classifying governmental agency having jurisdiction would benefit from a gradient level of criticality for the facilities that has specific operation guidelines. It provides the framework by which the jurisdiction can evaluate the criticality of all of their facilities relative to each other and thus provides a means to ensure the most critical systems are recognized as such and have the resources allocated to them so that they are available when needed to deliver emergency services and provide for disaster recovery. Without a gradient scale, fewer resources would be available to the most critical systems because all of the critical facilities would require the same amount of resources.

The requirement for the various types of critical systems needs to align with the importance of the system to the protection of life and property. A set of specific operational requirements for the various levels of criticality is needed to provide design criteria and for consistent application. A gradient level of risk assessment with probabilistic modeling provides a quantitative method to ensure the most critical systems have been designed sufficiently robust so that they are available when needed to deliver emergency services and provide for disaster recovery.

Panel Meeting Action: Reject

Panel Statement: Nothing in the recommendation or the substantiation of the comment provided a technical reason to expand existing Annex F with the information from Proposals 13-263, 13-268, 13-269, and 13-291.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 18

13-176 Log #800 NEC-P13 **Final Action: Reject**
(708.10)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-270
Recommendation: Revise the panel action to read as follows:

On premises where COPS are present with other types of power systems described in other sections of this article, the covers and plates for the receptacles or the receptacles themselves shall be of a color different from other system receptacle covers or plates or receptacles or be permanently marked to clearly distinguish them from other systems.

Exception: If the COPS supplies power to a DCOA system that is a stand alone structure, the color or marking shall not be required.

Substantiation: Receptacle covers for boxes should be included. Various distinctive colors can be used on other systems which would be confusing.

Panel Meeting Action: Reject

Panel Statement: There was no technical substantiation provided in the comment to support the recommended action.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 18

13-177 Log #1321 NEC-P13 **Final Action: Reject**
(708.10(C)(1)(1))

Submitter: Robert Konnik, RSCC
Comment on Proposal No: 13-271
Recommendation: Recommendation: This proposal should be accepted.
Substantiation: Article 300.4 "Protection Against Physical Damage" states "Where subject to physical damage, conductors shall be protected." Type MI conductors is covered in Table 310.13(A) so must also be protected from physical damage.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided any technical substantiation that MC cable affords the proper amount of protection for conductors, such as the protection provided by the existing wiring methods in 708.10(C)(1)(1). Section 330.12(1) does not permit MC cable to be installed where subject to physical damage, therefore, inserting this wiring method into 708.10(C)(1) is inappropriate.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 18

13-178 Log #1064 NEC-P13 **Final Action: Reject**
(708.10(C)(1)(3)(d) (New))

Submitter: Stephen McCluer, APC by Schneider Electric
Comment on Proposal No: 13-272
Recommendation: Revise text to read as follows:

708.10(C)(1)(3)(d) Where provisions must be made for flexibility at equipment connection, one or more of the following shall also be permitted.

(a) Flexible metal fittings

(b) Flexible metal conduit with listed fittings

(c) Liquidtight flexible metal conduit with listed fittings

(d) Wiring methods in accordance with ~~Article 645~~ 645.5(D)(2) when wiring under a raised floor is for a critical operations data system ~~is~~ within the DCOA.

Substantiation: The comment addresses the panel's objection that the proposal did not follow NEC Style Manual guidance to make references to specific clauses rather than to an entire Article. This comment amends the original proposal to specify that when a critical operations data system is within a DCOA, then 645.5(D)(2) wiring methods shall apply to wiring under a raised floor.

Panel Meeting Action: Reject

Panel Statement: The wiring methods listed in 645.5(D)(2) includes many wiring methods that do not provide protection against physical damage equivalent to the wiring methods specified in 708.10(C)(1). No technical substantiation was provided to include these wiring methods in 708.10(C).

Number Eligible to Vote: 18

Ballot Results: Affirmative: 18

13-179 Log #1641 NEC-P13 **Final Action: Hold**
(708.10(C)(2))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Hold" as it introduces new material and is not in accordance with 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.

The concept of 4 inches of concrete equated to a 2 hour fire-rating has not had public review.

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 13-273
Recommendation: Accept proposed 708.10(C)(2)(3) with the additional fine print as shown. Continue to accept the balance of the proposal.

(3) Be embedded in ~~not less than 50 mm (2 in.) of~~ concrete with a sufficient thickness to achieve a minimum 2 hour fire rating

FPN 1: A typical 2-hour construction is 100 mm (4 in.) thick concrete.

FPN 2: See section 19 of the NFPA Fire Protection Handbook 20th edition for minimum slab thickness for fire resistance ratings. This provides thickness for various types of concrete.

Substantiation: Although 2 inches of concrete served the industry well for a 1 hour fire rating, the requirement is now for a 2 hour fire rating. To satisfy the panels request for more prescriptive information on the thickness of the concrete, fine print note 1 has been added. The NEC currently has fine print notes that state typically 150 mm (6 inch) thickness of concrete is used for a 3-hour rating in section 450.42. This note was also added to 110.31A. Since 2 inches of concrete was previously used as acceptable for 1-hour, 100 mm (4 inches) was added in the fine print note for the requirement of 2-hours.

Additionally since concrete thickness may vary based on the type of concrete, fine print note 2 was added to provide information on this.

Panel Meeting Action: Accept in Principle

Revise existing 708.10(C)(2)(3) as follows:

Be ~~embedded~~ encased in a minimum of ~~not less than 50~~ 100 mm (~~24~~ in.) of concrete

Panel Statement: The panel action provides a prescriptive value for the thickness of concrete that allows for objective enforcement and has made editorial revisions for consistency with similar requirements in Articles 695 and 700.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 16 Negative: 2

Explanation of Negative:

ODE, M.: See my negative statement in Comment 13-102.

SPINA, M.: Although information was received with these comments this information was new material which has not had opportunity for adequate public review and comment.

13-180 Log #808 NEC-P13 **Final Action: Accept in Principle in Part (708.10(C)(3))**

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 13-275

Recommendation: Accept the proposal and revise text to read as follows:

Where COPS feeders are installed below the level of the 100 year flood plain, the conductor insulation shall be listed for use in wet locations and be installed in a wiring method identified as suitable for the location.

Substantiation: Conductor insulation, not the conductor is listed for wet locations. "identified for the use" covers wet locations, physical damage, direct burial encasement, and other factors.

Panel Meeting Action: Accept in Principle in Part

Revise 708.10(C)(3) to read: "(3) Floodplain Protection. Where COPS feeders are installed below the level of the 100-year floodplain, the insulated circuit conductors shall be listed for use in a wet location and be installed in a wiring method that is permitted for use in wet locations." Reject the remainder of the comment.

Panel Statement: The submitter is correct that the insulation is listed for wet locations and not the conductor. The requirements for the wiring method in a flood plane concentrate on flooding and potential water damage so changing the phrase "a wiring method that is permitted for use in a wet location" to one "suitable for the location" so expanding the coverage to other conditions is unnecessary and not substantiated.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 18

13-181 Log #13 NEC-P13 **Final Action: Accept in Principle (708.14(7))**

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Accept in Principle" to correlate with the action to "Accept" Proposal 13-277.

The Technical Correlating Committee further directs that the text in 708.14(7) be revised to read as follows:

"(7) All cables for fire alarm, security, and signaling systems shall be riser rated and shall be a listed 2-hour electrical circuit protective system. Riser emergency communications cable shall be Type CMR-CI or shall be a listed 2-hour electrical circuit protective system."

Submitter: Stanley Kaufman, CableSafe Inc.

Comment on Proposal No: 13-284

Recommendation: Accept this proposal.

Substantiation: The panel statement that riser communications cables can be found in chapter 7 is wrong. All communications cables are covered in Chapter 8.

In the intent is to cover signaling cables such as a CL2R, the text should be changed to "signaling and communications cables".

Panel Meeting Action: Accept

Number Eligible to Vote: 18

Ballot Results: Affirmative: 18

13-182 Log #2403 NEC-P13 **Final Action: Reject (708.52)**

Submitter: Vincent J. Saporita, Cooper Bussmann

Comment on Proposal No: 13-294

Recommendation: Accept the original proposal (deleting the entire existing 708.52) and replace with the following:

708.52 Ground Fault Protection of Equipment. The alternate source for critical operations power systems shall not be required to have ground-fault protection of equipment with automatic disconnecting means. Ground fault indication of the critical operations power systems source shall be provided for solidly grounded wye critical operations power systems of more than 150 volts to ground and circuit-protective devices rated 1000 amperes and more. The sensor for the ground fault signal devices shall be located at, or ahead of, the main system disconnecting means for the critical operations power system source, and the maximum setting of the signal devices shall be for a ground fault current of 1200 amperes. In instructions on the course of action to be taken in event of indicated ground fault shall be located at or near the sensor location.

Substantiation: The Panel Statement to Proposal 13-294 suggested this approach as better solution to the original 13-294 proposal. Because the loads on critical operation power systems are so vital, ground fault protection should be permitted, but not required. This corellates with 700.26 for emergency systems.

Keeping the power on is vitally important. This revised text provides the option of ground fault protection or ground fault indication on the alternate source. If ground fault protection is chosen, then 230.95 and 215.10 along with 708.54 provide the requirements for ground fault protection and selective coordination for all overcurrents, including ground faults. If only ground fault indication is chosen, then this text provides the requirements for indication and 708.54 provides the requirements for selective coordination, including ground faults.

Panel Meeting Action: Reject

Panel Statement: Ground faults are much more likely to occur than any other type of fault. With indication only, a true ground fault will propagate into a much larger fault and, potentially damage critical equipment. The recommendation removes the requirement for the two levels of ground fault protection on the all COPS power source(s) equipment which compromises the intended high integrity of the power supply to the COPS.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 17 Negative: 1

Explanation of Negative:

OLSON, G.: The committee should have accepted this in principal, and put the ground fault text from article 700.26 into article 708. section IV. I don't believe it is the intent of any of the requirements of the NEC to require ground fault protection for a generator set, or any other source of power. The intent of ground fault equipment is to detect a fault in a load circuit and disconnect it to prevent a larger, more damaging event from occurring. In very critical systems, this protection is required to be provided in selectively coordinated levels. Accepting in principal and making the change for the alternate source as is indicated by the comment would have been more appropriate.

13-183 Log #610 NEC-P13 **Final Action: Reject (708.54)**

Submitter: Daniel J. Caron, Bard, Rao + Athanas Consulting Engineers, LLC

Comment on Proposal No: 13-302

Recommendation: Revise text to read as follows:

708.54 Coordination. Critical operations power system(s) overcurrent protective devices shall be coordinated in accordance with 708.54(A) or (B):

(A) Coordination to 0.01 seconds. Critical operations power system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.

(B) Engineering Supervision. For new and existing installations, where the critical operations power system design is under the control of a licensed professional engineer engaged in the design or maintenance of electrical installations, the selection of overcurrent protective devices shall be permitted to coordinate to the extent practicable. The design shall be documented, stamped by the professional engineer and made available for review by the authority having jurisdiction.

Exception: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

FPN: Overcurrent protective devices used for critical operations power system circuit protection, where coordinated to optimize selective operation of the circuit overcurrent protective devices when a short circuit or ground fault occurs, increase overall reliability of the system.

Substantiation: Panel 13 is urged to reevaluate their decision regarding selective coordination. Proposal 302 was accepted in principal, in pad during the ROP, but was overturned in the final vote by less than 1/2 of the panel members.

The proposed rewording of Proposal 302 above, reflects the Panel discussions during the ROP that preferred positive code language vs. an additional exception. "Coordination to 0.01 seconds" was added to clarify that the instantaneous portion of the overcurrent time/current curve must also be considered when coordinating devices. The title "Engineering Supervision" was added to reflect similar instances in the NEC, such as 240.86 and is used extensively in the National Electrical Code in no less than 20 other instances.

The panel also rejected the word "practicable" stating it "....is not defined and subjective." However, this same Panel defended the term "practicable" in Proposal 13-151 stating "'Where practicable' leaves the decision up to the authority having jurisdiction...." The word "practicable" appears in the National Electrical Code in no less than 70 other instances.

Authors of Proposal 10-82, who also defend selective coordination as currently written, have, apparently recognized that a selectively coordinated system increases arc-flash energy, thus the proposal to require a means of reducing arc flash energy will be required in the proposed 240.87.

A system that is coordinated by an Engineer engaged in the business of designing these systems, understands the balance required between coordination, arc flash energy, safety and reliability. The idea that Engineers are opposed to coordinated power systems is incorrect. Engineers are opposed to the strict interpretation that system coordination takes precedence over all other issues within a power system design. The engineering community has been balancing coordination and safety in electrical distribution systems quite effectively for decades. There is little justification to defend the strict requirement for selective coordination.

In many situations, it is impossible to add to an existing distribution system and achieve full coordination without jeopardizing the existing system. The proposed language provides some relief to the strict interpretation, while maintaining a safe and reliable system.

The NEC seeks to provide a nationally recognized standard. Proposal 302, as originally written, is part of the 2008 Massachusetts Electrical Code. Relief to this strict requirement is being granted, in varying forms, in many other jurisdictions.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 17 Negative: 1
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.

13-184 Log #1808 NEC-P13 **Final Action: Reject**
(708.54)

Submitter: Michael P. Walls, American Chemistry Council
Comment on Proposal No: 13-295
Recommendation: The panel action on this proposal should have been to accept the proposal in principle and revise the proposed text as follows:

Overcurrent devices shall be selected by a qualified person to optimize selective coordination between equipment protection, service continuity, and arc flash protection.

Substantiation: The recommended wording for the balance of the first two sometimes opposing criteria is taken from Chapter 15 of IEEE 242 (the Buff Book), the IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems. As stated in IEEE 242 on page 607 in Section 15.7.1, "complete selective coordination may not be achieved in all systems". The current language of 700.27, 701.18, and 708.54 does not allow the flexibility for a qualified person to make the compromise between these two criteria, which has been the common practice in selective protective device coordination for decades. Additional substantiation for this rewording of the proposal comes from NFPA 110 which says in Article 6.5.1 that "The overcurrent protective devices in the EPSS shall be coordinated to optimize selective tripping of the circuit overcurrent protective devices when a short circuit occurs". The current language in these NEC Articles for 100% coordination has had the affect of inappropriately restricting the options available for a qualified person, and has led to the use of a limited set of options to achieve 100% coordination, giving a windfall advantage to a certain specific class of equipment. The recommended change would make the necessary adjustment in the language to allow more flexible coordination in accordance with the methodology recommended in IEEE 242. In addition, the addition of the wording "a qualified person" will incorporate the panel judgment from Proposal 13-203 which was to accept in principle in part, additional language to indicate the qualifications of persons performing the coordination.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-137.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 16 Negative: 2
Explanation of Negative:
CARON, D.: See my response to Comment 13-135
MOUTON, C.: See explanation for negative vote on Comment 137.

13-185 Log #1576 NEC-P13 **Final Action: Reject**
(708.54, FPN)

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 13-300
Recommendation: Accept this proposal.
Substantiation: A lack of coordination between standard overcurrent protective devices and ground fault protection for equipment (GFPE) may be one of the most frequent errors made by engineers. A FPN would help in pointing out the need to consider coordination between these devices as well.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-141.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 17 Negative: 1
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.

13-186 Log #1765 NEC-P13 **Final Action: Reject**
(708.54 Exception and FPN (New))

Submitter: Thomas A. Domitrovich, Eaton Corp. / Rep. American Circuit Breaker Manufacturers Assoc.
Comment on Proposal No: 13-302
Recommendation: Accept the proposal as submitted.
Substantiation: The American Circuit Breaker Manufacturers Association (ACBMA), headquarters in Washington, D.C., is an association of American manufacturers of circuit breakers to represent and promote the mutual interests of American circuit breaker manufacturers in areas of codes and standards, applications, safety, and education. Members of the Association include Eaton Corporation, General Electric Company, Siemens Industry, Inc., and Square D/ Schneider Electric.

To address the panel's objection to the word "practicable" as not being defined and being subjective, we offer the fact that this word, the word Practicable, is used throughout many NFPA documents as follows:

NFPA 70 "National Electrical Code", 2008 edition: Practicable appears 71 times. The phrase "where practicable" is used 22 times in this same document.

NFPA 99 "Standard for Healthcare Facilities", 2005 Edition: Practicable appears 6 times. The phrase "extent practicable" is used once.

NFPA 110 "Standard for Emergency and Standby Power Systems", 2010 Edition: Practicable appears 3 times.

The panel, in other areas of the code, supports the use of the word "Practicable" as in 700.7. Also, this panel has demonstrated the acceptance of this word through supporting its use as part of Proposals 13-151, 13-60a, 13-63 and 13-214.

Accepting the original proposal provides the option to enable the licensed professional engineer to engineer a solution.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 13-135.
Number Eligible to Vote: 18
Ballot Results: Affirmative: 17 Negative: 1
Explanation of Negative:
CARON, D.: See my response to Comment 13-135.

13-187 Log #1915 NEC-P13 **Final Action: Reject**
(708.54 Exception and FPN (New))

Submitter: Ed Larsen, Square D Company/Schneider Electric
Comment on Proposal No: 13-240
Recommendation: Accept the proposal in principle, revising the exception as follows:

Exception No. 2: Where the legally required standby system design is under the control of a licensed professional engineer engaged in the design or maintenance of electrical installations, the selection of overcurrent protective devices shall be permitted to coordinate to the ~~extent practicable~~ level required. The design shall be documented, stamped by the professional engineer, and made available for review by the authority having jurisdiction.

Substantiation: This proposal should be accepted in principle for a number of reasons:

1. The objective of the proposal has been completely missed and text has been inserted with an entirely different meaning.

2. Achieving selective coordination has been made even more difficult for no substantive reason. A PE license is not necessary to determine if two overcurrent protective device (OCPD) time-current curves cross or overlap one another, nor is a license required to determine if two OCPDs will coordinate by reading a manufacturer's coordination table. No longer will a contractor, for example, be able to call an OCPD manufacturer to find out what size upstream OCPD he needs to coordinate a small emergency power system. The manufacturer will not be able to answer the question unless they are a licensed PE in that state.

3. It is suggested that where a PE license is necessary is to optimize protection and coordination as recommended in the various IEEE *Color Books* that address the issue of coordination and as is allowed in NFPA 110, Phoenix, Wisconsin and Massachusetts,

4. The actions of the panel seem inconsistent. In the revised text of this proposal, only licensed professional engineers are allowed to design selectively coordinated emergency power systems, but unlicensed facility operators are allowed to defeat that coordination at will while live work is performed, a time when the likelihood of a power disrupting incident occurring is probably at its highest (see the panel statement on ROP 13-199 and the statements of other panels on ROPs 10-26 and 12-37).

5. The use of an incident energy reduction system (see ROP 13-199) requires engineering. A maintenance switch type system requires a second coordination study to determine if the system can still operate properly at the lower instantaneous trip setting. If it is acceptable for an engineer to coordinate the system to the level required under maintenance conditions, why is it not also permitted under normal operating conditions?

Finally, the panel should note that the text of this exception is similar to that in 240.86(A).

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 13-135. The phrase "level required" is not clear as to the desired result.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 16 Negative: 2

Explanation of Negative:

CARON, D.: See my response to Comment 13-135.

CZARNECKI, N.: The comment should be accepted in principle and revised to be worded similarly to the panel ROP action.

Exception No.2: The selection of overcurrent protection devices, in order to achieve selective coordination, shall be permitted by a licensed professional engineer engaged primarily in the design and maintenance of electrical installations. The design shall be documented, stamped by the professional engineer, and made available for review by the authority having jurisdiction." The NEMA ROP Ballot Comment - "The Panel should revisit this proposal and consider the merits of wording in an Exception versus a main rule."

13-188 Log #2691 NEC-P13 **Final Action: Reject**
(708.54 Exception and FPN)

Submitter: Frederic P. Hartwell, Rep. Massachusetts Electrical Code Advisory Committee

Comment on Proposal No: 13-302

Recommendation: Accept the proposal as submitted.

Substantiation: When CMP 13 removed the word "practicable" it gutted the proposal. The entire concept was that under the conditions specified in an exception, and it absolutely should be an exception, an alternate procedure could be followed. This procedure invoked the word "practicable", and because that involves considerable technical judgment, the requirement was for a professional engineer to be involved. In a sense we agree with the comment in the voting that the PE is excessive, but only because the panel continued to leave the requirement totally prescriptive. In the real world these applications cannot be made completely prescriptive, and the approach followed in Massachusetts comports with NFPA 110.

CMP 13 need not go very far to find one of the some 70 instances of the use of a "where practicable" provision. It appears in 700.7, in the very same family of article as this proposal addresses. As noted in the voting, CMP 13 not only knows about this provision, it declined to remove it in this very code cycle. After extensive conversations with all interests involved, it is increasingly clear to us that this proposal would go a very long way towards building a consensus around one of the most contentious code issues in recent memory. CMP 13 should take this opportunity to create that consensus.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 13-135.

Number Eligible to Vote: 18

Ballot Results: Affirmative: 17 Negative: 1

Explanation of Negative:

CARON, D.: See my response to Comment 13-135.

ARTICLE 720 — CIRCUITS AND EQUIPMENT OPERATING AT LESS THAN 50 VOLTS

3-90 Log #1822 NEC-P03 **Final Action: Hold**
(720)

TCC Action: The Technical Correlating Committee directs that Code-Making Panel 3 will have primary jurisdiction over a new article dealing with this concept.

The Technical Correlating Committee directs the Chair of Code-Making Panel 3 to appoint a Task Group, including members from other applicable Code-Making Panels, to address this issue.

Submitter: John Lamprinakos, Worthington Armstrong Venture

Comment on Proposal No: 3-144

Recommendation: ***NO NEW, REVISED, OR DELETED TEXT—JUST SUBSTANTIATION FOR EXISTING PROPOSAL ***

Substantiation: The current code has specific requirements for power distribution at 30 volts or less for listed lighting devices and their associated listed components (ref. article 411), but there is no similar requirements for power distribution at 30 volts or less for listed non-lighting systems and their associated listed components, such as listed low voltage (30 volts or less) sensors, IT equipment. AV equipment, daylighting equipment, HVAC actuators, etc. Therefore the code is silent on the requirements for power distribution at 30 volts or less when non-lighting and lighting devices are connected in the same 30 volts or less power distribution system. Thus, the current code implies (although it does not specifically demand) that separate power distribution systems must be deployed in order to perform the identical task of low voltage power distribution at 30 volts or less. Due to equipment, wiring and overall system redundancy, this can be extremely wasteful from both an energy and economy standpoint.

In order to remedy this situation, I, John Lamprinakos, on behalf of the Worthington Armstrong Venture, a recognized provider of ceiling suspension systems and a registered member of the EMerge Alliance, do enthusiastically endorse the adoption of proposal 3-144 which calls for the optimization of Article 720 by including specific language as proposed in 3-144 to recognize and appropriately guide the installation of power distribution systems at 30 volts or less, such as those used in conjunction with alternative energy sources (e.g. photovoltaics, wind turbines, batteries, fuel cells, etc.) and that can provide safe and efficient power to a wide variety of listed low voltage devices which are increasingly being used in commercial buildings.

In response to growing industry demand, energy saving systems and system components that employ low voltage power distribution are currently being developed and deployed by members of the EMerge Alliance. This open, non-discriminatory, non-profit (501c6) alliance of leading companies in the commercial building industry was specifically established to promote the rapid adoption of safe low-voltage DC power distribution and use in commercial building interiors. The Alliance has recently published an open standard that integrates interior infrastructures, power, controls, and a wide variety of peripheral devices in a common platform. The first embodiment of an EMerge system is via Class 224VDC distribution through a suspended ceiling grid. This system is UL Listed (CCN = IFFA, IFFA2, IFFC, IFFC2) and has been installed at several locations in the U.S. (USGBC Headquarters, PNC Headquarters. Southern California Edison, Los Angeles Community College District, etc.)

In short we believe inclusion of the explicit language proposed in 3-144 would better describe industry safety requirements and better assure article 720's functional safety mission.

The current EMerge Alliance membership includes: 3am Systems, Ltd., Acuity Brands, Inc., APEX Consulting, Armstrong World Industries, AVP, BACnet, Turner Construction, Brinjac Engineering, CABA, Clean Technology Commercialization, Configura, lnc., Convia, lnc., Crestron Electronics. Inc., Delta Products Corp., Eden Park Illumination, Energy Solutions lntl, Inc., the EnergyPeak Alliance, the EnOcean Alliance. Finelite, lnc., PNC Financial Services Group, Inc., Green Plug, Inc., Herman Miller Corporation, Houston Advanced Research Center, JB Electrical Design, Darnell Group, Johnson Controls, Kanepi Innovations, University of California—California Institute for Energy and the Environment (ClEE), LA Community College District, Lighting Science Group. Lutron Electronics, MCV Technologies, Inc., Metropolitan Lifelong Learning Center LLC, Naomi Miller Lighting Design, Nextek Power Systems, Northwire, Inc,. OneSource Building Technologies, lnc., Osram Sylvania, Paladino and Company, Philips NY, Sensor Switch, Inc,. Southern California Edison, Steelcase lnc., Tyco Electronics, Watt Stopper/Legrand, Webcor Builders, Worthington Armstrong Venture, ZigBee Alliance, and Zumtobel.

Panel Meeting Action: Hold

Panel Statement: The panel concludes that the Proposal 3-144 and Comment 3-90 may have merit, but has held the proposal and comment for further study in accordance with 4.4.6.2.2(c) of NFPA Regulations Governing Committee Project because the proposal and comment would propose something that could not be properly handled within the time frame for processing the report. The proposed text does not comply with the style manual. The panel requests more detailed technical information in order to make a more informed decision. The panel requests that the technical correlating committee review the proposal and comment to consider whether Article 720 or another Article (new or existing) is more appropriate and possibly assign a technical correlating committee task group to prepare a proposal for next cycle.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-91 Log #1923 NEC-P03 **Final Action: Hold**
(720)

Submitter: Ben Hartman, Nextek Power Systems, Inc.

Comment on Proposal No: 3-144

Recommendation: No new, revised, or deleted text, just substantiation for existing proposal.

Substantiation: The current code has specific requirements for power distribution at 30 volts or less for listed lighting devices and their associated listed components (ref article 411), but there is no similar requirements for power distribution at 30 volts or less for listed non-lighting systems and their associated listed components, such as listed low voltage (30 volts or less) sensors, IT equipment, AV equipment, daylighting equipment, HVAC actuators, etc. Therefore the code is silent on the requirements for power distribution at 30 volts or less when non-lighting and lighting devices are connected in the

same 30 volts or less power distribution system. Thus the current code implies (although it does not specifically demand) that separate power distribution systems must be deployed in order to perform the identical task of low voltage power distribution at 30 volts or less. Due to equipment, wiring and overall system redundancy, this can be extremely wasteful from both an energy and economy standpoint.

In order to remedy this situation, I, Ben Hartman, on behalf of Nextek Power Systems, Inc., a recognized provider of AC and DC Power Electronics and a registered member of the EMerge Alliance, do enthusiastically endorse the adoption of proposal 3-144 which calls for the optimization of Article 720 by including specific language as proposed in 3-144 to recognize and appropriately guide the installation of power distribution systems at 30 volts or less, such as those used in conjunction with alternative energy sources (e.g. photovoltaics, wind turbines, batteries, fuel cells, etc.) and that can provide safe and efficient power to a wide variety of listed low voltage devices which are increasingly being used in commercial buildings.

In response to growing industry demand, energy saving systems and system components that employ low voltage power distribution are currently being developed and deployed by members of the EMerge Alliance. This open, non-discriminatory, non-profit (50Ic6) alliance of leading companies in the commercial building industry was specifically established to promote the rapid adoption of safe, low-voltage DC power distribution and use in commercial building interiors. The Alliance I has recently published an open standard that integrates interior infrastructures, power, controls and a wide variety of peripheral devices in a common platform. The first embodiment of an EMerge system is via Class 2 24VDC distribution through a suspended ceiling grid. This system is UL Listed (CCN = IFF A, IFF A2, IFFC, IFFC2) and has been installed at several locations in the U.S. (USGBC Headquarters, PNC Headquarters, Southern California Edison, Los Angeles Community College District, etc.).

In short, we believe inclusion of the explicit language proposed in 3-144 would better describe industry safety requirements and better assure article 720's functional
safety mission.

The current EMerge Alliance membership includes: 3am Systems, Ltd., Acuity Brands, Inc., APEX Consulting, Armstrong World Industries, AVP, BACnet, Turner Construction, Brinjac Engineering, CAB A, Clean Technology Commercialization, Configura, Inc., Convia, Inc., Crestron Electronics, Inc., Delta Products Corp., Eden Park Illumination, Energy Solutions IntI, Inc., the EnergyPeak Alliance, the EnOcean Alliance, Finelite, Inc., PNC Financial Services Group, Inc., Green Plug, Inc., Herman Miller Corporation, Houston Advanced Research Center, JB Electrical Design, Darnell Group. Johnson Controls, Kanepi Innovations, University of California - California Institute for Energy and the Environment (CIEE), LA Community College District, Lighting Science Group, Lutron Electronics, MCV Technologies, Inc., Metropolitan Lifelong Learning Center LLC, Naomi Miller Lighting Design, Nextek Power Systems, Northwire, Inc., One Source Building Technologies, Inc., Osram Sylvania, Paladino and Company, Philips NV, Sensor Switch, Inc., Southern California Edison, Steelcase Inc., Tyco Electronics, Watt StopperlLegrand, Web cor Builders, Worthington Armstrong Venture, ZigBee Alliance, and Zumtobel.

Panel Meeting Action: Hold
Panel Statement: See the panel action and statement on Comment 3-90.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-92 Log #2145 NEC-P03 **Final Action: Hold**
(720)

Submitter: Jeannine Fisher, Firelite, Inc.
Comment on Proposal No: 3-144
Recommendation: ***NO NEW, REVISED, OR DELETED TEXT– JUST SUBSTANTIATION FOR EXISTING PROPOSAL.***
Substantiation: The current code has specific requirements for power distribution at 30 volts or less for listed lighting devices and their associated listed components (ref. article 411), but there is no similar requirements for power distribution at 30 volts or less for listed non-lighting systems and their associated listed components, such as listed low voltage (30 volts or less) sensors, IT equipment, A V equipment, daylighting equipment, HVAC actuators, etc. Therefore the code is silent on the requirements for power distribution at 30 volts or less when non-lighting and lighting devices are connected in the same 30 volts or less power distribution system. Thus the current code implies (although it does not specifically demand) that separate power distribution systems must be deployed in order to perform the identical task of low voltage power distribution at 30 volts or less. Due to equipment, wiring and overall system redundancy, this can be extremely wasteful from both an energy and economy standpoint.

In order to remedy this situation, I, Jeannine Fisher, on behalf of Finelite, Inc., a recognized provider of luminaires and a registered member of the EMerge Alliance, do enthusiastically endorse the adoption of proposal 3-144 which calls for the optimization of Article 720 by including specific language as proposed in 3-144 10 recognize and appropriately guide the installation of power distribution systems at 30 volts or less, such as those used in conjunction with alternative energy sources (e.g. photovoltaics, wind turbines, batteries, fuel cells, etc.) and that can provide safe and efficient power 10 a wide variety of listed low voltage d<:vices which are increasingly being used in commercial buildings.

In response to growing industry demand, energy saving systems and system components that employ low voltage power distribution are currently being developed and deployed by members of the EMerge Alliance. This open, non-discriminatory, non-profit (50Ic6) alliance of leading companies in the commercial building industry was specifically established to promote the rapid adoption of safe. low-voltage DC power distribution and use in commercial building interiors. The Alliance has recently published an open standard that integrates interior infrastructures. power, controls and a wide variety of peripheral devices in a common platform The first embodiment of an EMerge system is via Class 2 24VDC distribution through a suspended ceiling grid. This system IS UL Listed (CCN = IFFA, IFFA2, IFFC, IFFC2) and has been installed at several locations in the U.S. (USGBC Headquarters, PNC Headquarters, Southern California Edison, Los Angeles Community College District, etc.).

In short, we believe inclusion of the explicit language proposed in 3-144 would better describe industry safety requirements and better assure article 720's functional
safety mission.

The current EMerge Alliance membership includes: 3am Systems, Ltd., Acuity Brands, Inc., APEX Consulting, Armstrong World Industries. AVP, BACnet, Turner Construction, Brinjac Engineering, CABA, Clean Technology Commercialization, Configura, Inc., Convia, Inc., Crestron Electronics, Inc., Delta Products Corp., Eden Park Illumination, Energy Solutions Int. Inc., the EnergyPeak Alliance, the EnOcean Alliance, Finelite, Inc., PNC Financial Services Group, Inc., Green Plug, Inc., Herman Miller Corporation, Houston Advanced Research Center, JB Electrical Design, Darnell Group, Johnson Controls, Kanepi Innovations, University of California - California Institute for Energy and the Environment (CIEE), LA Community College District, Lighting Science Group, Lutron Electronics, MCV Technologies, Inc., Metropolitan Lifelong Learning Center LLC, Naomi Miller Lighting Design, Nextek Power Systems, Northwire, Inc., OneSource Building Technologies, Inc., Osram Sylvania, Paladino and Company, Philips NV, Sensor Switch. Inc., Southern California Edison, Steelcase Inc.,Tyco Electronics, Watt Stopper/ Legrand, Webcor Builders, Worthington Armstrong Venture, Zigbee Alliance, and Zumtobel.

Panel Meeting Action: Hold
Panel Statement: See the panel action and statement on Comment 3-90.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-93 Log #2165 NEC-P03 **Final Action: Hold**
(720)

Submitter: John Akins, Tyco Electronics
Comment on Proposal No: 3-144
Recommendation: None provided
Substantiation: The current code has specific requirements for power distribution at 30 volts or less for listed lighting devices and their associated listed components (ref. Article 411), but there are no similar requirements for power distribution at 30 volts or less for listed non-lighting systems and their associated listed components, such as listed low voltage (30 volts or less) sensors, IT equipment, AV equipment, daylighting equipment, HVAC actuators, etc. Therefore the code is silent on the requirements for power distribution at 30 volts or less when non-lighting and lighting devices are connected in the same 30 volts or less power distribution system. Thus the current code implies (although it does not specifically demand) that separate power distribution systems must be deployed in order to perform the identical task of low voltage power distribution at 30 volts or less. Due to equipment, wiring and overall system redundancy, this can be extremely wasteful from both an energy and economy standpoint.

In order to remedy this situation. I (enter your name), on behalf of (name of organization), a recognized provider of (enter primary electrical product or service) and a registered member of the EMerge Allliance, do enthusiastically endorse the adoption of Proposal 3-144 which calls for the optimization of Article 720 by including specific language as proposed in Proposal 3-144 to recognize and appropriately guide the installation of power distribution systems at 30 volts or less, such as those used in conjunction with alternative energy sources (e.g., photovoltaics, wind turbines, batteries, fuel cells, etc.) and that can provide safe and efficient power to a wide variety of listed low voltage devices which are increasingly being used in commercial buildings.

In response to growing industry demand, energy saving systems and system components that employ low voltage power distribution are currently being developed and deployed by members of the EMerge Alliance. This open, non-discriminatory, non-profit (501c6) alliance of leading companies in the commercial building industry was specifically established to promote the rapid adoption of safe, low-voltage DC power distribution and use in commercial building interiors. The Alliance has recently published an open standard that integrates interior infrastructures, power, controls and a wide variety of peripheral devices in a common platform. The first embodiment of an EMerge system is via Class 2 24VDC distribution through a suspended

ceiling grid. This system is UL Listed (CCN-IFFA, IFFA2, IFFC, IFFC2) and has been installed at several locations in the U.S. (USGBC Headquarters, PNC Headquarters, Southern California Edison, Los Angeles Community College District, etc.).

In short, we believe inclusion of the explicit language proposed in Proposal 3-144 would better describe industry safety requirements and better assure article 720s functional safety mission.

The current Emerge Alliance membership includes: 3am Systems, Ltd., Acuity Brands, Inc., APEX Consulting, Armstrong World Industries, AVP, BACnet, Turner Construction, Brinjac Engineering, CABA, Clean Technology Commercialization, Configura, Inc., Convia, Inc., Crestron Electronics, Inc., Delta Products Corp., Eden Park Illumination, Energy Solutions Intl, Inc., the EnergyPeak Alliance, the EnOcean Alliance, Finelite, Inc., PNC Financial Services Group, Inc., Green Plug, Inc., Herman Miller Corporation, Houston Advanced Research Center, JB Electrical Design, Darnell Group, Johnson Controls, Kanepi Innovations, University of California—California Institute for Energy and the Environment (CIEE), LA Community College District, Lighting Science Group, Lutron Electronics, MCV Technologies, Inc., Metropolitan Lifelong Learning Center LLC, Naomi Miller Lighting Design, Nextek Power Systems, Northwire, Inc., OneSource Building Technologies, Inc., Osram Sylvania, Paladino and Company and Company, Philips NV, Sensor Switch, Inc., Southern California Edison, Steelcase, Inc., Tyco Electronics, Watt Stopper/Legrand, Webcor Builders, Worthington Armstrong Ventrue, ZigBee Alliance, and Zumtobel.

Panel Meeting Action: Hold

Panel Statement: See the panel action and statement on Comment 3-90.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-94 Log #2450 NEC-P03 **Final Action: Hold**
(720)

Submitter: Douglas Jacobson, Crestron Electronics, Inc.

Comment on Proposal No: 3-144

Recommendation: No new, revised, or deleted text - just substantiation for existing proposal.

Substantiation: The current code has specific requirements for power distribution at 30 volts or less for listed lighting devices and their associated listed components (ref. article 411), but there is no similar requirements for power distribution at 30 volts or less for listed non-lighting systems and their associated listed components, such as listed low voltage (30 volts or less) sensors, IT equipment, A V equipment, daylighting equipment, HVAC actuators, etc. Therefore the code is silent on the requirements for power distribution at 30 volts or less when non-lighting and lighting devices are connected in the same 30 volts or less power distribution system. Thus the current code implies (although it does not specifically demand) that separate power distribution systems must be deployed in order to perform the identical task flow voltage power distribution at 30 volts or less. Due to equipment, wiring and overall system redundancy, this can be extremely wasteful from both an energy and economy standpoint.

In order to remedy this situation, I, Douglas Jacobson, on behalf of Crestron Electronics,Inc., a recognized provider of lighting control systems and a registered member of the EMerge Alliance, do enthusiastically endorse the adoption of proposal 3-144 which calls for the optimization of Article 720 by including specific language as proposed in 3-144 to recognize and appropriately guide the installation of power distribution systems at 30 volts or less, such as those used in conjunction with alternative energy sources (e.g. photovoltaics, wind turbines, batteries, fuel cells, etc.) and that can provide safe and efficient power to a wide variety of listed low voltage devices which are increasingly being used in commercial buildings.

In response to growing industry demand, energy saving systems and system components that employ low voltage power distribution are currently being developed and deployed by members of the EMerge Alliance. This open, nondiscriminatory, non-profit (5Olc6) alliance of leading companies in the commercial building industry was specifically established to promote the rapid adoption of safe, low-voltage DC power distribution and use in commercial building interiors. The Alliance has recently published an open standard that integrates interior infrastructures, power, controls and a wide variety of peripheral devices in a common platform. The first embodiment of an EMerge system is via Class 2 24VDC distribution through a suspended ceiling grid. This system is UL Listed (CCN = IFFA, IFFA2, IFFC, IFFC2) and has been installed at several locations in the U.S. (USGBC Headquarters, PNC Headquarters, Southern California Edison, Los Angeles Community College District, etc.).

In short, we believe inclusion of the explicit language proposed in 3-144 would better describe industry safety requirements and better assure article 720's functional safety mission.

The current EMerge Alliance membership includes: 3am Systems. Ltd., Acuity Brands, Inc., APEX Consulting, Armstrong World Industries, A VP, BACnet, Turner Construction, Brinjac Engineering, CABA, Clean Technology Commercialization, Configura, Inc.• Convia, Inc., Crestron Electronics, Inc., Delta Products Corp., Eden Park Illumination, Energy Solutions Inti, Inc., the EnergyPeak Alliance, the EnOcean Alliance, Finelite, Inc., PNC Financial Services Group, Inc., Green Plug, Inc., Herman Miller Corporation, Houston Advanced Research Center, JB Electrical Design, Darnell Group, Johnson Controls, Kanepi Innovations, University of California - California Institute for Energy and the Environment (ClEE), LA Community College District, Lighting Science Group, Lutron Electronics, MCV Technologies, Inc., Metropolitan Lifelong Learning Center LLC, Naomi Miller Lighting Design, Nextek Power Systems, Northwire, Inc., OneSource Building Technologies, Inc., Osram Sylvania, Paladino and Company, Philips NV, Sensor Switch, Inc., Southern California Edison, Steelcase Inc., Tyco Electronics, Watt Stopper/Legrand, Webcor Builders, Worthington Armstrong Venture, ZigBee Alliance, and Zumtobel.

Panel Meeting Action: Hold

Panel Statement: See the panel action and statement on Comment 3-90.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-95 Log #2513 NEC-P03 **Final Action: Hold**
(720)

Submitter: Sean Browne, Armstrong World Industries, Inc.

Comment on Proposal No: 3-144

Recommendation: No new, revised, or deleted text. This is just additional substantiation for existing proposal.

Substantiation: The current code has specific requirements for power distribution at 30 volts or less for listed lighting devices and their associated listed components (ref. article 411), but there is no similar requirements for power distribution at 30 volts or less for listed non-lighting systems and their associated listed components, such as listed low voltage (30 volts or less) sensors, IT equipment, AV equipment, daylighting equipment, HVAC actuators, etc. Therefore the code is silent on the requirements for power distribution at 30 volts or less when non-lighting and lighting devices are connected in the same 30 volts or less power distribution system. Thus the current code implies (although it does not specifically demand) that separate power distribution systems must be deployed in order to perform the identical task of low voltage power distribution at 30 volts or less. Due to equipment, wiring and overall system redundancy, this can be extremely wasteful from both an energy and economy standpoint.

In order to remedy this situation, proposal 3-144 calls for the optimization of Article 720 by including specific language to recognize and appropriately guide the installation of power distribution systems at 30 volts or less, such as those used in conjunction with alternative energy sources (e.g. photovoltaics, wind turbines, batteries, fuel cells, etc.) and a wide variety of listed low voltage devices which are increasingly being used in commercial buildings. In response to growing industry demand, energy saving systems and system components that employ low voltage power distribution are currently being developed and deployed by members of the EMerge Alliance. This open, non-discriminatory, non-profit (501c6) alliance of leading companies in the commercial building industry was specifically established to promote the rapid adoption of safe, low-voltage DC power distribution and use in commercial building interiors. The Alliance has recently published an open standard that integrates interior infrastructures, power, controls and a wide variety of peripheral devices in a common platform. The first embodiment of an EMerge system is via Class 2 24VDC distribution through a suspended ceiling grid. This system is UL Listed (CCN = IFFA, IFFA2, IFFC, IFFC2) and has been installed at several locations in the U.S. (USGBC Headquarters, PNC Headquarters, Southern California Edison, Los Angeles Community College District, etc.).

In short, we believe inclusion of the explicit language proposed in 3-144 would better describe industry safety requirements and better assure article 720's functional safety mission.

The current EMerge Alliance membership includes: 3am Systems, Ltd., Acuity Brands, Inc., APEX Consulting, Armstrong World Industries, AVP, BACnet, Turner Construction, Brinjac Engineering, CABA, Clean Technology Commercialization, Configura, Inc., Convia, Inc., Crestron Electronics, Inc., Delta Products Corp., Eden Park Illumination, Energy Solutions Intl, Inc., the EnergyPeak Alliance, the EnOcean Alliance, Finelite, Inc., PNC Financial Services Group, Inc., Green Plug, Inc., Herman Miller Corporation, Houston Advanced Research Center, JB Electrical Design, Darnell Group, Johnson Controls, Kanepi Innovations, University of California – California Institute for Energy and the Environment (CIEE), LA Community College District, Lighting Science Group, Lutron Electronics, MCV Technologies, Inc., Metropolitan Lifelong Learning Center LLC, Naomi Miller Lighting Design, Nextek Power Systems, Northwire, Inc., OneSource Building Technologies, Inc., Osram Sylvania, Paladino and Company, Philips NV, Sensor Switch, Inc., Southern California Edison, Steelcase Inc., Tyco Electronics, Watt Stopper/ Legrand, Webcor Builders, Worthington Armstrong Venture, ZigBee Alliance, and Zumtobel.

Panel Meeting Action: Hold

Panel Statement: See the panel action and statement on Comment 3-90.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 725 — CLASS 1, CLASS 2, AND CLASS 3 REMOTE-CONTROL, SIGNALING, AND POWER-LIMITED CIRCUITS

3-96 Log #1625 NEC-P03 **Final Action: Reject**
(725 and 760)

Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 3-196
Recommendation: Revise various sections of Article 725 to accommodate the UL scope change for cable routing assemblies as follows:

725.133 Installation of Conductors and Equipment in Cables, Compartments, Cable Trays, Enclosures, Manholes, Outlet Boxes, Device Boxes, ~~and~~ Raceways, and Cable Routing Assemblies for Class 2 and Class 3 Circuits. Conductors and equipment for Class 2 and Class 3 circuits shall be installed in accordance with 725.136 through 725.143…..

725.139 Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, ~~or~~ Raceway, or Cable Routing Assembly.

(A) Two or More Class 2 Circuits. Conductors of two or more Class 2 circuits shall be permitted within the same cable, enclosure, ~~or~~ raceway, or cable routing assembly.

(B) Two or More Class 3 Circuits. Conductors of two or more Class 3 circuits shall be permitted within the same cable, enclosure, ~~or~~ raceway, or cable routing assembly.

(C) Class 2 Circuits with Class 3 Circuits. Conductors of one or more Class 2 circuits shall be permitted within the same cable, enclosure, ~~or~~ raceway, or cable routing assembly with conductors of Class 3 circuits, provided the insulation of the Class 2 circuit conductors in the cable, enclosure, ~~or~~ raceway, or cable routing assembly is at least that required for Class 3 circuits.

(D)…

(E) Class 2 or Class 3 Cables with Other Circuit Cables. Jacketed cables of Class 2 or Class 3 circuits shall be permitted in the same enclosure, cable tray, ~~or~~ raceway, or cable routing assembly with jacketed cables of any of the following:

(1) Power-limited fire alarm systems in compliance with Parts I and III of Article 760
(2) Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770
(3) Communications circuits in compliance with Parts I and IV of Article 800
(4) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820
(5) Low-power, network-powered broadband communications in compliance with Parts I and IV of Article 830

(F) Class 2 or Class 3 Conductors or Cables and Audio System Circuits. Audio system circuits described in 640.9(C), and installed using Class 2 or Class 3 wiring methods in compliance with 725.133 and 725.154, shall not be permitted to be installed in the same cable, ~~or~~ raceway, or cable routing assembly with Class 2 or Class 3 conductors or cables……

725.154 Applications of Listed Class 2, Class 3, and PLTC Cables. Class 2, Class 3, and PLTC cables shall comply with any of the requirements described in 725.154(A) through (H).

(A) Plenums. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CL2P or CL3P. Listed wires and cables installed in compliance with 300.22 shall be permitted. Listed plenum signaling raceways shall be permitted to be installed in other spaces used for environmental air as described in 300.22(C). Only Type CL2P or CL3P cable shall be permitted to be installed in these raceways.

(B) Riser. Cables installed in risers shall be as described in any of (B)(1), (B)(2), or (B)(3):

(1) Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type CL2R or CL3R. Floor penetrations requiring Type CL2R or CL3R shall contain only cables suitable for riser or plenum use. Listed riser signaling raceways, and ~~listed~~ plenum signaling raceways, and riser cable routing assemblies shall be permitted to be installed in vertical riser runs in a shaft from floor to floor. Only Type CL2R, CL3R, CL2P, or CL3P cables shall be permitted to be installed in these raceways or routing assemblies……

725.179 Listing and Marking of Class 2, Class 3, ~~and~~ Type PLTC Cables, Signaling Raceways, and Cable Routing Assemblies. Class 2, Class 3, and Type PLTC cables, ~~and nonmetallic~~ signaling raceways, and cable routing assemblies installed as wiring methods within buildings shall be listed as being resistant to the spread of fire and other criteria in accordance with 725.179(A) through ~~(K)~~ (M) and shall be marked in accordance with 725.179 ~~(L)~~ (N).

(A)…
(B)…
(C)…
(D)…
(E)…(F)…
(G)…
(H)…(I)…(J)…(K)…..

725.179(L) Riser Cable Routing Assemblies. Riser cable routing assemblies shall be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.
Informational Note: One method of defining resistance to the spread of fire is that cable routing assemblies pass the requirements in the test for flame propagation (riser) in *Subject 2024A, UL Outline of Investigation for Cable Routing Assemblies*.

725.179(M) General-Purpose Cable Routing Assemblies. General-purpose cable routing assemblies shall be listed as being resistant to the spread of fire.
Informational Note: FPN: One method of defining resistance to the spread of fire is that cable routing assemblies pass the requirements in the vertical tray-flame test (general use) in *Subject 2024A, UL Outline of Investigation for Cable Routing Assemblies*.

~~(L)~~ (N) Marking……

Revise various sections or Article 760 to accommodate the UL scope change for cable routing assemblies as follows:

760.133 Installation of Conductors and Equipment in Cables, Compartments, Cable Trays, Enclosures, Manholes, Outlet Boxes, Device Boxes, ~~and~~ Raceways, and Cable Routing Assemblies for Power-Limited Circuits. Conductors and equipment for power-limited fire alarm circuits shall be installed in accordance with 760.136 through 760.143.

760.139 Installation of Conductors of Different PLFA Circuits, Class 2, Class 3, and Communications Circuits in the Same Cable, Enclosure, Cable Tray, ~~or~~ Raceway, or Cable Routing Assembly.

(A) Two or More PLFA Circuits. Cable and conductors of two or more power-limited fire alarm circuits, communications circuits, or Class 3 circuits shall be permitted within the same cable, enclosure, cable tray, ~~or~~ raceway, or cable routing assembly.

(B) Class 2 Circuits with PLFA Circuits. Conductors of one or more Class 2 circuits shall be permitted within the same cable, enclosure, cable tray, ~~or~~ raceway, or cable routing assembly with conductors of power-limited fire alarm circuits, provided that the insulation of the Class 2 circuit conductors in the cable, enclosure, ~~or~~ raceway, or cable routing assembly is at least that required by the power-limited fire alarm circuits.

(C) Low-Power Network-Powered Broadband Communications Cables and PLFA Cables. Low-power network-powered broadband communications circuits shall be permitted in the same enclosure, cable tray, ~~or~~ raceway, or cable routing assembly with PLFA cables.

(D) Audio System Circuits and PLFA Circuits. Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 725.133 and 725.154 shall not be permitted to be installed in the same cable, cable tray, ~~or~~ raceway, or cable routing assembly with power-limited conductors or cables…….

760.154 Applications of Listed PLFA Cables. PLFA cables shall comply with the requirements described in either 760.154(A), (B), or (C) or where cable substitutions are made as shown in 760.154(D).

(A) Plenum. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type FPLP. Types FPLP, FPLR, and FPL cables installed in compliance with 300.22 shall be permitted. Type FPLP-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable.

(B) Riser. Cables installed in risers shall be as described in either (1), (2), or (3):

(1) Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type FPLR. Floor penetrations requiring Type FPLR shall contain only cables suitable for riser or plenum use. Type FPLR-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable.
(2) Other cables shall be installed in metal raceways or located in a fireproof shaft having firestops at each floor.
(3) Type FPL cable shall be permitted in one- and two family dwellings.
Informational Note: See 300.21 for firestop requirements for floor penetrations.

(C) Other Wiring Within Buildings. Cables installed in building locations other than those covered in 760.154(A)or (B) shall be as described in either (C)(1), (C)(2), (C)(3), or (C)(4). Type FPL-CI cable shall be permitted to be installed as described in either (C)(1), (C)(2), (C)(3), or(C)(4) to provide a 2-hour circuit integrity rated cable.

(1) General. Type FPL shall be permitted.

(2) In Raceways and Cable Routing Assemblies. Cables shall be permitted to be installed in raceways and cable routing assemblies.

Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayer and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

This comment provides correlation with the comments developed by the P3 and P16 Task Group.

UL has changed the title and has expanded the scope of Outline of Investigation Subject 2024A and its associated Guide Information Page (White Book, QBAA). The title of the UL Outline has been changed from "Optical Cable Routing Assemblies" to "Cable Routing Assemblies" and the title of the QBAA Guide Information Page has been changed from "Optical Fiber/ Communications Cable Routing Assemblies for Use in Telecommunications Installations" to "Cable Routing Assemblies." The scope has been broadened to include the application of cable routing assemblies with communications wires and Class 2, Class 3, power-limited fire alarm, and low-power network-powered broadband communications cables.

To incorporate the UL scope changes of cable routing assemblies into Article 725 of the NEC, the task group has revised Section 725.133 and 725.139 Installation requirements, 725.154 Applications, and 725.179 Listing requirements.

To incorporate the UL scope changes of cable routing assemblies into Article 760, the task group has revised similar sections with the exception of Section 725.179.

Since "Cable Routing Assemblies" was added to the title of Section 725.179, an editorial change was made to add "Signaling Raceways" as well to accurately reflect all wiring methods contained in 725.179. The "nonmetallic" term describing signaling raceways was removed from the section since signaling raceways are not manufactured in any other type beyond non-metallic and would lead the user of the code to think that metallic signaling raceways were available.

Panel Meeting Action: Reject

Panel Statement: The comments have broadened the scope of cable routing assembly with no indication of any changes of requirements for the product. No provisions have been included in the Code to address installation requirements/limitations for this product. It is recommended that this proposed change be referred to CMP 8 for informational purposes. In addition it is brought to the attention of the technical correlating committee that CMP 16 has accepted changes that will allow the use of cable routing assemblies for the installation of Class 2 & 3 circuits and power-limited fire alarm circuits. It is recommended that the technical correlating committee review the actions taken by CMP 16 for correlation.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 10 Negative: 5

Explanation of Negative:

AYER, L.: Panel 16 voted to accept cable routing assemblies and Panel 3 did not. While I can understand some of the reasons put forth by the panel, at the end of the day there needs to be communication by both Panel 3 and 16 of some sort to either accept or reject the cable routing assembly language.

EGESDAL, S.: It is important that Articles 725, 760, 770, 800, 820, and 830 correlate. The Panel 16 action on articles under their jurisdiction permits Class 2 and Class 3 cables and power-limited fire alarm cables to be installed in a cable routing assembly, while Article 725 and Article 760 do not. This comment should be accepted, or the Panel 16 action should be revised to exclude Class 2 and Class 3 cables from being installed in a cable routing assembly.

KAHN, S.: The panel should have accepted this Comment as submitted by the Joint Task Group. Since CMP-16 accepted a similar comment, the requirements for identical types of wiring differ for systems covered by Articles 770, 800, 820, and 830 differ from those for systems covered by Articles 725 and 760. It is important that the requirements of the NEC be consistent. The substantiation included with the Task Group comment is sound. I agree with the actions taken by Panel 16. CMP-3 should have accepted this comment as submitted by the Joint Task Group. It is important that the requirements of the NEC be consistent for similar installations.

SEPULVEDA, M.: We need to review these important Articles 725, 760, 770, 800, 820, & 830 to make sure that they correlate. There are differences in the way that Panel 16 actions on the articles under their jurisdiction permits, Class 2, Class 3 cables & power-limited fire alarm cables to be installed in a cable routing assembly. However Article 725 and Article 760 don't. This comment needs to be accepted, or the Panel 16 action should be revisited and revised to exclude Class 2 and Class 3 cables from being installed in a cable routing assembly.

A cable routing assembly is not a cable tray as defined. A cable routing assembly is for all intents and purposes a continuous linear cable strap or hanger, and is not a cable tray.

STENE, S.: This comment should have been accepted since the text for the Comment was developed by an NEC TCC Task Group with Panel 3 and 16 members.

The original proposal only dealt with the appropriate applications within Article 725 for Class 2 and Class 3 circuits, however, Proposal 3-196 also provided permission to install Class 2 and 3 cables with power-limited fire alarm cables within cable routing assemblies so the same application applies to 760.133, 760.139, and 760.154 so applying these same requirements in Article 760, based on agreement by the NEC Technical Correlating Committee, would not constitute new material.

As noted in the Comment substantiation, Underwriters Laboratories has changed the title from "Optical Cable Routing Assemblies" to "Cable Routing Assemblies"and expanded the scope of the Outline of Investigation Subject 2024A from "optical fiber/Communications cable routing assemblies for use in telecommunications facilities" to just "cable routing assemblies." Section 725.139(D)(1) permits Class 2 and Class 3 conductors to be installed in the same cable as communications conductors, in which case, the Class 2 and 3 circuits shall be classified as communications circuits and shall be installed in accordance with the requirements in Article 800. Where the Class 2 and 3 conductors are reclassified as communications conductors, the entire cable could already be installed in the cable routing assembly. There is absolutely no safety issue in permitting a cable routing assembly to provide support and protection for Class 2, Class 3, and power-limited fire alarm conductors, as well as communications conductors.

3-97 Log #1624 NEC-P03 **Final Action: Reject**
(725.2)

Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 3-151
Recommendation: Accept Proposal 3-151 in Principle and revise the definition of a Cable Routing Assembly as follows:
Cable Routing Assembly. A single channel or connected multiple channels, as well as associated fittings, forming a structural system that is used to support, route and protect high densities of wires and cables, typically communications wires and cables, optical fiber and data (Class 2 and Class 3) cables associated with information technology and communications equipment.
Substantiation: The panel should accept in principle Proposal 3-151 and add the new proposed definition of "cable routing assembly" to 725.2.

At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayer and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

This comment provides correlation with the comments developed by the P3 and P16 Task Group. The submitter of the proposal stated that these routing assemblies are used for data (class 2) cables. In recognition of the use of these routing assemblies beyond optical fiber and communications cables and the UL scope change (explained below), a revised definition is being resubmitted for inclusion in Article 725.

UL has changed the title and has expanded the scope of Outline of Investigation Subject 2024A and its associated Guide Information Page (White Book, QBAA). The title of the UL Outline has been changed from "Optical Cable Routing Assemblies" to "Cable Routing Assemblies" and the title of the QBAA Guide Information Page has been changed from "Optical Fiber/ Communications Cable Routing Assemblies for Use in Telecommunications Installations" to "Cable Routing Assemblies." The scope has been broadened to include the application of cable routing assemblies with communications wires and Class 2, Class 3, power-limited fire alarm, and low-power network-powered broadband communications cables.

Panel Meeting Action: Reject

Panel Statement: The proposed definition is not needed. See the committee action and statement of Comment 3-96.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 10 Negative: 5

Explanation of Negative:

AYER, L.: Panel 16 voted to accept the definition of cable routing assembly and Panel 3 did not. While I can understand some of the reasons put forth by the panel at the end of the day there needs to be communication by both Panel 3 and 16 of some sort to either accept or reject the definition.

EGESDAL, S.: See Explanation of negative vote on comment 3-98

KAHN, S.: See my Explanation of Negative Vote on Comment 3-96.

SEPULVEDA, M.: Please see the negative vote on comments 3-96, log 1625.

STENE, S.: See my negative statement in Comment 3-96.

3-98 Log #2013 NEC-P03 **Final Action: Reject**
(725.2)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-150
Recommendation: Accept Proposal 3-150.
Substantiation: Other documents, such as NFPA 13 use "concealed space." A "concealed space" has a different meaning than the NEC use of "concealed." The NEC uses the term "concealed space."

The definition of concealed space is in the NFPA Glossary. NFPA 96 is the controlling document, but any NFPA standard can use the definition.

Panel Meeting Action: Reject

Panel Statement: NEC Article 100 definition for "Concealed Space" first sentence addresses the submitter's concern, which is "Rendered inaccessible by the structure or finish of a building." ROP 3-150 is more, not less, restrictive. The comment does not provide any additional substantiation to address the panel's reason for rejecting the proposal.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

STENE, S.: The title of NFPA 96 is the Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations. The scope of the document states that it applies to minimum fire safety requirements for cooking

operations as follows:
1.1 Scope.
1.1.1* This standard shall provide the minimum fire safety requirements (preventative and operative) related to the design, installation, operation, inspection, and maintenance of all public and private cooking operations.
1.1.2 This standard shall apply to residential cooking equipment used for commercial cooking operations.
1.2 Purpose. The purpose of this standard shall be to reduce the potential fire hazard of cooking operations, irrespective of the type of cooking equipment used and whether used in public or private facilities.
The submitter has not provided any technical substantiation to link a cooking ventilation standard and its definitions to the requirements in Article 725 for remote control, power limited and signaling circuits. The submitter also points out that "non-concealed space" is used in 725.154(E)(3), however, the phrase is used to describe installations of CL2X cable as an exposed wiring method, rather than the concealed wiring method as defined in Article 100. Adding an additional definition for "concealed" would be confusing for the user of the NEC since there are many other places in the NEC, such as in 250.52(A)(1), Exception where the term "exposed" permits the grounding electrode conductor to be installed in a suspended ceiling with removable ceiling tiles. Based on the proposed definition, this grounding electrode conductor would be a violation since above a suspended ceiling would be considered to be a concealed space.

3-99 Log #2015 NEC-P03 **Final Action: Reject**
(725.2)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-151
Recommendation: Accept in Principle Proposal 3-151 changing the title to "Cable Routing Assembly" to correlate with the change made by Panel 16.
Substantiation: A cable routing is a linear product that holds cable, similar to the function of multiple J hooks, cable ties, or clamps. A cable routing assembly is listed, but not listed as a raceway.
Panel Meeting Action: Reject
Panel Statement: The change to the title is not needed. See the committee action and statement of Comment 3-96.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
STENE, S.: See my negative statement in Comment 3-96.

3-100 Log #18 NEC-P03 **Final Action: Accept**
(725.2 and 760.2)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 3-147
Recommendation: Continue to reject these proposals.
Substantiation: The current definitions abandoned cables are based on proposals and comments submitted for the 2002 and 2008 NEC. The table below shows the definitions of abandoned cables currently in the NEC and their genesis.

Genesis of Abandoned Cable Definitions

Article	Definition	Comment	Proposal
640	**Abandoned Audio Distribution Cable.** Installed audio distribution cable that is not terminated at equipment and not identified for future use with a tag.	2002 NEC Comment 16-3 by Carson	2002 NEC Proposal 16-1a by CMP 16
645	**Abandoned Supply Circuits and Interconnecting Cables.** Installed supply circuits and interconnecting cables that are not terminated at equipment and not identified for future use with a tag.		2008 NEC Proposal 12-106 by Trout
725	**Abandoned Class 2, Class 3, and PLTC Cable.** Installed Class 2, Class 3, and PLTC cable that is not terminated at equipment and not identified for future use with a tag.	2002 NEC Comment 16-21 by Jensen	2002 NEC Proposal 16-32 by Jensen
760	**Abandoned Fire Alarm Cable.** Installed fire alarm cable that is not terminated at equipment **other than a connector** and not identified for future use with a tag.	2002 NEC Comment 16-131 by Jensen	2002 NEC Proposal 16-109 by Jensen
770	**Abandoned Optical Fiber Cable.** Installed optical fiber cable that is not terminated at equipment **other than a connector** and not identified for future use with a tag.	2002 NEC Comment 16-190 by Jensen	2002 NEC Proposal 16-154 by Jensen
800	**Abandoned Communications Cable.** Installed communications cable that is not terminated **at both ends at a connector or other equipment** and not identified for future use with a tag.	2002 NEC Comment 16-247 by Jensen	2002 NEC Proposal 16-189 by Jensen
820	**Abandoned Coaxial Cable.** Installed coaxial cable that is not terminated at equipment **other than a coaxial connector** and not identified for future use with a tag.	2002 NEC Comment 16-314 by Jensen	2002 NEC Proposal 16-273 by Jensen
830	**Abandoned Network-Powered Broadband Communications Cable.** Installed network-powered broadband communications cable that is not terminated at equipment **other than a connector** and not identified for future use with a tag.	2002 NEC Comment 16-370a by Kaufman	2002 NEC Proposal 16-364 by Hirschler

A single definition of "abandoned cable" is inappropriate to cover signaling, fire alarm, optical fiber, communications, CATV and network-powered broadband because each of these cable types has its own installation practices that must be accommodated in the definition of "abandoned cable" to avoid inappropriate and unnecessary removal.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-101 Log #1985 NEC-P03 **Final Action: Reject**
(725.3)

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 3-154
Recommendation: Proposal should be accepted.
Substantiation: 90.3 says that the rules in Chapters 1 through 4 apply to the Chapter 7 Articles except as amended by the Chapter 7 rules. If it is the panels intent to limit the application of the rules in Chapter 1 though 4 for Article 725 installations it must say so directly. Just putting a statement that says "Circuits and equipment shall comply with the articles or sections listed in 725.3(A) through (G)." does not accomplish the objective. The first part of the rule should be worded like the second part that says "Only those sections of Article 300 referenced in this article shall apply to Class 1, Class 2, and Class 3 circuits." The code wording is not consistent and is not clear what the actual intent of the first part of the rule is.
Panel Meeting Action: Reject
Panel Statement: The proposed text would indicate that the rule in 90.3 does not apply which is incorrect.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: Acceptance of the suggested text would exclude compliance with any other part of the NEC. The intent of 725.3 is to bring attention to very specific sections of the NEC that are especially applicable but not to exclude other requirements.

3-102 Log #806 NEC-P03 **Final Action: Reject**
(725.3(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-156
Recommendation: Accept the proposal.
Substantiation: This provision provides that an AGA approved gas furnace with Class 2 thermostat control requires the control circuit to be classified as Class 1 if failure to operate introduces a fire hazard. If equipment such as a high-limit temperature control and the controlling thermostat fail to open and de-energize the gas valve, the temperature rise introduces a fire hazard which this provision then requires the (Note: This is where the submitter ended the text).
Panel Meeting Action: Reject
Panel Statement: The comment does not address the issues raised in the proposal.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: Section 725.3(A) only applies to the number and size of conductors in a raceway (the fill requirements) and has nothing to do with thermostat control and fire hazard. The substantiation is more appropriate for application to 725.31 for safety control equipment.

3-103 Log #2016 NEC-P03 **Final Action: Reject**
(725.3(A))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-156
Recommendation: Accept Proposal 3-156.
Substantiation: The proposal is editorial and removes redundant text.
Panel Meeting Action: Reject
Panel Statement: The comment adds no new information to the actions taken by the committee on the proposal. The reference to 725.3 is necessary for the AHJ.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: Section 300.17, as referenced in 725.3(A), applies to Class 1, Class 2, and Class 3 conductors, and where installed Class 2 or Class 3 cables containing conductors, not just Class 1 as alluded to in the substantiation. Section 725.3 does not exempt compliance with any Chapter 3 wiring methods, including wire fill for raceways that may be used where installing Class 2 or 3 circuits.

3-103a Log #CC301 NEC-P03 **Final Action: Accept**
(725.3(C))

Submitter: Code-Making Panel 3,
Comment on Proposal No: 3-151
Recommendation: Revise 725.3(C) Exception to read as follows:
Exception: As permitted in 725.154(A).
Substantiation: The revised exception provides correlation with 725.154(A), which permits plenum cable in ducts, plenums, and other spaces used for environmental air.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
STENE, S.: Since Proposal 3-151 is addressing a definition in 725.2, this Comment should be more appropriately applied to Proposal 3-157. The existing exception to 725.3(C) in the 2008 NEC reads as follows: "Type CL2P or CL3P cables and plenum signaling raceways shall be permitted for Class 2 and Class 3 circuits installed in other spaces used for environmental air in accordance with 725.154(A)." and limits the installation of plenum rated Class 2 and 3 cables, as well as listed plenum signaling raceways to just the other spaces used for environmental air. This existing exception does not permit individual cables, conductors, and signaling raceways to be installed in fabricated ducts. Cables and raceways installed in fabricated ducts can vibrate due to the high velocity of air through the duct, cause problems where dampers may be used to turn on or off air to a certain area, and may be damage at turning vanes and similar sharp edges within the duct. In addition, Section 725.154(A) limits the installation of cables and conductors to the requirements in 300.22 as follows: "Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CL2P or CL3P. Listed wires and cables installed in compliance with 300.22 shall be permitted. Listed plenum signaling raceways shall be permitted to be installed in other spaces used for environmental air as described in 300.22(C)." Limiting the installation to the requirements in 300.22(B), for instance, would only permit the individual conductors and cables to be installed in metal raceways or cables with this new exception misleading many installers into believing individual cables and conductors could be installed in the fabricated duct without any enclosure. This reference to 300.22 is necessary in 725.3 to ensure that Class 1, 2, and 3 conductors and cables comply with the requirements in environmental air ducts and other spaces used for environmental air (plenums). As can be seen in 300.22(B), only metallic wiring methods can be used in a fabricated environmental air duct and then only long enough to connect to electrical equipment that directly acts upon or sensing of the contained air. The second sentence in 725.154(A) also requires compliance with 300.22 for listed wires and cables, reinforcing the text in 725.3(C). Both references to 300.22 compliance, one in 725.3(C) and one in 725.154(A), make it totally clear that metal encasement of conductors and cables in a fabricated duct is necessary.
Section 3.1.4.1 of the NEC Style Manual requires exceptions to be written in complete sentences so making this change would be an NEC style issue.

3-104 Log #2017 NEC-P03 **Final Action: Reject**
(725.3(C))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-157
Recommendation: Accept Proposal 3-157 to delete 725.3(C).
Substantiation: 725.3(C) restricts Class 2 and Class 3 cables to 300.22(C) spaces, and does not correlate with 725.154(A), which permits CL2P and CL3P in 300.22(B) & (C) spaces.
Panel Meeting Action: Reject
Panel Statement: Refer to the recommendation and substantiation in Comment 3-103a, which meets the intent of the submitter.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: This reference to 300.22 is necessary in 725.3 to ensure that Class 1, 2, and 3 conductors and cables comply with the requirements in environmental air ducts and other spaces used for environmental air (plenums). As can be seen in 300.22(B), only metallic wiring methods can be used in a fabricated environmental air duct and then only long enough to connect to electrical equipment that directly acts upon or sensing of the contained air. The second sentence in 725.154(A) also requires compliance with 300.22 for listed wires and cables, reinforcing the text in 725.3(C). Both references to 300.22 compliance, one in 725.3(C) and one in 725.154(A), make it totally clear that metal encasement of conductors and cables in a fabricated duct is necessary.

3-105 Log #1920 NEC-P03 **Final Action: Accept in Principle**
(725.3(H) (New))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 3-159
Recommendation: Accept in Principle the Panel Action with the additional wording as shown:
725.3(H) "Vertical Support for Fire Rated Cables and Conductors. Vertical installations of circuit integrity (CI) cables <u>installed in a raceway</u> and conductors or cables of electrical circuit protective systems shall be in accordance with 300.19(B)."
Substantiation: The additional phrase, "installed in a raceway", aligns the wording of 725.3(H) with the wording of 300.19(B).
Panel Meeting Action: Accept in Principle
Revise 725.3(H) to read as follows:
(H) Vertical Support for Fire Rated Cables and Conductors. Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of electrical protective systems shall be installed in accordance with 300.19.
Panel Statement: The text was changed to make it clear that circuit integrity cables and conductors are permitted to be installed in a raceway and must comply with various subsections of 300.19.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: The text should be further modified by inserting "where applicable" after "300.19" to read as follows: Vertical Support for Fire Rated Cables and Conductors. Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of electrical protective systems shall be installed in accordance with 300.19<u>, where applicable.</u>" Compliance with 300.19 is not always required in all vertical installations so adding "where applicable" will provide the engineer/installer/inspector with the choice of applying the requirement or not, without requiring it for all applications and installations.

3-106 Log #2018 NEC-P03 **Final Action: Reject**
(725.3(H) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-159
Recommendation: Reject Proposal 3-159.
Substantiation: Installation requirements are part of manufacturer's instructions, UL has detailed installation requirements for electrical circuit protection systems, but nothing specific for cable.
Panel Meeting Action: Reject
Panel Statement: This added text and the reference to 300.19 provides appropriate requirements for Class 1, Class 2 and Class 3 circuit integrity cables installed in a raceway, in addition to the conductors and cables installed in electrical circuit protective systems.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-107 Log #807 NEC-P03 **Final Action: Reject**
(725.24)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-167
Recommendation: Accept the proposal and revise text to read as follows: Mechanical Execution of Work. Class 1, Class 2, and Class 3 cables and conductors shall be secured to approved supports by means of straps, staples, hangers, cable ties, or other approved means designed and installed so as not to damage the cables and conductors.

Exception: That portion of cables and conductors fished between access points through concealed spaces in existing buildings or other structures and supporting is impractical.
Substantiation: 300.4(D) and other sections already apply unless amended. An exception for fished conductors is warranted. If all applicable NEC provisions are complied with, what does "neat and workmanlike" have to do with safety? 90.1 states the NEC purpose is protection from hazards. "Workmanlike" is a term not to be used per the NEC Style Manual.
Panel Meeting Action: Reject
Panel Statement: Section 300.4 (D) does not apply unless referenced. Section 110.12 applies to Chapters 1-4 generally and by inference to Article 725. Repeating this phrase within Article 725 provides clarity to the user, and allows flexibility to accommodate the Class 1, Class 2 or Class 3 wiring methods as provided for in 725.1 and FPN. No documentation of a problem has been provided or technical substantiation of a problem to be solved.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

STENE, S.: Section 110.12 has been in the NEC for many, many Code cycles and it gives the inspector some control over what manner of installation of electrical equipment and wiring must be adhered to for the final application. The second sentence modification is unacceptable since the intent of the existing text is to ensure that exposed Class 1, Class 2, and Class 3 conductors and cables not be installed on the surface of the building or structure where the conductors or cable could be damaged during normal building use. For example, installing a Class 2 cable used for fan shutdown during fire alarm activation must not be installed tight into the building truss such that flexing of the building would cause damage to the cable and affect the operation of the fire alarm system and its ability to shut air circulation down during a fire.

3-108 Log #622 NEC-P03 **Final Action: Accept**
(725.25)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 3-173
Recommendation: Continue to reject this proposal.
Substantiation: Panel 1 rejected similar Proposals 1-139 and 1-146 with the statement "The submitter has not substantiated that a problem exists, or that the problem would be alleviated by removing abandoned cables and equipment neatly. Rather, the panel concludes, that in some cases, abandoned cables and equipment are best left abandoned. The proposed text is unnecessary as the section more appropriately applies to "Requirements for Electrical Installations" and "Mechanical Execution of Work.""

Panel 12 rejected similar Proposals 12-114, 12-146 with the statement. "The requirement is unenforceable. Disposition of removed materials is not a code responsibility. The remaining installation is required to be in accordance with 110.3, which is enforceable."

Panel 16 rejected similar Proposals 16-24, 16-122, 16-241 and 16-305 with the statement. "This is an unenforceable requirement. Removing abandoned cable involves pulling unused cable and wiring from conduit, raceways, ducts, shafts and drop ceilings. The objective of the original text is directed at the final installation, that it be "neat and workmanlike", not necessarily the installation (in this case, removal) process. The submitter has provided no substantiation for additional requirements during the removal process."
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-109 Log #1044 NEC-P03 **Final Action: Accept**
(725.43)

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 3-176
Recommendation: Revise text to read as follows:

Overcurrent protection for conductors 14 AWG and larger shall be provided in accordance with the conductor ampacity, without applying the ampacity adjustment and correction ~~derating~~ factors of 310.15 to the ampacity calculation. Overcurrent protection shall not exceed 7 amperes for 18 AWG conductors and 10 amperes for 16 AWG.
Exception: Where other articles of this Code permit or require other overcurrent protection.
FPN: For example, see 430.72 for motors, 610.53 for cranes and hoists, and 517.74(B) and 660.9 for X-ray equipment.
Substantiation: The revised text clarifies that both the adjustment factors and the correction factors identified in 310.15 are applicable. The term "derating" needs to be replaced since it is not defined in the NEC and it is not the terminology used in 310.15 to apply factors to change the ampacity of conductors due to some conditions. It is important to use terminology consistently throughout the Code. This proposal was one of many submitted to replace the term "derating", which is not defined with the term "adjustment" as applied to the number of conductors in a raceway or cable and "correction" as applied to temperature. This was done as applicable wherever the term "derating" was used in the NEC to provide that consistency. See panel action and comment in proposal 3-145 in the ROP.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-110 Log #1596 NEC-P03 **Final Action: Reject**
(725.43 Exception No. 2 (New))

Submitter: James C. Missildine, Jr., Southern Company Services, Inc.
Comment on Proposal No: 3-178
Recommendation: Proposal 3-178 should have been "Accept in Principle' and should read "Exception No.2: Where the Class I circuit is an extension of a manufacturer ~~vendor~~ supplied circuit breaker control circuit for solenoid operation, ~~device or circuit~~ provided with integral short circuit and ground fault protection, and the current normally present is lower than the ampacity of the wiring, conductors sized #14 AWG and larger shall be permitted to be protected at not more than 300 percent of ampacity.
Substantiation: Power circuit breakers latch in the open or closed position and are operated by a charged spring mechanism which is released by a solenoid. The only current normally present in the 'close' or 'trip ' circuit unless an operation is initiated would be for an indicating lamp or computer voltage input used to monitor the integrity of the close or trip solenoid. This normal operating current present in the circuits is much lower than the ampacity of the remote control circuit. These circuits require only short circuit and ground fault protection since the main service on them is momentary.

Many of these breakers have 35A fuses in the trip circuit to allow for a large inrush on the solenoid without blowing the fuse. The breaker internal control wiring provided by the manufacturer is commonly #12 or #14. If the trip circuit is treated as a branch circuit, a #8 conductor would be required for the remote control circuits. These circuits are typically wired to computer I-O which will not accept a #8 conductor. This exception would allow a #12 conductor to be applied.

This will bring the requirement for these circuits into agreement with IEEE C37.20.2 (IEEE Standard for Metal-Clad Switchegar). Section 7.3 Control and secondary circuits and devices requires only short-circuit protection. Overcurrent protection may be provided, but is not required.
Panel Meeting Action: Reject
Panel Statement: Proposal 3-178 does not provide technical substantiation for the proposed 300% multiplier.
This comment appears to be attempting to resolve a design issue, which does not require revision to the Code.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

STENE, S.: The Class 1 circuit may be a branch circuit based on the definition of branch circuit in Article 100 but modifications to the requirements of Articles 210 and 240 can be readily seen in Part II of Article 725. Section 725.43 provides a modification of the requirements for the conductors, based on 310.15, not requiring derating of the conductors in 310.15(B)(2)(a) or the ambient temperature derating in the ampacity tables, such as Table 310.16. Section 725.45, as well as 430.72, Table 450.3(B), 240.21(B) and (C), 240.4(D), and 210.19(A)(4), Exception No. 1 would permit conductors smaller

than the overcurrent device under special circumstances. The existing exception in 725.43 already permits these applications as noted above.

3-111 Log #799 NEC-P03 **Final Action: Reject**
(725.48)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-179
Recommendation: Accept the proposal with the following revisions:
(B) Class I Circuits with Power and Lighting Circuits. Class 1 circuit conductors shall only be permitted to be installed with power and lighting circuit conductors in accordance with the following:
(1) In the same cable, flexible cord or cable, raceway trench, or other enclosure where the conductors are functionally associated, except as permitted in 725.48(B)(2), (3), and (4).
(2) In factory or field-assembled control centers.
(3) In a manhole, handhole enclosure, cable tray, box or enclosure that complies with the Exception for 314.29 in accordance with one or more of the following:
(a) The Class 1 circuit conductors or the power and lighting circuit conductors are in a raceway, metal-covered cable, or Type UF cable. Where Type UF cable is employed for the Class 1 circuits and power or lighting circuits, the cables shall be grouped and identified as to their system.
(b) Class 1 circuit conductors are effectively separated from the power and lighting circuit conductors by a nonconductor such as flexible tubing in addition to the conductor insulation.
(c) Where installed in manholes, the Class 1 circuit conductors are permanently and effectively separated from the power and lighting circuit conductors and securely fastened to racks, insulators, or other approved supports.
Substantiation: "Power" may be deemed not to include lighting circuits. Flexible cords and cables should be included as they are permitted for flexible connections. Class 1 and power/lighting circuit conductors should be permitted in the same trench or handhole enclosure in compliance with this section. Where installed in handhole enclosures, separation of systems should be required as in manholes. Cable trays should be included in the provisions.
Panel Meeting Action: Reject
Panel Statement: Section 725.48 applies very specifically to Class 1 conductors installed with the power supply circuits associated with the Class 1 circuit and has nothing to do with power and lighting circuits as alluded to in both the proposal and the comment. The submitter has not provided any technical substantiation in his comment to address the panel statement in the proposal.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-112 Log #2680 NEC-P03 **Final Action: Reject**
(725.48(B)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 3-180
Recommendation: Accept the proposal.
Substantiation: The panel statement is only partially responsive. To maintain the argument that all the control wiring in the conduit must be related to the same process is inconsistent with the plain truth that none of the power circuits need to have any functional relationship whatsoever. With respect to the comment in the voting, which is appreciated, no common scenario I can think of, as a working electrician, would cause the result mentioned. A ground fault might take out another control circuit, but not likely energize it in a way that would cause it to operate. Further, any ground-fault or short circuit would open the overcurrent device and also cause a shut down. Either each raceway is entirely reserved for a single process, or it isn't. Many engineers make that specification for these very reasons, but that is a design question, not a matter of fundamental safety. The NEC does have segregated raceway requirements where a safety concern logically follows, such as 700.9(B), but not here.
Panel Meeting Action: Reject
Panel Statement: The proposed text does not add clarity to the section. The purpose of the text in 725.48(B)(1) is to provide separation for Class 1 conductors and other power-supply circuits.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-113 Log #2019 NEC-P03 **Final Action: Reject**
(725.52)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-184
Recommendation: Accept Proposal 3-184.
Substantiation: Class 1 circuits and non-power-limited circuits are permitted to be installed together. If both circuits enter a building, the fire alarm circuit will have transient protection if installed in accordance with NFPA 72. The Class 1 circuit is not required to have transient protection. If both circuits connect to a combination fire alarm/security panel, a transient (from lightning) could destroy the fire alarm/security panel.
Panel Meeting Action: Reject
Panel Statement: The present text is adequate. No new technical substantiation has been provided to alter the position of the panel and its statement on Proposal 3-184.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-114 Log #2816 NEC-P03 **Final Action: Reject**
(725.121(A)(4), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-185
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: There has been no technical reason submitted for creating an additional annex for reference information other than Annex A. Putting this information into an annex in the back will tend to make the Code less user friendly and make it more difficult for the user to access the information in a timely fashion.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-115 Log #2020 NEC-P03 **Final Action: Accept in Principle**
(725.130(J) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-191
Recommendation: Reconsider Proposal 3-191 and insert 725.139(J) as new text.
Substantiation: Article 300 does not apply unless reference. The proposed text correlates with the requirements of 300.16(B), which follows.
300.16(B) Bushing. A bushing shall be permitted in lieu of a box or terminal where the conductors emerge from a raceway and enter or terminate at equipment, such as open switchboards, unenclosed control equipment, or similar equipment. The bushing shall be of the insulating type for other than lead-sheathed conductors.
Panel Meeting Action: Accept in Principle
Add new 725.3(J) to read as follows:
(J) Bushing. A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).
Panel Statement: Placing text here eliminates unnecessary cross referencing.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
STENE, S.: The submitter did not provide any technical substantiation that cables were being damaged where installed as open cables with a transition into a raceway. In addition, Section 300.15(C) requires a fitting be used where the cable enters into a raceway or a sleeve without a transition box but the accepted text in the Comment requires a bushing. Bushings only apply where the conductors emerge from a raceway and enter or terminate at equipment, such as open switchboards, unenclosed control equipment, or similar equipment as noted in Section 300.16(B). A bushing at the end of a raceway may not be appropriate for an installation where EMT is stubbed up through a wall and then used as a sleeve for the cable to enter from the drop ceiling.

Based on 300.15(C), a fitting is required where a box is not installed at the transition point, not a bushing.

3-116 Log #2681 NEC-P03 **Final Action: Reject**
(725.136(I)(3))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 3-195
Recommendation: Accept the proposal.
Substantiation: The panel statement is very interesting, and excellent information. However, this issue still needs attention, partially due to formal recognition of this construction in some form in 334.116(C). In addition, CMP 3 (and 16) will have on its ROC agenda, courtesy of CMP 9 and the TCC sending it there, Proposal 9-8 which covers a form of tray cable with this type of separation. This section and 334.116(C) need to be correlated.
Panel Meeting Action: Reject
Panel Statement: Section 334.116(C) requires NMS cable to have an outer sheathing where the power part of the NM cable can be split from the signaling part of the NM cable so that the power part of the cable can be inserted into a separate part of a box that has a barrier between the power and the signaling part of the box. One manufacturer produced that type of cable and associated box in the latter part of the 1980s and this text applied to this type of cable sheathing.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-117 Log #2021 NEC-P03 **Final Action: Reject**
(725.139(E))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-196
Recommendation: Accept the comment from the P3/P16 Task Group.
Substantiation: AFAA supports the comment from the P3/P16 task group chaired by Craig Sato, UL.
Panel Meeting Action: Reject
Panel Statement: See the committee action and statement of Comment 3-96.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-118 Log #2022 NEC-P03 **Final Action: Reject**
(725.141)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-197
Recommendation: Accept Proposal 3-197.
Substantiation: Because Class 2 & 3 circuits are permitted to be installed with fire alarm circuits, it is important that both circuits have the same requirements for transient protection. The National Fire Alarm Code requires power-limited circuits to have transient protection where the circuit leaves/enters a building.
Panel Meeting Action: Reject
Panel Statement: The present text is adequate. No new technical substantiation has been provided to alter the position of the panel and its statement on Proposal 3-197.
To require transient protection for all Class 2 and 3 circuits installed outside a building, simply because power-limited fire alarm conductors must have transient protection, is unnecessary.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: To require transient protection for all Class 2 and 3 circuits installed outside a building simply because power-limited fire alarm conductors must have transient protection is unnecessary. Not all Class 2 or Class 3 circuits installed beyond the building of origin of the circuit need to have over-voltage protection or lightning protection. For example, a Class 2 circuit installed in an underground installation in rigid metal conduit, IMC, or nonmetallic conduit is isolated from exposure to lightning and from electric light and power circuits. Where there is exposure to these hazards, Section 725.141 already adequately provides the appropriate section references for the extra protection necessary for the circuit. There was no technical substantiation provided in the comment for this change.

3-119 Log #619 NEC-P03 **Final Action: Accept**
(725.154(A))

Submitter: Jarrett Shinoski, CommScope, Inc. / Rep. Insulated Cable Engineers Association, Inc.
Comment on Proposal No: 3-199
Recommendation: Continue to accept Proposal 3-199 in principle by the actions the panel took to permit the use of metal cable trays and metal cable tray systems in other space used for environmental air.
Substantiation: The Insulated Cable Engineers Association supports the panel action clarify that metal cable trays and metal cable tray systems are permitted to be used in other space used for environmental air. These cable trays are commonly used in ceiling plenums and underfloor plenums.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-120 Log #2023 NEC-P03 **Final Action: Reject**
(725.154(A))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-200
Recommendation: Accept Proposal 3-200.
Substantiation: NFPA 90 does not permit signaling raceways.
Panel Meeting Action: Reject
Panel Statement: The submitter has referred to NFPA 90 (the Panel understands the reference should have been to NFPA 90A) which in turn refers back to NFPA 70, thus creating a circular reference.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: NFPA 90(A) does not recognize signaling raceways, as used in Article 725 for Class 2 and Class 3 conductors and cables, but 725.179(I) does not recognize communications raceways as a replacement for plenum, riser and general purpose signaling raceways. The same listing standard, UL 2024, is used for optical fiber cable, communications cable, signaling cable, or coaxial cable but the manufacturer can mark the outside of the raceway with "signaling raceway" or "coaxial raceway" depending upon the end use of the raceway.

3-121 Log #624 NEC-P03 **Final Action: Reject**
(725.154(B)(1))

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 3-201
Recommendation: Reconsider and accept this proposal.
Substantiation: The Communications Cable & Connectivity Association requests that the panel reconsider and accept this proposal.
This proposal in one of a group of similar proposals that were submitted to Panels 3 and 16. The ROP actions were.

Proposal No.	Section	Action
3-201	725.154(B)(1)	Reject
3-278	760.53(B)(3)	Reject
16-62	770.154(B)(1)	Accept in Principle
16-179	800.154(B)(1)	Accept in Principle
16-282	820.154(B)(1)	Accept in Principle
16-338	830.151(B)	Accept in Principle
16-341	830.154(B)(1)	Accept in Principle

We agree with Jerry Dorna's ballot comment:
The current riser requirements are so complicated that they could be considered to be a "vague and unenforceable".
Section 770.154(B)(1) requires that "Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type OFNR or OFCR. Floor penetrations requiring Type OFNR or OFCR shall contain only cables suitable for riser or plenum use". Consequently at least two floor penetrations are required, one for plenum and riser cables and another for general-purpose cables.
The panel action on this proposal greatly simplifies the installation rules for cables in risers in other than one and two-family dwellings. The installation rules for one and two-family dwellings are already simplified since any listed cable is permitted.
Panel Meeting Action: Reject
Panel Statement: The current wording adequately expresses the intent of the Panel. No new substantiation has been provided.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
KEDEN, R.: My negative vote pertains to the committee actions on the comments 3-121, 3-122, 3-186, 3-187, 3-200 and 3-201. The proposals and comments to the issue included the technical substantiations and the discussions in CMP-3 have not convinced me or changed my vote.
The panel statement noted that CMP 3 actions to reject proposals 3-201, 3-278 and 3-301, as well as the aforementioned comments result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the

purview of CMP3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16).

Different wiring rules in Articles 725 and 760 versus Articles 770,800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to that time, CMP 16 was responsible to Article 725, 760, 770, 800, 810, 820 and 830. Today, there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820 and 830).

However, this issue does not warrant different treatment in my opinion; CMP-3 should have accepted this Comment.

OWEN, S.: My negative vote pertains to the committee action on comments 3-121, 3-122, 3-186, 3-187, 3-200, 3-201 and proposals 3-201, 3-278, 3-301. The panel statement noted that CMP 3 actions to reject these comments and proposals result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP 3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16). Different rules in Articles 725 and 760 versus Articles 770, 800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to the time, CMP 6 was responsible to Article 725, 760, 770, 800, 810, 820, and 830. Today there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820, and 830). I do not believe that this issue warrants different treatment.

Comment on Affirmative:

STENE, S.: There was no technical substantiation submitted with the proposal, just a question about whether this was what was intended. The text is not complicated since it requires a riser cable where the cable penetrates more than one floor. If the cable goes from the first floor to the third floor, then a riser cable is required. If the cable is installed in a metal raceway, then riser cable is not required but the metal raceway would normally require fire proofing at each floor.

The submitter could initiate a fact finding study for the 2014 NEC to determine if there is any validity of requiring a riser cable be used for every floor penetration, rather than multiple floor penetrations. The fire test for riser cables is located in UL 1666, The Standard for Safety Test for Flame Propagation Height of Electrical and Optical Fiber Cables Installed Vertically in Shafts.

The following is the Scope of UL 1666: 1 Scope

1.1 This is a fire test for determining values of flame propagation height for electrical and optical-fiber cables that are for installation vertically in shafts or in vertical runs that penetrate more than one floor.

1.2 The purpose of this test is to determine whether the flame propagation characteristics of these "riser" cables are in accordance with the National Electrical Code.

1.3 This test does not investigate the toxicity or corrosivity of the products of combustion or decomposition.

1.4 This test does not cover the construction requirements for any cable or the electrical, optical, and other performance requirements for any cable.

3-122 Log #921 NEC-P03 **Final Action: Reject**
(725.154(B)(1))

Submitter: Ray R. Keden, ERICO, Inc. / Rep. BICSI
Comment on Proposal No: 3-201
Recommendation: We ask Panel 3 to re-consider their rejection of the following revision: "Cables installed in vertical runs and penetrating one or more floors ~~more than one floor~~, or cables installed in vertical runs in a shaft, shall be Type CL2R or CL3R. Floor penetrations requiring Type CL2R or CL3R shall contain only cables suitable for riser or plenum use. Listed riser signaling raceways and listed plenum signaling raceways shall be permitted to be installed in vertical riser runs in a shaft from floor to floor. Only Type CL2R, CL3R, CL2P, or CL3P cables shall be permitted to be installed in these raceways."
Substantiation: Our recommendation will prohibit the installation of non-riser or non-plenum rated cables between floors. Following is additional substantiation:

- One argument for rejection in the Panel 3 discussion was that it should be possible to use General Use Cable in one- and two-family dwellings (e.g., to connect the basement with the ground floor). 800.154 (B)(3) permits this in risers by stating: "Type CM and CMX cable shall be permitted in one- and two-family dwellings".
- The current Code language theoretically permits that a 10-story building is cabled completely with General Use Cable in the riser if the cable is terminated in every floor. Then each cable only connects two floors.
- Panel 16 has accepted a similar proposal (16-179).

Panel Meeting Action: Reject
Panel Statement: The current wording adequately expresses the intent of the Panel. No new substantiation has been provided that alters the position of the panel.

The Code requires a riser cable where the cable penetrates more than one floor. If the cable goes from the first floor to the third floor, then a riser cable is required.

A fact finding study should be initiated for the 2014 NEC to determine scientifically if there is any validity of requiring a riser cable be used for every floor penetration rather than multiple floor penetrations. The fire test for riser cables is located in UL 1666, The Standard for Safety Test for Flame Propagation Height of Electrical and Optical Fiber Cables Installed Vertically in Shafts.

It is recommended that the technical correlating committee take note that Panel 16 has accepted this change and correlation may be needed.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

CASPARRO, P.: This comment should have been accepted. Requiring the use of riser-rated cable between any number of floors would simplify the code.

KEDEN, R.: My negative vote pertains to the committee actions on the comments 3-121, 3-122, 3-186, 3-187, 3-200 and 3-201. The proposals and comments to the issue included the technical substantiations and the discussions in CMP-3 have not convinced me or changed my vote.

The panel statement noted that CMP 3 actions to reject proposals 3-201, 3-278 and 3-301, as well as the aforementioned comments result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16).

Different wiring rules in Articles 725 and 760 versus Articles 770,800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to that time, CMP 16 was responsible to Article 725, 760, 770, 800, 810, 820 and 830. Today, there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820 and 830).

However, this issue does not warrant different treatment in my opinion; CMP-3 should have accepted this Comment.

OWEN, S.: My negative vote pertains to the committee action on comments 3-121, 3-122, 3-186, 3-187, 3-200, 3-201 and proposals 3-201, 3-278, 3-301. The panel statement noted that CMP 3 actions to reject these comments and proposals result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP 3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16). Different rules in Articles 725 and 760 versus Articles 770, 800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to the time, CMP 6 was responsible to Article 725, 760, 770, 800, 810, 820, and 830. Today there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820, and 830). I do not believe that this issue warrants different treatment.

3-123 Log #441 NEC-P03 **Final Action: Accept in Principle in Part**
(725.154(D))

Submitter: Donald W. Ankele, Underwriters Laboratories Inc.
Comment on Proposal No: 3-202
Recommendation: The Panel Action should be to Accept in Principle the following modified text that was included with Susan Stene's ballot on this proposal.

~~**725.154(D) Hazardous (Classified) Locations.** Cables installed in hazardous locations shall be as described in 725.154(D)(1) through (D)(4).~~
~~**(1) Type PLTC.** Cables installed in hazardous (classified) locations shall be Type PLTC. Where the use of Type PLTC cable is permitted by 501.10(B), 502.10(B), and 504.20, the cable shall be installed in cable trays, in raceways, supported by messenger wire, or otherwise adequately supported and mechanically protected by angles, struts, channels, or other mechanical means. The cable shall be permitted to be directly buried where the cable is listed for this use.~~
~~**(2) Intrinsically Safe Circuits and Nonincendive Field Wiring.** Wiring for nonincendive circuits as permitted by 501.10(B)(3), and wiring for intrinsically safe circuits as permitted by 504.20, shall be permitted for circuits derived from Class 2 sources.~~
~~**(3) Thermocouple Circuits.** Conductors in Type PLTC cables used for Class 2 thermocouple circuits shall be permitted to be any of the materials used for thermocouple extension wire.~~
~~**(4) In Industrial Establishments.** In industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation,~~
~~Type PLTC cable shall be permitted in accordance with either (1) or (2):~~
~~(1) Type PLTC cable, with a metallic sheath or armor in accordance with 725.179(E), shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).~~
~~(2) Type PLTC cable, without a metallic sheath or armor, that complies with the crush and impact requirements of Type MC cable and identified for such use with the marking PLTC-ER, shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).~~
725.154(E) Other Wiring Within Buildings. Cables installed in building locations other than those covered in 725.154(A) through (D) shall be as described in any of (E)(1) through (E)(7).
(7) Industrial Establishments. In industrial establishments where the

conditions of maintenance and supervision ensure that only qualified persons service the installation, and where the cable is not subject to physical damage, Type PLTC cable, that complies with the crush and impact requirements of Type MC cable, is identified for such use with the marking PLTC-ER, shall be permitted to be exposed between the cable tray and the utilization equipment or device. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft).

725.154(I) Thermocouple Circuits. Conductors in Type PLTC cables used for Class 2 thermocouple circuits shall be permitted to be any of the materials used for thermocouple extension wire.

Note – 725.154 will need to be renumbered.

Substantiation: The intent of the submitter was to move the requirements for the type of cable permitted in hazardous locations out of Article 725, while still permitting the use of Type PLTC-ER in industrial applications. Section 725.154(E)(7) states "Type PLTC cable that complies with the crush and impact requirements of Type MC cable and is identified for such use shall be permitted to be exposed between the cable tray and the utilization equipment or device." The appropriate identification is Type PLTC-ER in accordance with the listing requirements; therefore, the submitter is not adding or expanding the use of PLTC-ER in industrial applications as it is already permitted. The '-ER' marking was not specifically called out in 725.154(E)(7) in the 2008 NEC but there is no reason to exclude it. If Type PLTC-ER can be used in a Class I, Division 2, Class II, Division 2, or in an intrinsically safe hazardous location, it certainly could be used for limited applications within an industrial facility. The proposed text indicates that the identification shall be 'PLTC-ER'

Panel 14 has accepted proposals to move the requirements that were contained in 725.154(D)(1) and (D)(2) into 501.10, 502.10, 503.10, 504.10, 505.15, 506.15. Installation requirements such as support, mounting and direct burial is found in Article 336. The requirements for thermocouple circuits currently located in 725.154(D)(3) should be relocated as 725.154(I) (new).

Accepting in Principle the text proposed in the comment will remedy a potential correlation problem with the requirements in Chapter 5.

Panel Meeting Action: Accept in Principle in Part

1. Revise 725.154 lead-in paragraph to read as follows:

725.154 Applications of Listed Class 2, Class 3, and PLTC Cables. Class 2, Class 3, and PLTC cables shall comply with any of the requirements described in

725.154(A) through (I).

2. Replace existing 725.154(D) with new 725.154(D) to read as follows:

(D) Industrial Establishments. In industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type PLTC cable shall be permitted in accordance with either (1) or (2):

(1) Where the cable is not subject to physical damage, Type PLTC cable that complies with the crush and impact requirements of Type MC cable and is identified as PLTC-ER for such use shall be permitted to be exposed between the cable tray and the utilization equipment or device. The cable shall be continuously

supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft).

(2) Type PLTC cable, with a metallic sheath or armor in accordance with 725.179(E), shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).

3. Delete 725.154(E)(7) {now moved above in 725.154(D)(1)} and revise 725.154(E) lead-in paragraph to read as follows:

(E) Other Wiring Within Buildings. Cables installed in building locations other than those covered in 725.154(A) through (D) shall be as described in any of (E)(1) through (E)(6).

4. Add new 725.154(I) {relocated from existing 725.154(D)(3)} to read as follows:

(I) Thermocouple Circuits. Conductors in Type PLTC cables used for Class 2 thermocouple circuits shall be permitted to be any of the materials used for thermocouple extension wire.

Panel Statement: The panel accepts the deletion of existing 725.154(D) "Hazardous Location" subsection. The panel does not accept the deletion of Type PLTC cable with a metallic sheath or armor because it is used in industrial installations. The panel accepts the other parts of the recommendation but revised the location of some requirements to retain those requirements within the appropriate framework of this article.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-124 Log #802 NEC-P03 **Final Action: Reject**
(725.154(D) and (E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-203
Recommendation: Accept the revised text as follows:

(D)(4) Maintenance and Supervision. On premises where the conditions of maintenance and supervision ensure that only qualified persons service the installation Type PLTC cable shall be permitted in accordance with either (1) or (2):

(1) Type PLTC in accordance with 725.179(E) shall be permitted to be installed exposed, the cable shall be securely fastened to approved supports at intervals not to exceed 1.8 m (6 ft) and protected by approved means where likely to be subject to physical damage.

(2) Type PLTC cable without a metallic covering that complies with the crush and impact requirements of Type MC cable and identified with the marking PLTC-ER shall be permitted to be installed exposed. The cable shall be secured to supports at intervals not to exceed 1.8 m (6 ft) and protected by approved means where likely to be subject to physical damage.

Exception: Support shall not be required for that portion of cable that is fished between access points in finished buildings or other structures and supporting is not practical.

(E) Other Locations. Where not covered in 725.54(A) through (D), cables shall be permitted in accordance with the following: 1, 2, 3, 4, 5, and 6. No change.

(7) Maintenance and Supervision. On premises where the conditions of maintenance and supervision ensure that only qualified persons install and service the installation....(remainder unchanged).

Substantiation: Maintenance and supervision should be the criteria, not type of occupancy. 408.20 does not specify type of occupancy. (E)(7) is already covered by (D)(4). (E) should also apply to locations that are not in "buildings." An exception should cover fished cables.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided any technical substantiation to make the sweeping change to include all commercial and educational establishments where this section has limited the applications for industrial establishments only. Throughout the NEC, special consideration is given for industrial establishments where qualified personnel are used for installing and maintaining the equipment. Ladder type cable trays and similar cable trays provide continual support as required in 725.154(D) so the substantiation statement is incorrect. Since metallic sheathed or armored PLTC cable may be installed exposed in a Class 1, Division 2 location, protecting it from physical damage is a requirement and not just where it is likely to be exposed to physical damage.

These two subsections are dealing with exposed installations so adding the proposed exception permitting cables in concealed locations is unnecessary since concealed installations are already permitted.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-125 Log #1332 NEC-P03 **Final Action: Accept**
(725.154(H) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-204
Recommendation: *Continue rejecting this proposal.*
Substantiation: The proposal introduces terms that are associated with fire testing/fire performance and are not defined anywhere. Therefore, not only does no application exist (as CMP 3 correctly pointed out) but no organization has developed criteria for such fire performance.

Class 2 and Class 3 circuit cables in the NEC can be listed as complying with one of the following 4 categories: CL2P and CL3P (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), CL2R and CL3R (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), CL2 and CL3 (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581) and CL2X and CL3X (i.e. cables listed as resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581).

Nowhere does a definition exist for "very-low-smoke producing cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable.

Nowhere does a definition exist for "fire hazard cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable.

Panel Meeting Action: Accept

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-126 Log #2024 NEC-P03 **Final Action: Reject**
(725.154(H))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-204
Recommendation: Revise 725.154(H)

(H) Class 2, Class 3, and PLTC Cables With Suffix Markings. Class 2, Class 3, or PLTC cables with single or multiple suffix markings shall be permitted and marked in accordance with the appropriate section of 725.179.

(~~H~~1) Class 2, Class 3, and PLTC Circuit Integrity (CI) Cables or Electrical Circuit Protective System. Circuit integrity (CI) cables or a listed electrical circuit protective system shall be permitted for use in remote control, signaling, or power-limited systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions.

(2) Class 2 or Class 3 Cables for Wet Locations. Class 2 or Class 3 cables installed in wet locations shall be Types CL2-WET, CL2R-WET, CL3P-WET, CL3-WET, CL3R-WET or CL3P-WET."

(3) Class 2 or Class 3 Cables Exposed to Direct Sunlight. Class 2 or Class 3 cables installed where exposed to direct sunlight shall be Types CL2-SR, CL2R-SR, CL2P-SR, CL3-SR, CL3R-SR or CL3P-SR.

(4) Class 2 and Class 3 Cables Exposed to Oil or Gas and Oil. Class 2 and Class 3 cables installed where exposed to oil shall be Types CL2-PR, CL2R-PR, CL2P-PR, CL3-PR, CL3R-PR, orCL3P-PR. Class 2 and Class 3 cables installed where exposed to gas and oil shall be Types CL2-GR, CL2R-GR, CL2P-GR, CL3-GR, CL3R-GR, or CL3P-GR.

(5) Class 2 and Class 3 Very-Low-Smoke Producing Cables. Class 2 or Class 3 very-low-smoke producing cables installed in locations to meet low flame spread and very-low-smoke emissions shall be Types CL2-50, CL2R-50, CLP2-50, CL3P-50, CL3R-50 or CL3P-50.

(6) Class 2 and Class 3 Fire Hazard Cables. Class 2 or Class 3 fire hazard cables installed in locations to meet low flame spread, very-low-smoke, and known potential heat release shall be Types CL2-FHC, CL2R-FHC, CLP2-FHC, CL3P-FHC, CL3R-FHC or CL3P-FHC.

Substantiation: This proposal details application requirements and permits cables identified in 725.154(A), (B), (D), and (E) to have suffix markings.

Installation requirements do not change, because 760.154 is referenced in 760.130.

725.130(B) Class 2 and Class 3 Wiring Methods. Conductors on the load side of the power source shall be insulated at not less than the requirements of 725.179 and shall be installed in accordance with 725.133 and 725.154.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements per 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-127 Log #792 NEC-P03 **Final Action: Reject**
(725.179)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-205
Recommendation: Accept the proposal with the following revisions:
Add "or other structures" after "buildings."
Substantiation: All buildings are structures, but all structures are not buildings. In the NEC, "or structures" is commonly added after "buildings."
Panel Meeting Action: Reject
Panel Statement: No new substantiation has been provided to alter the panel's action and statement on Proposal 3-205.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: The main text for the listing and marking of Class 2, Class 3 and PLTC cable very specifically references wiring methods that can be installed within a building that may not apply to other structures. For example, there would be no reason require low smoke cables or cables that are resistant to the spread of fire on a wooden platform installed outside adjacent to a building and designed to support an electrical service.

3-128 Log #625 NEC-P03 **Final Action: Accept**
(725.179(A), FPN)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 3-207
Recommendation: Continue to reject this proposal.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel action to reject this proposal and recommends that the panel continue to reject it.

A fine print note giving information on fire testing of plenum cable has been in the NEC since the 1984 edition. It has undergone only minor editorial changes since 1984. It provides extremely useful to cable manufacturers. The proposed change would remove essential information.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
EGESDAL, S.: It is important for cables to have marking that identify the intended application, similar to the marking on conductors in the Article 310 tables.
Panel rejected the proposal on this subject, citing poor application text. Not that the application text in the comment parallel other application text in this article, Panel 3 found a new reason to reject the proposed change. This type of panel action is unfair to submitters.

SEPULVEDA, M.: It is very important for cables to have markings on them, which identify the intended application(s), similar to the markings on conductors in the Article 310 tables.

The Panel discarded the proposal on this subject matter, due to citing poor submission text. Not that the application text in the comment, parallels other applications text in this same article. Panel 3 has now found a new reason to reject the proposed change. This type of panel action is not fair to submitters.

3-129 Log #626 NEC-P03 **Final Action: Accept**
(725.179(A), FPN)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 3-209
Recommendation: Continue to reject this proposal.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel that this FPN information is valuable for the user of the code and the user should not have to go back to an annex to find it.

We also support the panel in rejecting similar Proposals 3-210, 3-212, 3-213, 3-215, 3-217, 3-219, 3-221, 3-223 and 3-232, all for Article 725.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-130 Log #723 NEC-P03 **Final Action: Accept in Part**
(725.179(A), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-207
Recommendation: The Proposal should have been Accepted in Principle, revised and the following words "and Annex A Explanatory Material" added after "NFPA 262-2007" so the revised text reads as follows:
~~FPN~~ Informational Note: One method of defining low smoke-producing cable and fire-resistant cable is ~~by establishing an acceptable value of the smoke produced when tested in accordance with~~ described in NFPA 262-2007, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, and Annex A Explanatory Material. ~~, to a maximum peak optical density of 0.5 and a maximum average optical density of 0.15. Similarly, one method of defining fire-resistant cables is by establishing a maximum allowable flame travel distance of 1.52 m (5 ft) when tested in accordance with the same test.~~
Substantiation: The FPN does not provide "information on various methods of defining smoke producing cables or fire-resistant cables". It refers to a single test method and defines the maximum values, which are not specified in the body of NFPA 262. Inclusion of the maximum values in the FPN are requirements and this violates 3.1.3 of the NEC Style Manual.

NFPA 262 defines the Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces but it does not specify any pass/fail criteria.

While the values specified for maximum peak optical density, maximum average optical density, and maximum allowable flame travel distance in the FPN are not included in the body of NFPA 262, they are contained in Annex A Explanatory Material. Addition of the words "and Annex A Explanatory Material" will reference the maximum values that are in the FPN and the proposed revised FPN will comply with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation..
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefor is not mandatory text. The submitter has provided new text that has not received public review.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-131 Log #1333 NEC-P03 **Final Action: Accept in Principle**
(725.179(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-208
Recommendation: 725.179 Listing and Marking of Class 2, Class 3, and Type PLTC Cables.

Class 2, Class 3, and Type PLTC cables and nonmetallic signaling raceways installed as wiring methods within buildings shall be listed as being resistant to the spread of fire and other criteria in accordance with 725.179(A) through (K) and shall be marked in accordance with 725.179(L).

(A) Types CL2P and CL3P. Types CL2P and CL3P plenum cable shall be listed as being suitable for use in ducts, plenums, and other space for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN: One method of defining low smoke producing and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.
Substantiation: Retain the FPN as written by CMP 3, but only if the FPNs from CMP 16 are changed to the same language. This comment is being written just in case CMP 3 is unwilling to change to existing NEC language.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-132 which meets the intent of the submitter.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-132 Log #1334 NEC-P03 **Final Action: Accept**
(725.179(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-208
Recommendation: 725.179 Listing and Marking of Class 2, Class 3, and Type PLTC Cables.

Class 2, Class 3, and Type PLTC cables and nonmetallic signaling raceways installed as wiring methods within buildings shall be listed as being resistant to the spread of fire and other criteria in accordance with 725.179(A) through (K) and shall be marked in accordance with 725.179(L).

(A) Types CL2P and CL3P. Types CL2P and CL3P plenum cable shall be listed as being suitable for use in ducts, plenums, and other space for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

~~FPN: One method of defining low smoke producing and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.~~

FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.
Substantiation: This comment is intended to bring consistency to the NEC. In Articles 770, 800, 820 and 830, the FPN is worded as this comment (and the original proposal) recommends. The original proposal was already made in the 2005 and 2008 NEC cycles, but was caught up in the "plenum cable moratorium" in the opinion of CMP 3 but not of CMP 16. This wording also follows the requirements of the preceding section, which requires that the cable be listed as having both "adequate fire-resistant and low smoke-producing characteristics". The wording of the panel (although adequate also) does not explain what is needed to define a cable that is a "low smoke-producing and fire-resistant cable" by omitting the words "a cable that is".

With regard to the comment by Mr. Ayers, I agree with him, but the (incorrect) use of the term "fire-resistant cable" is consistent in not just the FPNs in all 6 relevant articles (725, 760, 770, 800, 820 and 830) but is also consistent with the use in the charging paragraph.

If CMP 3 and CMP 16 would both like to eliminate the term "fire-resistant cable", consistently in all locations, and replace it by a term such as "low flame spread cable", that would be an excellent idea, but it does require consistency (and probably a task group of both panels). In the meantime the use of the term "fire-resistant cable" is necessary to correlate with the charging paragraph.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-133 Log #2025 NEC-P03 **Final Action: Accept in Principle**
(725.179(A), FPN)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-208
Recommendation: Accept Proposal 3-208.
Substantiation: The text in Dr. Hirschler's proposal is identical to text in Articles 770, 800, 820, and 830. Prior to this FPN being a single sentence it was two sentences: one for flame spread and one for smoke developed index.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-132 which meets the intent of the submitter.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-134 Log #2817 NEC-P03 **Final Action: Reject**
(725.179(A), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-209
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.

The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-114 which addresses the same issue.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-135 Log #2868 NEC-P03 **Final Action: Reject**
(725.179(A), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-307
Recommendation: The panel should accept this proposal.
Substantiation: The submitter is correct by referring to 3.1.3 of the NEC Style Manual which states "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language." Clearly, this FPN contains what could be determined to be mandatory language and could imply a requirement that goes well beyond the purpose of FPN's to simply inform.
Panel Meeting Action: Reject
Panel Statement: The panel understands from the submitter that correct reference proposal is 3-207 not 3-307.

The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefore is not mandatory text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

STENE, S.: A more appropriate action may have been to Accept in Part by changing "FPN" to "Informational Note" based on actions at the proposal stage by CMP-1 and rejecting the remainder of the comment.

3-136 Log #2818 NEC-P03 **Final Action: Reject**
(725.179(B), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-210
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-114 which addresses a similar recommendation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-137 Log #724 NEC-P03 **Final Action: Accept in Part**
(725.179(C), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-211
Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:
~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray in~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.

Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
Substantiation: Acceptance of the revised wording shown above will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPN's not contain requirements. The pass/fail criteria are already defined in those two standards.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefor is not mandatory text. The submitter has provided new text that has not received public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-138 Log #2819 NEC-P03 **Final Action: Reject**
(725.179(C), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-212
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-114 which addresses a similar recommendation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-139 Log #2820 NEC-P03 **Final Action: Reject**
(725.179(D), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-213
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-114 which addresses a similar recommendation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-140 Log #725 NEC-P03 **Final Action: Accept in Part**
(725.179(E), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-214
Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:
~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray in~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.

Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
Substantiation: Acceptance of the revised wording shown above will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPN's not contain requirements. The pass/fail criteria are already defined in those two standards.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation..
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefor is not mandatory text. The submitter has provided new text that has not received public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-141 Log #2821 NEC-P03 **Final Action: Reject**
(725.179(E), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-215
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation

practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-114 which addresses a similar recommendation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-142 Log #726 NEC-P03 **Final Action: Accept in Part**
(725.179(F), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-216
Recommendation: The Proposal should be Accepted in Principle and reworded as follows:
~~FPN~~ Informational Note: One method of defining circuit integrity is ~~by establishing a minimum 2-hour fire resistance rating for the cable when tested~~ described in ~~accordance with~~ UL 2196-2002, Standard for Tests of Fire Resistive Cables.
Substantiation: Acceptance of the revised wording shown above will still provide the user with a reference to a method of defining "circuit integrity" and also comply with the NEC Style Manual that FPN's not contain requirements. The pass/fail criteria is already defined in the standard.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefor is not mandatory text. The submitter has provided new text that has not received public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-143 Log #2822 NEC-P03 **Final Action: Reject**
(725.179(F), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-217
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-114 which addresses a similar recommendation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-144 Log #727 NEC-P03 **Final Action: Accept in Part**
(725.179(H), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-218
Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:
~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray in~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.
Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
Substantiation: Acceptance of the revised wording shown above will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPN's not contain requirements. The pass/fail criteria are already defined in those two standards.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefor is not mandatory text. The submitter has provided new text that has not received public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-145 Log #2823 NEC-P03 **Final Action: Reject**
(725.179(H), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-219
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-114 which addresses a similar recommendation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-146 Log #728 NEC-P03 **Final Action: Accept in Part**
(725.179(J), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-220
Recommendation: The Proposal should be Accepted in Principle and revised as follows:
~~FPN~~ Informational Note: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the raceways pass the requirements of~~ the Test for Flame Propagation (Riser) in UL 2024, *Standard for Optical Fiber Cable Raceway.*
Substantiation: The existing phrase "…raceways pass the requirements of…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefor is not mandatory text. The submitter has provided new text that has not received public review.
Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-147 Log #2824 NEC-P03 **Final Action: Reject**
(725.179(J), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-221
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-114 which addresses a similar recommendation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-148 Log #729 NEC-P03 **Final Action: Accept in Part**
(725.179(K), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-222
Recommendation: The Proposal should be Accepted in Principle and revised as follows:
~~FPN~~ Informational Note: One method of defining resistance to the spread of fire is ~~that the raceways pass the requirements of~~ described in the Vertical-Tray Flame Test (General use) in UL 2024, Standard for Optical Fiber Cable Raceway.
Substantiation: The existing phrase "…raceways pass the requirements of…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefor is not mandatory text. The submitter has provided new text that has not received public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-149 Log #2825 NEC-P03 **Final Action: Reject**
(725.179(K), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-223
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-114 which addresses a similar recommendation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-150 Log #2026 NEC-P03 **Final Action: Reject**
(725.179(L) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-224
Recommendation: Accept Proposal 3-224.
Substantiation: The proposal provides requirements for marking and guidance to all users of the NEC, similar to information provided for conductors.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements per 110.3 (B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-151 Log #2027 NEC-P03 **Final Action: Reject**
(725.179(M) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-225
Recommendation: Revise Proposal 3-225, creating a new 725.179(M)
(M) Conductors and Cables in Dry or Wet Locations. Cables specified in 725.154(A), (B), (D)(1), and (E) shall be listed for installation in dry or wet locations, or shall have a moisture-impervious metal sheath, and shall be marked as required in 725.179(M)(a) or (b).
(a) Conductors and cables listed for installation in dry location shall not be required to have an additional suffix marking.
(b) Conductors and cables listed for installation in wet locations shall be identified with the suffix "-WET". Conductors and cables listed for wet locations shall be suitable for installation in dry or damp locations.
FPN: One method of defining suitability for installation in wet locations is by testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*
Substantiation: The industries that use Article 725 install cables in wet locations. Adding a "-WET" suffix will assure better installations for cables exposed to wet locations.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements per 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-152 Log #2028 NEC-P03 **Final Action: Reject**
(725.179(N) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-226
Recommendation: Accept Proposal 3-226.
Substantiation: Article 725 cables are often installed outdoors and exposed to sunlight. It is important to identify cables with a marking for sunlight resistance.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements per 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-153 Log #2082 NEC-P03 **Final Action: Reject**
(725.179(O) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-227
Recommendation: Accept proposal 3-227.
Substantiation: It is important for the industries using Article 725 to have temperature rating information.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements per 110.3(B).

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-154 Log #2029 NEC-P03 **Final Action: Reject**
(725.179(P) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-228
Recommendation: Accept in Principle Proposal 3-228, revised as shown.

(P) Class 2 and Class 3 Conductors and Cables Exposed to Oil or Gas. Class 2 and Class 3 conductors and cables installed where exposed to gas or oil shall be listed as suitable for those locations. Cables specified in 725.154(A), (B), and (E), and installed locations exposed to oil or gas shall have the additional classification using the following suffixes: "-PR" for oil resistant, and "-GR" for gasoline and oil resistant.

FPN: One method of defining corrosion resistance is testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*

Substantiation: Presently, there is no marking that identifies which Class 2, and Class 3 cables as being suitable for installation where exposed to oil or gas. It is important to have the correct cable for locations that have the potential to degrade cable and conductor insulation and cause system malfunction.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements per 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-155 Log #1335 NEC-P03 **Final Action: Accept**
(725.179(Q) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-229
Recommendation: *Continue rejecting this proposal.*
Substantiation: The proposal introduces a definition of a term that is associated with fire testing/fire performance and is not defined anywhere. Therefore, not only does no application exist (as CMP 3 correctly pointed out) but no organization has developed criteria for such fire performance.

Class 2 and Class 3 circuit cables in the NEC can be listed as complying with one of the following 4 categories: CL2P and CL3P (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), CL2R and CL3R (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), CL2 and CL3 (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581) and CL2X and CL3X (i.e. cables listed as resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581).

Nowhere does a definition exist for "very-low-smoke producing cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable. The proposed fire properties recommended for such a listing do not correspond to any listing developed by a nationally recognized listing organization, even when optional listings are taken into account. UL has developed UL Subject 2424, "Outline of Investigation for Cable Marked "Limited Combustible", which contains a set of listing criteria for which no application exists, but this document requires that cables also be tested in accordance with NFPA 259.

Cables listed to UL 2424 are already allowed by NFPA 90A to be used anywhere that plenum cables are required.

Both NFPA 90A and the mechanical codes (the IMC, International Mechanical Code, and the UMC, Uniform Mechanical Code) have requirements of 25/50 (flame spread index/smoke developed index, in accordance with ASTM E 84) for materials in plenums other than wires and cables (and some other materials). NFPA 13 (sprinkler standard) also made it clear that the use of plenum cables in plenums does not even introduce a fire hazard sufficient to require installation of sprinklers.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-156 Log #2030 NEC-P03 **Final Action: Reject**
(725.179(Q) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-229
Recommendation: Accept Proposal 3-229.
Substantiation: There are cables available that would pass the UL 723 test, but it would be foolish for a manufacturer to submit a product for testing, as there is no marking available to differentiate a very low smoke cable from smoky cable.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements per 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-157 Log #1336 NEC-P03 **Final Action: Accept**
(725.179(R) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-230
Recommendation: *Continue rejecting this proposal.*
Substantiation: The proposal introduces a definition of a term that is associated with fire testing/fire performance and is not defined anywhere. Therefore, not only does no application exist (as CMP 3 correctly pointed out) but no organization has developed criteria for such fire performance.

Class 2 and Class 3 circuit cables in the NEC can be listed as complying with one of the following 4 categories: CL2P and CL3P (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), CL2R and CL3R (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), CL2 and CL3 (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581) and CL2X and CL3X (i.e. cables listed as resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581).

Nowhere does a definition exist for "fire hazard cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable. The proposed fire properties recommended for such a listing do not correspond to any listing developed by a nationally recognized listing organization, even when optional listings are taken into account. UL has developed UL Subject 2424, "Outline of Investigation for Cable Marked "Limited Combustible", which contains a set of listing criteria for which no application exists, but this document requires that cables also be tested in accordance with UL 723 after oven aging.

Cables listed to UL 2424 are already allowed by NFPA 90A to be used anywhere that plenum cables are required.

Both NFPA 90A and the mechanical codes (the IMC, International Mechanical Code, and the UMC, Uniform Mechanical Code) have requirements of 25/50 (flame spread index/smoke developed index, in accordance with ASTM E 84) for materials in plenums other than wires and cables (and some other materials). NFPA 13 (sprinkler standard) also made it clear that the use of plenum cables in plenums does not even introduce a fire hazard sufficient to require installation of sprinklers.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-158 Log #2031 NEC-P03 **Final Action: Reject**
(725.179(R) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-230
Recommendation: Accept Proposal 3-230.
Substantiation: There are cables listed that meet UL 2424. Cables with the characteristics tested by UL 2424 are identified in NFPA 90A.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements per 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 727 — INSTRUMENTATION TRAY CABLE: TYPE ITC

3-159 Log #730 NEC-P03 **Final Action: Accept in Part**
(727.6, FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-231
Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:
~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray in~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.

Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
Substantiation: Acceptance of the revised wording shown above will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPNs not

contain requirements. The pass/fail criteria are already defined in those two standards.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Accept in Part

The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.

Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefor is not mandatory text. The submitter has provided new text that has not received public review.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-160 Log #2826 NEC-P03 **Final Action: Reject**
(727.6, FPN)

Submitter: T David Mills, T. David Mills Associates

Comment on Proposal No: 3-232

Recommendation: The Panel should accept this proposal.

Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.

The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.

Panel Meeting Action: Reject

Panel Statement: There has been no technical reason submitted for creating an additional annex for reference information other than Annex A. Putting this information into an annex in the back will tend to make the Code less user friendly and make it more difficult for the user to access the information in a timely fashion.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 760 — FIRE ALARM SYSTEMS

3-161 Log #2827 NEC-P03 **Final Action: Reject**
(760.1, FPN 1)

Submitter: T David Mills, T. David Mills Associates

Comment on Proposal No: 3-233

Recommendation: The Panel should accept this proposal.

Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.

The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.

Panel Meeting Action: Reject

Panel Statement: There has been no technical reason submitted for creating an additional annex for reference information other than Annex A. Putting this information into an annex in the back will tend to make the Code less user friendly and make it more difficult for the user to access the information in a timely fashion.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-162 Log #2032 NEC-P03 **Final Action: Reject**
(760.3(B))

TCC Action: The Technical Correlating Committee directs that the NFPA 72 Task Group on Wiring review this comment and Proposal 3-239 for correlation during the 2014 NEC Code cycle.

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.

Comment on Proposal No: 3-239

Recommendation: Accept Proposal 3-239.

Substantiation: 760.3(B) contains redundant text. Additionally, Ms. Stene's comment is in error regarding cable in air ducts. The first sentence of 760.154(A) requires Type FPLP in air ducts. The second sentence of 760.154(A) permits (an exception in the 1993 edition) Types FPL, FPLR, & FPLP in air ducts in compliance with 300.22.

Panel Meeting Action: Reject

Panel Statement: Section 300.22 provides basic requirements for all electrical wiring and equipment. Subsections 760.53 (B) and 760.154 (B) provide specific application information. Subsection 760.3(B) provides enforceable language.

Panel 3 requests that the NEC Technical Correlating Committee chair communicate with the NFPA 72 Technical Correlating Committee chair to form a task group on wiring made up of members of both NFPA 70 & 72 to look at the wiring issues of both documents to provide correlation between documents, particularly with Article 725 and 760. Panel 3 understands that there is already wiring task group for each project, but these task groups need to be combined to provide a more global correlation effort between the two documents.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

KAHN, S.: I repeat the reason for my Negative Vote on the Proposal: "The proposer's substantiation for Proposal No. 3-239 is correct - 760.3(B) is redundant...etc."

Comment on Affirmative:

EGESDAL, S.: The Automatic Fire Alarm Association is willing to serve on any task group related Article 725 installation requirements.

SEPULVEDA, M.: The Electronic Security Association (ESA) is willing to serve on any task group which is related to Article 725 installation requirements.

STENE, S.: The reference to 300.22 is necessary in 760.3 to ensure that non-power-limited and power-limited fire alarm conductors and cables comply with the requirements in environmental air ducts and other spaces used for environmental air (plenums). As can be seen in 300.22(B), only metallic wiring methods can be used in a fabricated environmental air duct and then only long enough to connect to electrical equipment that directly acts upon or sensing of the contained air. The second sentence in 760.154(A) also requires compliance with 300.22 for listed wires and cables, reinforcing the text in 760.3(B). Both references to 300.22 compliance, one in 760.3(B) and one in 760.154(A), make it totally clear that metal encasement of conductors and cables in a fabricated duct is necessary.

3-163 Log #434 NEC-P03 **Final Action: Accept in Part**
(760.3(H))

Submitter: Susan L. Stene, Underwriters Laboratories Inc.

Comment on Proposal No: 3-241

Recommendation: New/Revise text to read as follows:

The proposed text should be changed to indicate: (H) Cables, Raceways or Sleeves Exposed to Different Temperatures. Where portions of cables, raceways or sleeves are exposed to different temperatures and condensation is known to be a problem, fire alarm ~~I~~ installations shall comply with 300.7(A).

Substantiation: Panel 3 correctly accepted the concept of the proposal. However, further detail should be included to inform the user of the specific concerns which would require the application of 300.7(A). The text proposed above provides specific information for the user regarding the specific use of 300.7(A)

Panel Meeting Action: Accept in Part

Accept the added words "Or Sleeves" in the title and reject the remainder of the recommendation.

Panel Statement: The action taken on Comment 3-24a included the requirements that are being proposed by the submitter. Repeating the requirements in this section is not necessary. This should satisfy the intent of the submitter.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

STENE, S.: Not accepting the additional text, as suggested in the comment, leaves the user of this section of the NEC with the dilemma of determining what the Panel intends for this application. The raceway or sleeve could be exposed to different temperatures but condensation is clearly not a problem, however, the newly modified text would require compliance with 300.7 even when there is no problem with condensation. For example, a raceway enclosing

fire alarm conductors installed from the outside of the building to the inside of the building in Minnesota would be a problem, whereas the same installation in San Diego or Phoenix would not be a problem and would not require compliance with 300.7. The phrase "Where portions of raceways or sleeves are exposed to different temperatures and condensation is known to be a problem" should be added to eliminate this issue.

3-164 Log #1919 NEC-P03 **Final Action: Accept in Principle**
(760.3(H) (New))

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 3-242
Recommendation: Accept in Principle the Panel Action with the additional wording as shown:
760.3(H) "Vertical Support for Fire Rated Cables and Conductors. Vertical installations of circuit integrity (CI) cables installed in a raceway and conductors or cables of electrical circuit protective systems shall be in accordance with 300.19(B)."
Substantiation: The additional phrase, "installed in a raceway", aligns the wording of 760.3(H) with the wording of 300.19(B).
Panel Meeting Action: Accept in Principle
Revise 760.3(H) to read as follows:
(H) Vertical Support for Fire Rated Cables and Conductors. Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of electrical protective systems shall be installed in accordance with 300.19.
Panel Statement: The text was changed to make it clear that circuit integrity cables and conductors are permitted to be installed in a raceway and must comply with various subsections of 300.19.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: The text should be further modified by inserting "where applicable" after "300.19" to read as follows: Vertical Support for Fire Rated Cables and Conductors. Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of electrical protective systems shall be installed in accordance with 300.19, where applicable." Compliance with 300.19 is not always required in all vertical installations so adding "where applicable" will provide the engineer/installer/inspector with the choice of applying the requirement or not, without requiring it for all installations and applications.

3-165 Log #2033 NEC-P03 **Final Action: Reject**
(760.3(H) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-242
Recommendation: Reject Proposal 3-242.
Substantiation: Installation requirements are part of manufacturer's instructions, UL has detailed installation requirements for electrical circuit protection systems, but nothing specific for cable.
Panel Meeting Action: Reject
Panel Statement: This added text and the reference to 300.19 provides appropriate requirements for fire alarm circuit integrity cables installed in a raceway, in addition to the conductors and cables installed in electrical circuit protective systems.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-166 Log #2034 NEC-P03 **Final Action: Reject**
(760.3(I) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-244
Recommendation: Reject Proposal 3-244.
Substantiation: The proposal introduces redundant text, because 300.17 is in 760.51.
Panel Meeting Action: Reject
Panel Statement: Section 300.17, as referenced in 760.3(I) (renumbered in the draft as 760.3(J)), applies to all conductors/cables covered by Article 760 where they are installed in raceway, not just 760.51. Section 760.3(I) does not exempt compliance with any Chapter 3 wiring methods, including wire fill for raceways that may be used where installing fire alarm circuits.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-167 Log #2035 NEC-P03 **Final Action: Reject**
(760.3(I) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-245
Recommendation: Accept Proposal 3-245.
Substantiation: While the panel statement is correct, it fail to address power-limited cables.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements per 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: Individual conductors based on 760.46 and 760.49 must already comply with 310.8(D) making this reference unnecessary. Cables covered with a listed sunlight resistant material may change the flame rating of a cable and leave it unsuitable for the installation and may cause obscuration of other cable marking. Non-power-limited fire alarm cables must already comply with 760.53 and power-limited fire alarm cables must comply with 760.154 so this proposed reference is unnecessary.

3-168 Log #2012 NEC-P03 **Final Action: Reject**
(760.7 (New))

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facilities Executives
Comment on Proposal No: 3-248
Recommendation: Accept in Principle with the following revision:
760.7 Mechanical Execution of Work.
Fire alarm circuits shall be installed in a neat workmanlike manner**.** Cables and conductors **not enclosed in raceway and** installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be
supported by straps, staples, cable ties, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4(D).
Substantiation: This revision to the original proposal highlights the concept that not all fire alarm wiring has to be installed in conduit. The committee's referral (in the substantiation of the original proposal rejection) to Sections II and III of this article does not reveal any explicit language indicating that raceway is optional in some applications. The term "It shall be permitted" is a strong hint at the more expensive wiring method; thus concealing the code minimum. Many fire alarm installations in our industry are being built with fire alarm wiring in conduit because of lack of understanding of NEC minimums.
Panel Meeting Action: Reject
Panel Statement: Installing non-power-limited or power-limited fire alarm cable without conduit is already accepted in Sections 760.46, 760.48, 760.49, and 760.127 in addition to other sections in Parts II and III of Article 760 so adding this information to a new section is unnecessary.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-169 Log #2036 NEC-P03 **Final Action: Reject**
(760.24)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-252
Recommendation: Accept Proposal 3-252.
Substantiation: The document proposed is not a 'workmanship" manual. Rather it provides guidance on job installation process and best practices.
Panel Meeting Action: Reject
Panel Statement: The panel maintains its original position on the proposal. Section 110.12, FPN already provides information on industry standards related to workmanship and doesn't just apply to mechanical execution of work. The phrase "and other ANSI-approved installation standards" will permit the user of the NEC to access other installation standards, such as NECA 301 for fire alarms.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-170 Log #627 NEC-P03 **Final Action: Accept**
(760.25)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 3-253
Recommendation: Continue to reject this proposal.
Substantiation: Panel 1 rejected similar Proposals 1-139 and 1-146 with the statement "The submitter has not substantiated that a problem exists, or that the problem would be alleviated by removing abandoned cables and equipment neatly. Rather, the panel concludes, that in some cases, abandoned cables and equipment are best left abandoned. The proposed text is unnecessary as the section more appropriately applies to "Requirements for Electrical Installations" and "Mechanical Execution of Work.""

Panel 12 rejected similar Proposals 12-114, 12-146 with the statement. "The requirement is unenforceable. Disposition of removed materials is not a code responsibility. The remaining installation is required to be in accordance with 110.3, which is enforceable."

Panel 16 rejected similar Proposals 16-24, 16-122, 16-241 and 16-305 with the statement. "This is an unenforceable requirement. Removing abandoned cable involves pulling unused cable and wiring from conduit, raceways, ducts, shafts and drop ceilings. The objective of the original text is directed at the final installation, that it be "neat and workmanlike", not necessarily the installation (in this case, removal) process. The submitter has provided no substantiation for additional requirements during the removal process."
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-171 Log #632 NEC-P03 **Final Action: Accept**
(760.25)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 3-253
Recommendation: Continue to reject this proposal.
Substantiation: Panel 1 rejected similar Proposals 1-139 and 1-146 with the statement "The submitter has not substantiated that a problem exists, or that the problem would be alleviated by removing abandoned cables and equipment neatly. Rather, the panel concludes, that in some cases, abandoned cables and equipment are best left abandoned. The proposed text is unnecessary as the section more appropriately applies to "Requirements for Electrical Installations" and "Mechanical Execution of Work."

Panel 12 rejected similar Proposals 12-114, 12-146 with the statement. "The requirement is unenforceable. Disposition of removed materials is not a code responsibility. The remaining installation is required to be in accordance with 110.3, which is enforceable."

Panel 16 rejected similar Proposals 16-24, 16-122, 16-241 and 16-305 with the statement. "This is an unenforceable requirement. Removing abandoned cable involves pulling unused cable and wiring from conduit, raceways, ducts, shafts and drop ceilings. The objective of the original text is directed at the final installation, that it be "neat and workmanlike", not necessarily the installation (in this case, removal) process. The submitter has provided no substantiation for additional requirements during the removal process."
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-172 Log #2037 NEC-P03 **Final Action: Reject**
(760.32)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-254
Recommendation: Accept Proposal 3-254.
Substantiation: There are 3 key changes in the proposal.

Change the "or" to "and".

Split the section, moving non-power-limited requirements to Part II and power-limited requirements to Part III.

Require all circuits entering a building to meet requirements of Article 800, Parts II, III, & IV.

There are transient protection devices available for various AC & DC circuits, which are not the typical communications system primary protectors.
Panel Meeting Action: Reject
Panel Statement: The submitter did not address any of the compliance and primary protector ratings issues in the proposal Panel Statement. Based on 760.41(A), the power source of non-power-limited fire alarm circuits shall have an output voltage not greater than 600-volts. Requiring non-power-limited fire alarm circuits extending beyond one building to comply with Parts II, III and IV of Article 800 would be a safety hazard at the very least, if not a potential fire hazard. Article 800 does not address circuits with voltages up to 600 volts. Compliance with Parts II and III of Article 800 would require primary and secondary protectors be installed on these non-power-limited conductors or cables where entering into the second building based on 800.50(C). Primary protectors are not rated for the permissible voltage of the non-power-limited circuit of up to 600 volts and with ampere ratings based on 310.15. There are plenty of transient protection devices available in the industry to provide protection for non-power, especially as covered in Article 285 but none in Article 800 that would apply. Article 800 is already referenced in 760.32 for power-limited fire alarm circuits.

Providing the information about fire alarm circuits extending to another building as indicated in 760.32 is much more user friendly than splitting it into two separate sections.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

EGESDAL, S.: The action of Panel 3 permits fire alarm systems having circuits extending outside of a building to be installed with no transient protection. All an installer has to do is meet any of the requirements of Article 300, Part I that apply to the installation…which may be no action required. NFPA 72-2007, National Fire Alarm Code requires installation of transient protection where a fire alarm circuit enters a building. This version of NFPA 72 is in-force in most jurisdictions in the USA.

The panel ignored the submitters substantiation that there are transient protection devices avail for AC voltages up to 600, and a wide range of DC voltages.

SEPULVEDA, M.: Panel 3 permits Fire Alarm Systems having circuits extending outside of a building to be installed with "no" transient protection. An installer doing the work only has to do is meet any of the requirements of Article 300, Part I, that apply to the installation…which may be no action necessary.

In most jurisdictions in the United States of America the NFPA 72-2007 edition National Fire Alarm Code (NFPA) requires the installation of transient protection where a Fire Alarm circuit is entering a building.

This version of NFPA 72 is in-force today and the panel has again ignored the submitter's proof that there are transient protection device purpose for A.C. voltages up to 600, and a very wide range of DC voltages as well.

3-173 Log #2038 NEC-P03 **Final Action: Reject**
(760.35)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-256
Recommendation: Accept Proposal 3-256.
Substantiation: Recently in a class taught by an AHJ, an installer asked why grounding was no longer required for fire alarm systems. The question was raised because Panel 3 removed the grounding reference from Article 760.
Panel Meeting Action: Reject
Panel Statement: Section 90.3 states Chapters 1 through 4 apply unless supplemented or modified by Chapters 5, 6, or 7.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-174 Log #2039 NEC-P03 **Final Action: Reject**
(760.37 (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-258
Recommendation: Accept Proposal 3-258.
Substantiation: The proposal provides minimal, but key requirements, necessary for proper installation of Class A circuits.
Panel Meeting Action: Reject
Panel Statement: No new substantiation has been provided to change the position of the panel.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-175 Log #1074 NEC-P03 **Final Action: Reject**
(760.41)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 3-259
Recommendation: Revise the accepted text to read: "A branch circuit that supplies only fire alarm equipment ~~An individual branch circuit~~ shall be required for the power source." (Remainder unchanged).
Substantiation: The panel statement includes a definition of an individual branch circuit and then says that this individual branch circuit can supply multiple pieces of the same equipment. If the panel interpretation on this point is correct, then I could use one individual branch circuit to supply more than one of anything as long as they are the same. This is a direct contradiction to the definition of individual branch circuit which says "only one utilization equipment." For example, where the fire alarm panel is in one enclosure and the battery charger or other auxiliary power supply or other related equipment is in another, they are often separate items of utilization equipment. A single circuit could be used according to the panel statement of intent, but this circuit is no longer an individual branch circuit. In fact, an identical requirement for

PLFA circuits was also accepted. Literally, since each power supply has to have an "individual branch circuit" many fire alarm panels would require two individual branch circuits since many appliance circuits are NPLFA while PLFA initiating circuits are supplied by the same panel. Apparently the panel is disregarding the definitions of "one" and "utilization equipment." As soon as more than one utilization equipment is connected, the circuit is no longer an individual branch circuit. The panel is correct that there is no definition of "dedicated circuit" even though many proposals have been made to add one. So the panel should say what they mean or accept the Exception in the original proposal to allow more than one item of fire alarm utilization equipment to be supplied by the same circuit. This comment is intended to have the code actually say what the panel said they meant. Alternatively, the panel should accept the revision as proposed in the comment on affirmative by Mr. Ayer. This would eliminate duplicated language in 760-41 and 760-121 and does not use the incorrect term individual branch circuit.

Panel Meeting Action: Reject

Panel Statement: The text as modified by the panel at the proposal stage addresses the panels intent.

See the revised text in the panel meeting action in Proposal 3-259 since it changes the existing text in 760.41(B) in the 2008 NEC to the following text: "The branch circuit supplying the fire alarm equipment(s) shall supply no other loads." The existing text stated "an individual branch circuit shall be required for the supply of the power source" (of the fire alarm panel) and was not intended to supply multiple pieces of equipment. The new text provides the requirement for the branch circuit to supply only the fire alarm equipment, but could have multiple pieces of equipment connected to the branch circuit.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

EGESDAL, S.: It is important that the power for a fire alarm system supply only fire alarm equipment. The submitter of this comment provided excellent wording to clarify application, installation, and inspection requirements.

SEPULVEDA, M.: It is extremely important that the power for a Fire Alarm System supply only fire alarm equipment (or dedicated circuit). The submitter of this comment provided exceptional wording to make clear the application, installation, and inspection requirements.

3-176 Log #1429 NEC-P03 **Final Action: Accept in Principle in Part**
(760.41)

Submitter: Mark Shapiro, Farmington Hills, MI

Comment on Proposal No: 3-259

Recommendation: Revise the panel's action as follows:

(A) Power Source. The power source of non-power-limited fire alarm circuits shall comply with Chapter 1 through 4, and the output voltage shall be not more than 600 volt, nominal. ~~Fire alarm disconnect shall be permitted to be secured in the "on" position.~~

(B) Branch Circuit. The branch circuit supplying the fire alarm equipment(s) shall supply no other loads. The location of the branch circuit overcurrent protective device shall be permanently identified at the fire alarm control panel. The circuit disconnecting means shall have a red marking, shall be accessible only to authorized personnel, and shall be identified as "FIRE ALARM CIRCUIT. This branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit interrupters.

FPN: See 210.8(A)(5), Exception, for receptacles in dwelling-unit unfinished basements that supply power for fire alarm systems."

Substantiation: NFPA 72 is included by reference in most building codes. This means that, unlike the pattern for referenced documents in the NEC, it is a mandatory part of those building codes. So, if the NEC "permits" fire alarm circuits to be locked on and other codes require it, there will be a direct code conflict.

Having enforced NFPA 72's locking and marking requirements for years, I have seen no problems with them and have found them to be a useful set of requirements. They help to locate the fire alarm circuit. They help keep other wiring off the circuit. They help to keep the vital circuit energized. And, help avoid unnecessary trouble signals.

Panel Meeting Action: Accept in Principle in Part

Revise the panel action of Proposal 3-259 to read as follows:

(A) Power Source. The power source of non-power-limited fire alarm circuits shall comply with Chapter 1 through 4, and the output voltage shall be not more than 600 volts, nominal. Fire alarm circuit disconnect shall be permitted to be secured in the "on" position.

(B) Branch Circuit. The branch circuit supplying the fire alarm equipment(s) shall supply no other loads. The location of the branch circuit overcurrent protective device shall be permanently identified at the fire alarm control unit. The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified as "FIRE ALARM CIRCUIT." The red identification shall not damage the overcurrent protective devices or obscure the manufacturer's markings. This branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit interrupters.

FPN: See 210.8(A)(5), Exception, for receptacles in dwelling-unit unfinished basements that supply power for fire alarm systems."

Panel Statement: The panel rejected the deletion of the last sentence in 760.41(A) since this is permissive text and is not mandatory. Requiring the fire alarm circuit disconnecting means to have red identification was accepted. Information was also added to caution against degrading equipment due to identification. The panel accepted the phrase "is to be identified as FIRE ALARM CIRCUIT". The panel did not accept use of the term "authorized" and instead inserted "qualified" as a defined term.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-177 Log #2869 NEC-P03 **Final Action: Reject**
(760.41(B))

Submitter: T David Mills, T. David Mills Associates

Comment on Proposal No: 3-260

Recommendation: The panel action should be "Accept in Principle".

Substantiation: The panel action should be "Accept in Principle" since by accepting the proposal in total with the phrase "to read as follows" implies that the final wording negates entirely the panel action taken on Proposal 3-259, which is not the intent of the panel.

Panel Meeting Action: Reject

Panel Statement: This action was moot since the Final Action was reject, based on less than 2/3 affirmative votes.

Also see panel action and statement on Comment 3-176.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-178 Log #2040 NEC-P03 **Final Action: Accept**
(760.46)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.

Comment on Proposal No: 3-263

Recommendation: Continue to accept the proposal.

Substantiation: The proposal provides minimal, but key requirements, necessary for proper installation of Class A circuits. Installation requirements are part of manufacturer's instructions, UL has detailed installation requirements for electrical circuit protection systems, but nothing specific for cable.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-179 Log #2468 NEC-P03 **Final Action: Accept**
(760.49(A))

Submitter: Edward Walton, WC Services

Comment on Proposal No: 3-266

Recommendation: Support panel reject of this proposal.

Substantiation: Manufacturers are supplying 18 AWG circuit integrity cables qualified for 100 foot vertical applications which comply with 300.19(8) and table 300.19 (see UL FHlT.24). There is no need to limit AWG size.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-180 Log #787 NEC-P03 **Final Action: Reject**
(760.53)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 3-271

Recommendation: Accept the proposal with the following revisions:

A) NFPA Wiring Method. Multiconductor non-power limited fire alarm cables shall be installed in accordance with 760.53(A)(1), (A)(2), and (A)(3).

(1) Exposed in raceways or fished cables shall be installed in approved raceways or exposed. Cable splices and terminations shall in listed boxes, fittings, fire alarm device enclosures, utilization equipment enclosures, or other approved enclosures. Cables shall be secured to supports at intervals not greater than 1.8 m (6 ft) and protected against physical damage by approved means. Where exposed cables are located less than 2.1m (7 ft) above the floor or standing surface, that shall be securely fastened to approved supports in an approved manner at intervals not to exceed 450 mm (18 in.).

Exception: Support shall not be required for that portion of cables or raceways fished between access points through concealed spaces in finished buildings or other structures and supporting is impractical.

Substantiation: "Adequately" is subjective and a term not to be used per the NEC Style Manual, cables should be supported whether or not concealed, as is required for most wiring methods which may not be as critical for safety. The proposal covers protection by baseboards, door frames, etc. and elevation. The present text has no specific provisions for fastening/support for cables located

7ft 6 in. above the floor.
Panel Meeting Action: Reject
Panel Statement: The proposed text is incomplete. There was no technical substantiation provided to show "adequately supported" is the same as "securely supported" in the recommendation and that the existing text is a safety issue. The same applies to the recommended change "adequate protection can be afforded." The exception is not necessary since cables can be fished into concealed spaces based on the title and the existing first sentence in the Code.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-181 Log #2041 NEC-P03 **Final Action: Accept in Principle**
(760.53(A))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-272
Recommendation: Accept proposal 3-272.
Substantiation: The purpose is to provide a bushing for non-power-limited cable, where the cable emerges from race into space. 760.53 is covered in an exception to 760.46, so additional text is needed.

[760.46 Installation of non–power-limited fire alarm circuits shall be in accordance with 110.3(B), 300.7, 300.11, 300.15, 300.17, and other appropriate articles of Chapter 3.

Exception No. 1: As provided in 760.48 through 760.53.

Exception No. 2: Where other articles of this Code require other methods.]
Panel Meeting Action: Accept in Principle

Add new 760.3(K) to read as follows:

(K) Bushing. A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).
Panel Statement: Placing text here eliminates unnecessary cross referencing.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

STENE, S.: The submitter did not provide any technical substantiation that cables were being damaged where installed as open cables with a transition into a raceway. In addition, Section 300.15(C) requires a fitting be used where the cable enters into a raceway or a sleeve without a transition box but the accepted text in the Comment requires a bushing. Bushings only apply where the conductors emerge from a raceway and enter or terminate at equipment, such as open switchboards, unenclosed control equipment, or similar equipment as noted in Section 300.16(B). A bushing at the end of a raceway may not be appropriate for an installation where EMT is stubbed up through a wall and then used as a sleeve for the cable to enter from the drop ceiling. Based on 300.15(C), a fitting is required where a box is not installed at the transition point, not a bushing.

3-182 Log #2042 NEC-P03 **Final Action: Reject**
(760.53(A))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-273
Recommendation: Accept proposal 3-273 or revise 760.53 to clarify requirements.
Substantiation: 760.53 is covered in an Exception to 760.46, so additional text is needed.

[760.46 Installation of non–power-limited fire alarm circuits shall be in accordance with 110.3(B), 300.7, 300.11, 300.15, 300.17, and other appropriate articles of Chapter 3.

Exception No. 1: As provided in 760.48 through 760.53.

Exception No. 2: Where other articles of this Code require other methods.]
Panel Meeting Action: Reject
Panel Statement: Section 760.46 requires compliance with the requirements in 110.3(B), 300.7, 300.11, 300.15, 300.17, and other appropriate articles in Chapter 3. Section 760.46, Exception No. 1 is providing additional requirements where multiconductor NPLFA cables are installed since the requirements in Article 300 and the other wiring method Articles in Chapter 3 do not specifically cover multiconductor NPLFA cables.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-183 Log #2870 NEC-P03 **Final Action: Accept in Principle**
(760.53(A))

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-272
Recommendation: The panel action should have been Accept in Principle.
Substantiation: The panel action should have been Accept in Principle with the following modification to the proposed text to read, "(4) If a Box or Conduit Body is Not Required. If a box or conduit body is not required, as permitted in 300.15(C), a fitting, such as a bushing, shall be installed where cables emerge from raceway used for mechanical support or protection." This rewording addresses the concern of the submitter to have information specifically included in 760.53(A) providing protection of cables without relying on the inferred requirement to follow 300.15(C) via 760.46.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-181.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

STENE, S.: The submitter did not provide any technical substantiation that cables were being damaged where installed as open cables with a transition into a raceway. In addition, Section 300.15(C) requires a fitting be used where the cable enters into a raceway or a sleeve without a transition box but the accepted text in the Comment requires a bushing. Bushings only apply where the conductors emerge from a raceway and enter or terminate at equipment, such as open switchboards, unenclosed control equipment, or similar equipment as noted in Section 300.16(B). A bushing at the end of a raceway may not be appropriate for an installation where EMT is stubbed up through a wall and then used as a sleeve for the cable to enter from the drop ceiling. Based on 300.15(C), a fitting is required where a box is not installed at the transition point, not a bushing.

3-184 Log #2043 NEC-P03 **Final Action: Reject**
(760.53(B) and 760.53(C))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-276
Recommendation: 760.53(A) does not change.

760.53(B) Revise text as shown.

760.53(C).Add new text as shown.

760.53 Multiconductor NPLFA Cables.

Multiconductor non–power-limited fire alarm cables that meet the requirements of 760.176 shall be permitted to be used on fire alarm circuits operating at 150 volts or less and shall be installed in accordance with 760.53(A) and (B).

(B) Applications of Listed NPLFA Cables. The use of non–power-limited fire alarm circuit cables shall comply with 760.53(B)(1) through (B)(4) and shall be permitted to have suffixes in accordance with 760.53(C).

(1) Ducts and Plenums. Multiconductor non–power-limited fire alarm circuit cables, Types NPLFP, NPLFR, and NPLF, shall not be installed exposed in ducts or plenums.

FPN: See 300.22(B).

(2) Other Spaces Used for Environmental Air. Cables installed in other spaces used for environmental air shall be Type NPLFP.

Exception No. 1: Types NPLFR and NPLF cables installed in compliance with 300.22(C).

Exception No. 2: Other wiring methods in accordance with 300.22(C) and conductors in compliance with 760.49(C).

~~Exception No. 3: Type NPLFP-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable~~.

(3) Riser. Cables installed in vertical runs and penetrating more than one floor or cables installed in vertical runs in a shaft shall be Type NPLFR. Floor penetrations requiring Type NPLFR shall contain only cables suitable for riser or plenum use.

Exception No. 1: Type NPLF or other cables that are specified in Chapter 3 and are in compliance with 760.49(C) and encased in metal raceway.

Exception No. 2: Type NPLF cables located in a fireproof shaft having firestops at each floor.

FPN: See 300.21 for firestop requirements for floor penetrations.

~~Exception No. 3: Type NPLF-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable.~~

(4) Other Wiring Within Buildings. Cables installed in building locations other than the locations covered in 760.53(B)(1), (B)(2), and (B)(3) shall be Type NPLF.

Exception No. 1: Chapter 3 wiring methods with conductors in compliance with 760.49(C).

Exception No. 2: Type NPLFP or Type NPLFR cables shall be permitted.

~~Exception No. 3: Type NPLFR-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable~~.

(C) Non-Power-Limited Cables With Suffix Markings. Non-power-limited cables with single or multiple suffix markings shall be permitted where required to meet special applications.

(1) Non-Power-Limited Cables or Electrical Circuit Protective System. Non-power-Limited circuit integrity (CI) cables or a listed electrical circuit protective system shall be permitted for use in fire alarm systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions.

(2) Non-Power-Limited Cables for Wet Locations. Non-power-limited cables installed in wet locations shall be Types NPLF-WET, NPLFR-WET, or NPLFP-WET.

(3) Non-Power-Limited Cables Exposed to Direct Sunlight. Non-power-limited Cables installed exposed to direct sunlight shall be Types NPLF-SR, NPLFR-SR, or NPLFP-SR.

(4) Non-Power-Limited Fire Hazard Cables. Non-power-limited fire hazard cables installed to provide low flame spread, very-low-smoke, and known

potential heat release shall be Types NPLF-FHC, NPLFR-FHC, or NPLFP-FHC.
(5) Non-Power-Limited Very-Low-Smoke Producing Cables. Non-power-limited very-low-smoke producing cables installed to provide low flame spread and very-low-smoke emissions shall be Types NPLF-50, NPLFR-50, or NPLFP-50.
(6) Non-Power-Limited Cables in Corrosive Locations. Non-power-limited cables installed where exposed to oil shall be Types NPLF-PR, NPLFR-PR, or NPLFP-PR. Non-power-limited cables installed where exposed to gas and oil shall be Types NPLF-GR, NPLFR-GR, or NPLFP-PR-GR.
Substantiation: This comment provides the application missing from the proposal, as noted by Panel 3.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: None of the suggested changes in the proposal or the comment deal with applications; all are dealing with markings more appropriately covered in 760.176. This applications section is designed to provide information where a particular cable can be installed. For example, "a nonpower-limited fire alarm cable listed for wet locations shall be permitted to be installed in an underground installation." The marking requirement would then be located in 760.176 with the installation requirements located in Part II of Article 760. This proposal does not provide any application for any of the proposed cables and there are no installation requirements for these cables. Suffix markings are already permitted on cables based on the listing standards and the product marking guide for UL Category HNHT on page 154 of the 2009 UL White Book.

3-185 Log #2044 NEC-P03 **Final Action: Accept in Principle**
(760.53(B)(1))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-277
Recommendation: Accept Proposal 3-277 or clarify requirements.
Substantiation: Power-limited cable is permitted to use non-power-limited cable. Power-limited circuits are permitted in air ducts. Non-power-limited circuits installed using non-power-limited cable is prohibited from being installed in an air duct. The question: If a power-limited circuit is installed using non-power-limited cable, can the cable be installed in an air duct?
Panel Meeting Action: Accept in Principle
Revise 760.53(B)(1) as follows:
(1) Ducts ~~and Plenums~~**.** Multiconductor non–power-limited fire alarm circuit cables, Types NPLFP, NPLFR, and NPLF, shall not be installed exposed in ducts ~~or plenums~~.
Panel Statement: The panel accepts Comment 3-185 in principle and revises 760.53(B)(1) to clarify that NPFLA Cables are not permitted to be installed in ducts and to correlate with the changes made to section 300.22 by Proposal 3-94.
The technical correlating committee should be aware that other sections of the code may be affected by the Proposal 3-94 changes.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-186 Log #628 NEC-P03 **Final Action: Reject**
(760.53(B)(3))

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 3-278
Recommendation: Reconsider and accept this proposal.
Substantiation: The Communications Cable & Connectivity Association requests that the panel reconsider and accept this proposal.
This proposal in one of a group of similar proposals that were submitted to Panels 3 and 16. The ROP actions were.

Proposal No.	Section	Action
3-201	725.154(B)(1)	Reject
3-278	760.53(B)(3)	Reject
16-62	770.154(B)(1)	Accept in Principle
16-179	800.154(B)(1)	Accept in Principle
16-282	820.154(B)(1)	Accept in Principle
16-338	830.151(B)	Accept in Principle
16-341	830.154(B)(1)	Accept in Principle

Acceptance of this proposal will greatly simplify installations. We agree with the ballot comment Mr. Gerald Dorna submitted with his affirmative vote on Proposal 16-62. (He had similar affirmative ballot comments on all the companion proposals.) His statement was:
The current riser requirements are so complicated that they could be considered to be a "vague and unenforceable".
Section 770.154(B)(1) requires that "Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type OFNR or OFCR. Floor penetrations requiring Type OFNR or OFCR shall contain only cables suitable for riser or plenum use". Consequently at least two floor penetrations are required, one for plenum and riser cables and another for general-purpose cables.
The panel action on this proposal greatly simplifies the installation rules for cables in risers in other than one and two-family dwellings. The installation rules for one and two-family dwellings are already simplified since any listed cable is permitted.
Panel Meeting Action: Reject
Panel Statement: The current wording adequately expresses the intent of the panel. No new substantiation has been provided.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
KEDEN, R.: My negative vote pertains to the committee actions on the comments 3-121, 3-122, 3-186, 3-187, 3-200 and 3-201. The proposals and comments to the issue included the technical substantiations and the discussions in CMP-3 have not convinced me or changed my vote.
The panel statement noted that CMP 3 actions to reject proposals 3-201, 3-278 and 3-301, as well as the aforementioned comments result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16).
Different wiring rules in Articles 725 and 760 versus Articles 770,800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to that time, CMP 16 was responsible to Article 725, 760, 770, 800, 810, 820 and 830. Today, there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820 and 830).
However, this issue does not warrant different treatment in my opinion; CMP-3 should have accepted this Comment.
OWEN, S.: My negative vote pertains to the committee action on comments 3-121, 3-122, 3-186, 3-187, 3-200, 3-201 and proposals 3-201, 3-278, 3-301. The panel statement noted that CMP 3 actions to reject these comments and proposals result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP 3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16). Different rules in Articles 725 and 760 versus Articles 770, 800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to the time, CMP 6 was responsible to Article 725, 760, 770, 800, 810, 820, and 830. Today there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820, and 830). I do not believe that this issue warrants different treatment. My negative vote pertains to the committee action on comments 3-121, 3-122, 3-186, 3-187, 3-200, 3-201, 3-278, 3-301. The panel statement noted that CMP 3 actions to reject these proposals result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP 3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16). Different rules in Articles 725 and 760 versus Articles 770, 800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to the time, CMP 6 was responsible to Article 725, 760, 770, 800, 810, 820, and 830. Today there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820, and 830). I do not believe that this issue warrants different treatment.
Comment on Affirmative:
STENE, S.: There was no technical substantiation submitted with the proposal, just a question about whether this was what was intended. The text is not complicated since it requires a riser cable where the cable penetrates more than one floor. If the cable goes from the first floor to the third floor, then a riser cable is required. If the cable is installed in a metal raceway, then riser cable is not required but the metal raceway would normally require fire proofing at each floor.
The submitter could initiate a fact finding study for the 2014 NEC to determine if there is any validity of requiring a riser cable be used for every floor penetration, rather than multiple floor penetrations. The fire test for riser cables is located in UL 1666, The Standard for Safety Test for Flame Propagation Height of Electrical and Optical Fiber Cables Installed Vertically in Shafts.
The following is the Scope of UL 1666: 1 Scope
1.1 This is a fire test for determining values of flame propagation height for

electrical and optical-fiber cables that are for installation vertically in shafts or in vertical runs that penetrate more than one floor.
1.2 The purpose of this test is to determine whether the flame propagation characteristics of these "riser" cables are in accordance with the National Electrical Code.
1.3 This test does not investigate the toxicity or corrosivity of the products of combustion or decomposition.
1.4 This test does not cover the construction requirements for any cable or the electrical, optical, and other performance requirements for any cable.

3-187 Log #922 NEC-P03 **Final Action: Reject**
(760.53(B)(3))

Submitter: Ray R. Keden, ERICO, Inc. / Rep. BICSI
Comment on Proposal No: 3-278
Recommendation: We ask Panel 3 to re-consider their rejection of the following revision: "Cables installed in vertical runs and penetrating one or more floors ~~more than one floor~~ or cables installed in vertical runs in a shaft shall be Type NPLFR." (No change to the remainder of the section).
Substantiation: Our recommendation will prohibit the installation of non-riser rated cables between floors. Following is additional substantiation:

- One argument for rejection in the Panel 3 discussion was that it should be possible to use General Use Cable in one- and two-family dwellings (e.g., to connect the basement with the ground floor). 800.154 (B)(3) permits this in risers by stating: "Type CM and CMX cable shall be permitted in one- and two-family dwellings".
- The current Code language theoretically permits that a 10-story building is cabled completely with General Use Cable in the riser if the cable is terminated in every floor. Then each cable only connects two floors.
- Panel 16 has accepted a similar proposal (16-179).

Panel Meeting Action: Reject
Panel Statement: The current wording adequately expresses the intent of the panel. No new substantiation has been provided that alters the position of the panel.
The Code requires a riser cable where the cable penetrates more than one floor. If the cable goes from the first floor to the third floor, then a riser cable is required.
A fact finding study should be initiated for the 2014 NEC to determine scientifically if there is any validity of requiring a riser cable be used for every floor penetration rather than multiple floor penetrations. The fire test for riser cables is located in UL 1666, The Standard for Safety Test for Flame Propagation Height of Electrical and Optical Fiber Cables Installed Vertically in Shafts.
It is recommended that the technical correlating committee take note that Panel 16 has accepted this change and correlation may be needed.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

KEDEN, R.: My negative vote pertains to the committee actions on the comments 3-121, 3-122, 3-186, 3-187, 3-200 and 3-201. The proposals and comments to the issue included the technical substantiations and the discussions in CMP-3 have not convinced me or changed my vote.

The panel statement noted that CMP 3 actions to reject proposals 3-201, 3-278 and 3-301, as well as the aforementioned comments result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16).

Different wiring rules in Articles 725 and 760 versus Articles 770,800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to that time, CMP 16 was responsible to Article 725, 760, 770, 800, 810, 820 and 830. Today, there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820 and 830).

However, this issue does not warrant different treatment in my opinion; CMP-3 should have accepted this Comment.

OWEN, S.: My negative vote pertains to the committee action on comments 3-121, 3-122, 3-186, 3-187, 3-200, 3-201 and proposals 3-201, 3-278, 3-301. The panel statement noted that CMP 3 actions to reject these comments and proposals result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP 3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16). Different rules in Articles 725 and 760 versus Articles 770, 800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to the time, CMP 6 was responsible to Article 725, 760, 770, 800, 810, 820, and 830. Today there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820, and 830). I do not believe that this issue warrants different treatment.

WHISTLER, W.: By allowing general purpose cable to be daisy chained from floor to floor, we are circumventing the intended use of this cable, as I can terminate the cable on each floor and then go to the next floor forming a bundle of cables that now create the very thing we are trying to prevent. Riser cable is designed to minimize the spread of fire when penetrating floors and properly installed and general purpose cable was designed for horizontal cabling not vertical.

3-188 Log #1073 NEC-P03 **Final Action: Accept in Principle**
(760.121)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 3-280
Recommendation: The accepted text should be revised to read: "A branch circuit that is used only for fire alarm equipment ~~An individual branch circuit~~ shall be required for the power source." (Remainder unchanged).
Substantiation: The panel statement includes a definition of an individual branch circuit and then says that this individual branch circuit can supply multiple pieces of the same equipment. If the panel interpretation on this point is correct, then I could use one individual branch circuit to supply more than one of anything as long as they are the same. This is a direct contradiction to the definition of individual branch circuit which says "only one utilization equipment." For example, where the fire alarm panel is in one enclosure and the battery charger or other auxiliary power supply or other related equipment is in another, they are often separate items of utilization equipment. A single circuit could be used according to the panel statement of intent, but this circuit is no longer an individual branch circuit. In fact, an identical requirement for NPLFA circuits was also accepted. Literally, since each power supply has to have an "individual branch circuit" many fire alarm panels would require two individual branch circuits since many appliance circuits are NPLFA while PLFA initiating circuits are supplied by the same panel. Apparently the panel is disregarding the definitions of "one" and "utilization equipment." As soon as more than one utilization equipment is connected, the circuit is no longer an individual branch circuit. The panel is correct that there is no definition of "dedicated circuit" even though many proposals have been made to add one. So the panel should say what they mean or accept the Exception in the original proposal to allow more than one item of fire alarm utilization equipment to be supplied by the same circuit. This comment is intended to have the code actually say what the panel said they meant. Alternatively, the panel should accept the revision as proposed in the comment on affirmative by Mr. Ayer. This would eliminate duplicated language in 760-41 and 760-121 and does not use the incorrect term individual branch circuit.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 3-189 which meets the intent of the submitter.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-189 Log #1430 NEC-P03 **Final Action: Accept in Principle**
(760.121)

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 3-280
Recommendation: Revise the panel's action as follows:
(B) Branch Circuit. An individual branch circuit shall be required for the supply of the power source. The location of the branch circuit overcurrent protective device shall be permanently identified at the fire alarm control panel. The circuit disconnecting means shall have a red marking, shall be accessible only to authorized personnel, and shall be identified as "FIRE ALARM CIRCUIT.
Substantiation: NFPA 72 is included by reference in most building codes. This means that, unlike the pattern for referenced documents in the NEC, it is a mandatory part of those building codes. So, if the NEC "permits" fire alarm circuits to be locked on and other codes require it, there will be a direct code conflict.

Having enforced NFPA 72's locking and marking requirements for years, I have seen no problems with them and have found them to be a useful set of requirements. They help to locate the fire alarm circuit. They help keep other wiring off the circuit. They help to keep the vital circuit energized. And, help avoid unnecessary trouble signals.
Panel Meeting Action: Accept in Principle
Revise the panel action of Proposal 3-280 to read as follows:
(B) Branch Circuit. The branch circuit supplying the fire alarm equipment(s) shall supply no other loads. The location of the branch circuit overcurrent protective device shall be permanently identified at the fire alarm control unit. The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified as "FIRE ALARM CIRCUIT." The red identification shall not damage the overcurrent protective devices or obscure the manufacturer's markings. This branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit interrupters.
Panel Statement: Requiring the fire alarm circuit disconnecting means to have red identification was accepted. Information was also added to caution against degrading equipment due to identification. The panel accepted the phrase "is to be identified as FIRE ALARM CIRCUIT". The panel did not accept use of the term "authorized" and instead inserted "qualified" as a defined term.
Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-190 Log #2045 NEC-P03 **Final Action: Accept in Principle**
(760.130(B))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-286
Recommendation: Accept Proposal 3-286.
Substantiation: Jobs are being installed with no bushing on cut lengths of raceway. It is important to require a bushing to prevent damage to conductor insulation. While this may be a redundant requirement, it is a very important requirement.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 3-181.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
STENE, S.: The submitter did not provide any technical substantiation that cables were being damaged where installed as open cables with a transition into a raceway. In addition, Section 300.15(C) requires a fitting be used where the cable enters into a raceway or a sleeve without a transition box but the accepted text in the Comment requires a bushing. Bushings only apply where the conductors emerge from a raceway and enter or terminate at equipment, such as open switchboards, unenclosed control equipment, or similar equipment as noted in Section 300.16(B). A bushing at the end of a raceway may not be appropriate for an installation where EMT is stubbed up through a wall and then used as a sleeve for the cable to enter from the drop ceiling. Based on 300.15(C), a fitting is required where a box is not installed at the transition point, not a bushing.
Adding a requirement for a bushing in a new subsection 760.130(B)(4) is unnecessary since the base requirement in 760.130(B) in the existing NEC already requires compliance for installations of PLFA wiring with 300.15.

3-191 Log #2046 NEC-P03 **Final Action: Reject**
(760.130(B))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-287
Recommendation: Accept Proposal 3-287.
Substantiation: This section does not address raceway fill. The Panel needs to clarify that power-limited cables installed in a short length of raceway (e.g., EMT) used for mechanical support shall or shall not have to meet raceway fill requirements.
Panel Meeting Action: Reject
Panel Statement: Inserting the raceway fill requirement of 300.17 for power-limited cables and individual conductors in 760.3(J), based on the Panel Action in Proposal 3-244 text as amended, will help alleviate the issue of over-filling a raceway and the subsequent pull stress on conductor and cable insulation. Conductor insulation is often stressed during the process of pulling the conductors into the raceway causing ground faults that are registered in the fire alarm equipment as a ground trouble signal.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: Text covering 300.17 is already in 760.46 for non-power-limited fire alarm circuits and in 760.130(A) for power-limited fire alarm systems where using non-power-limited fire alarm wiring methods and materials on the load side of PLFA power sources.

3-192 Log #784 NEC-P03 **Final Action: Reject**
(760.130(B)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-289
Recommendation: Accept the proposal with the following revisions:
(B)(1) In approved raceways, auxiliary gutters, or exposed. Splices and taps shall be made in fittings, boxes, fire alarm system device enclosures, or other approved enclosures. In accordance with 110.3, exposed cables shall be securely fastened to supports by staples, cable ties, straps, hangers or similar fittings designed and installed so as not to damage the cable, at intervals not to exceed 1.4 m (4 1/2 ft) and within 300 mm (12 in.) of terminations.
Where likely to be subject to physical damage, or where installed exposed less than 2.1m (7 ft) above the floor or other standing surface, cables shall be protected by approved means. Exception: Fire alarm cables shall not require intermediate support for that portion fished between access points in concealed locations in finished buildings or other structures and supporting is impractical.
Substantiation: Raceways should be approved for the use so as not to imply "Uses not permitted" is amended. Support requirements are usually specified for wiring methods less critical for safety. The present text says nothing about fished cables.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any substantiation for the questions and issues covered in the Panel Statement in the proposal. Exposed does not apply to individual conductors, only to cables so the proposed change is inappropriate for the application of individual conductors and cables are already covered. "Adequately supported," "adequately protected" and "equivalent" are all providing requirements that an AHJ can use to make a determination of compliance based on the installation. The proposed exception is not required since the existing text in (B)(1) already covers fished cables in a concealed location and fishing individual conductors would not be acceptable. There was no technical substantiation provided for the suggested changes in (B)(2) and standing surface is not explained in the mandatory text or in the substantiation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-193 Log #783 NEC-P03 **Final Action: Reject**
(760.136(F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-293
Recommendation: Accept the proposal with the following revisions:
In hoistways, power-limited fire alarm circuit conductors in approved raceways.
Substantiation: Raceways suitable for the use should be included. FMC and EMT are suitable as FMC and LFNMC.
Panel Meeting Action: Reject
Panel Statement: Replacing rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing with "approved raceways" introduces new material that has not had public review. All raceways must be approved based on 110.2. There was no technical substantiation provided to permit all types of raceways in a hoistway. The raceways permitted in 760.136(F) match the raceways provided for hoistways, based on the reference to 620.21.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-194 Log #2467 NEC-P03 **Final Action: Accept**
(760.142)

Submitter: Edward Walton, WC Services
Comment on Proposal No: 3-295
Recommendation: Support panel reject of this proposal.
Substantiation: Manufacturers are supplying 18 AWG circuit integrity cables qualified for 100 foot vertical applications which comply with 300.19(6) and table 300.19 (see UL FHIT.24). There is no need to limit AWG size.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-195 Log #786 NEC-P03 **Final Action: Reject**
(760.143)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-296
Recommendation: Accept the proposal.
Substantiation: "Strapped" "taped" is covered by "attached by any means" as is "conduit" which is covered by "raceway." The prohibition against support by other wiring methods does not include cables or individual conductors. Does the panel statement that there is no substantiation to include cables and conductors imply fire alarm circuit conductors may be supported by them? The present wording does not permit aerial conductor to be attached to a raceway mast.
Panel Meeting Action: Reject
Panel Statement: No new technical substantiation has been provided to alter the panel's position on the proposal. The requested technical substantiation was not provided.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-196 Log #1918 NEC-P03 **Final Action: Reject**
(760.143)

Submitter: Thomas Guida, TJG Services, Inc.
Comment on Proposal No: 3-297
Recommendation: Accept in Principle the Panel Action with the additional wording as shown:
760.143 Support of Conductors. Power-limited fire alarm circuit conductors shall not be strapped, taped, or attached by any means to the exterior of any conduit or other raceway as a means of support. Vertical installations of circuit integrity (CI) cables installed in a raceway and conductors or cables of electrical circuit protective systems shall be in accordance with 300.19(B)."

Substantiation: The additional phrase, "installed in a raceway", aligns the wording of 760.143 with the wording of 300.19(B).
Panel Meeting Action: Reject
Panel Statement: The panel acted on this issue in the action on Comment 3-164. See panel action and statement on Comment 3-164.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-197 Log #2047 NEC-P03 **Final Action: Reject**
(760.143)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-297
Recommendation: Reject Proposal 3-297.
Substantiation: Installation requirements are part of manufacturer's instructions, UL has detailed installation requirements for electrical circuit protection systems, but nothing specific for cable.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements of 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: This added text and the reference to 300.19 provides appropriate requirements for power-limited circuit integrity cables installed in a raceway, in addition to the conductors and cables installed in electrical circuit protective systems.

3-198 Log #620 NEC-P03 **Final Action: Accept**
(760.154(A))

Submitter: Jarrett Shinoski, CommScope, Inc. / Rep. Insulated Cable Engineers Association, Inc.
Comment on Proposal No: 3-299
Recommendation: Continue to accept Proposal 3-299 in principle by the actions the panel took to permit the use of metal cable trays and metal cable tray systems in other space used for environmental air.
Substantiation: The Insulated Cable Engineers Association supports the panel action clarify that metal cable trays and metal cable tray systems are permitted to be used in other space used for environmental air. These cable trays are commonly used in ceiling plenums and underfloor plenums.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-199 Log #2048 NEC-P03 **Final Action: Reject**
(760.154(A), (B), (C), and (E))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-300
Recommendation: Delete text from 760.154(A), 760.154(B), and 760.154(C).
Add new 760.154(E).
760.154(D) does not change.
760.154 Applications of Listed PLFA Cables.
PLFA cables shall comply with the requirements described in either 760.154(A), (B), or (C) or where cable substitutions are made as shown in 760.154(D) or have suffixes in accordance with 760.154(E) requirements.
(A) Plenum. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type FPLP. Types FPLP, FPLR, and FPL cables installed in compliance with 300.22 shall be permitted. Type FPLP-CI cable ~~shall be permitted to be installed to provide a 2-hour circuit integrity rated cable.~~
(B) Riser. Cables installed in risers shall be as described in either (1), (2), or (3):
(1) Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type FPLR. Floor penetrations requiring Type FPLR shall contain only cables suitable for riser or plenum use. Type FPLR-CI cable shall be permitted to be installed to provide a ~~2-hour circuit integrity rated cable.~~
(2) Other cables shall be installed in metal raceways or located in a fireproof shaft having firestops at each floor.
(3) Type FPL cable shall be permitted in one- and two-family dwellings.
FPN: See 300.21 for firestop requirements for floor penetrations.
(C) Other Wiring Within Buildings. Cables installed in building locations other than those covered in 760.154(A) or (B) shall be as described in either (C)(1), (C)(2), (C)(3), or (C)(4). Type FPL-CI cable shall be permitted to be ~~installed as described in either (C)(1), (C)(2), (C)(3), or (C)(4) to provide a 2-hour circuit integrity rated cable.~~
(1) General. Type FPL shall be permitted.
(2) In Raceways. Cables shall be permitted to be installed in raceways.
(3) Nonconcealed Spaces. Cables specified in Chapter 3 and meeting the requirements of 760.179(A) and (B) shall be permitted to be installed in nonconcealed spaces where the exposed length of cable does not exceed 3 m (10 ft).
(4) Portable Fire Alarm System. A portable fire alarm system provided to protect a stage or set when not in use shall be permitted to use wiring methods in accordance with 530.12.
(E) Power-Limited Cables With Suffix Markings. Power-limited cables with single or multiple suffix markings shall be permitted where required to meet special applications.
(1) Power-Limited Cables or Electrical Circuit Protective System. Power-Limited circuit integrity (CI) cables or a listed electrical circuit protective system shall be permitted for use in fire alarm systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions.
(2) Power-Limited Cables for Wet Locations. Power-limited cables installed in wet locations shall be Types FPL-WET, FPLR-WET, or FPLP-WET.
(3) Power-Limited Cables Exposed to Direct Sunlight. Power-limited Cables installed exposed to direct sunlight shall be Types FPL-SR, FPLR-SR, or FPLP-SR.
(4) Power-Limited Fire Hazard Cables. Power-limited fire hazard cables installed to provide low flame spread, very-low-smoke, and known potential heat release shall be Types FPL-FHC, FPLR-FHC or FPLP-FHC.
(5) Power-Limited Very-Low-Smoke Producing Cables. Power-limited very-low-smoke producing cables installed to provide low flame spread and very-low-smoke emissions shall be Types FPL-50, FPLR-50, or FPLP-50
(6) Power-Limited Cables in Corrosive Locations. Power-limited cables installed where exposed to oil shall be Types FPL-PR, FPLR-PR, or FPLP-PR. Power-limited cables installed where exposed to oil shall be Types FPL-GR, FPLR-GR, or FPLP-GR.
Substantiation: This comment provides the application data missing from the proposal, as noted by Panel 3.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: None of the suggested changes in the proposal or the comment deal with applications; all are dealing with markings more appropriately covered in 760.179. This applications section is designed to provide information where a particular cable can be installed. For example, "a power-limited fire alarm cable listed for wet locations shall be permitted to be installed in an underground installation." The marking requirement would then be located in 760.179 with the installation requirements located in Part III of Article 760. This proposal does not provide any application for any of the proposed cables and there are no installation requirements for these cables. Suffix markings are already permitted on cables based on the listing standards and the product marking guide for UL Category HNIR on page 154 and 155 of the 2009 UL White Book.

3-200 Log #629 NEC-P03 **Final Action: Reject**
(760.154(B)(1))

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 3-301
Recommendation: Reconsider and accept this proposal.
Substantiation: The Communications Cable & Connectivity Association requests that the panel reconsider and accept this proposal.
This proposal in one of a group of similar proposals that were submitted to Panels 3 and 16. The ROP actions were.

Proposal No.	Section	Action
3-201	725.154(B)(1)	Reject
3-278	760.53(B)(3)	Reject
16-62	770.154(B)(1)	Accept in Principle
16-179	800.154(B)(1)	Accept in Principle
16-282	820.154(B)(1)	Accept in Principle
16-338	830.151(B)	Accept in Principle
16-341	830.154(B)(1)	Accept in Principle

We agree with Jerry Dorna's ballot comment:

The current riser requirements are so complicated that they could be considered to be a "vague and unenforceable".

Section 770.154(B)(1) requires that "Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type OFNR or OFCR. Floor penetrations requiring Type OFNR or OFCR shall contain only cables suitable for riser or plenum use". Consequently at least two floor penetrations are required, one for plenum and riser cables and another for general-purpose cables.

The panel action on this proposal greatly simplifies the installation rules for cables in risers in other than one and two-family dwellings. The installation rules for one and two-family dwellings are already simplified since any listed cable is permitted.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 3-186.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

KEDEN, R.: My negative vote pertains to the committee actions on the comments 3-121, 3-122, 3-186, 3-187, 3-200 and 3-201. The proposals and comments to the issue included the technical substantiations and the discussions in CMP-3 have not convinced me or changed my vote.

The panel statement noted that CMP 3 actions to reject proposals 3-201, 3-278 and 3-301, as well as the aforementioned comments result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16).

Different wiring rules in Articles 725 and 760 versus Articles 770,800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to that time, CMP 16 was responsible to Article 725, 760, 770, 800, 810, 820 and 830. Today, there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820 and 830).

However, this issue does not warrant different treatment in my opinion; CMP-3 should have accepted this Comment.

OWEN, S.: My negative vote pertains to the committee action on comments 3-121, 3-122, 3-186, 3-187, 3-200, 3-201 and proposals 3-201, 3-278, 3-301. The panel statement noted that CMP 3 actions to reject these comments and proposals result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP 3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16). Different rules in Articles 725 and 760 versus Articles 770, 800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to the time, CMP 6 was responsible to Article 725, 760, 770, 800, 810, 820, and 830. Today there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820, and 830). I do not believe that this issue warrants different treatment.

3-201 Log #923 NEC-P03 **Final Action: Reject**
(760.154(B)(1))

Submitter: Ray R. Keden, ERICO, Inc. / Rep. BICSI
Comment on Proposal No: 3-301
Recommendation: We ask Panel 3 to re-consider their rejection of the following revision:
"Cables installed in vertical runs and penetrating one or more floors ~~more than one floor~~, or cables installed in vertical runs in a shaft, shall be Type FPLR. Floor penetrations requiring Type FPLR shall contain only cables suitable for riser or plenum use. Type FPLR-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable."
Substantiation: Our recommendation will prohibit the installation of non-riser rated cables between floors. Following is additional substantiation:

- One argument for rejection in the Panel 3 discussion was that it should be possible to use General Use Cable in one- and two-family dwellings (e.g., to connect the basement with the ground floor). 800.154 (B)(3) permits this in risers by stating: "Type CM and CMX cable shall be permitted in one- and two-family dwellings".
- The current Code language theoretically permits that a 10-story building is cabled completely with General Use Cable in the riser if the cable is terminated in every floor. Then each cable only connects two floors.
- Panel 16 has accepted a similar proposal (16-179).

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 3-187.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

KEDEN, R.: My negative vote pertains to the committee actions on the comments 3-121, 3-122, 3-186, 3-187, 3-200 and 3-201. The proposals and comments to the issue included the technical substantiations and the discussions in CMP-3 have not convinced me or changed my vote.

The panel statement noted that CMP 3 actions to reject proposals 3-201, 3-278 and 3-301, as well as the aforementioned comments result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16).

Different wiring rules in Articles 725 and 760 versus Articles 770,800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to that time, CMP 16 was responsible to Article 725, 760, 770, 800, 810, 820 and 830. Today, there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820 and 830).

However, this issue does not warrant different treatment in my opinion; CMP-3 should have accepted this Comment.

OWEN, S.: My negative vote pertains to the committee action on comments 3-121, 3-122, 3-186, 3-187, 3-200, 3-201 and proposals 3-201, 3-278, 3-301. The panel statement noted that CMP 3 actions to reject these comments and proposals result in different wiring rules for Types CL2R, CL3R, NPLFR and FPLR (which are under the purview of CMP 3), and OFNR, OFCR, CMR, CATVR, BLR and BMR (which are under the purview of CMP 16). Different rules in Articles 725 and 760 versus Articles 770, 800, 820 and 830 are to be expected, and presumably were anticipated when the TCC and the Standards Council, three code cycles ago, reassigned responsibility for Article 725 and 760 to CMP 3. Prior to the time, CMP 6 was responsible to Article 725, 760, 770, 800, 810, 820, and 830. Today there are numerous differences between CMP 3's articles (725 and 760) and CMP 16's articles (770, 800, 820, and 830). I do not believe that this issue warrants different treatment.

3-202 Log #1337 NEC-P03 **Final Action: Accept**
(760.154(E) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-300
Recommendation: *Continue rejecting this proposal.*
Substantiation: The proposal introduces terms that are associated with fire testing/fire performance and are not defined anywhere. Therefore, not only does no application exist (as CMP 3 correctly pointed out) but no organization has developed criteria for such fire performance.

Non power limited fire alarm cables in the NEC can be listed as complying with one of the following 3 categories: NPLFP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), NPLFR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), and NPLF (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581).

Nowhere does a definition exist for "very-low-smoke producing cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable.

Nowhere does a definition exist for "fire hazard cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-203 Log #630 NEC-P03 **Final Action: Accept**
(760.176(C), FPN)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 3-304
Recommendation: Continue to reject this proposal.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel action to reject this proposal and recommends that the panel continue to reject it.

A fine print note giving information on fire testing of plenum cable has been in the NEC since the 1984 edition. It has undergone only minor editorial changes since 1984. It provides extremely useful to cable manufacturers. The proposed change would remove essential information.
Panel Meeting Action: Accept
Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-204 Log #631 NEC-P03 **Final Action: Accept**
(760.176(C), FPN)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 3-306
Recommendation: Continue to reject this proposal.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel that this FPN information is valuable for the user of the code and the user should not have to go back to an annex to find it.

We also support the panel in rejecting similar Proposals 3-308, 3-310, 3-311, 3-325, 3-327, 3-329, 3-330 and 3-332, all for Article 760.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-205 Log #731 NEC-P03 **Final Action: Accept in Part**
(760.176(C), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-304
Recommendation: The Proposal should have been Accepted in Principle, revised and the following words "and Annex A Explanatory Material" added after "NFPA 262-2007" so the revised text reads as follows:
~~FPN~~ Informational Note: One method of defining low smoke-producing cable and fire-resistant cable is ~~by establishing an acceptable value of the smoke produced when tested in accordance with~~ described in NFPA 262-2007, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, and Annex A Explanatory Material. ~~, to a maximum peak optical density of 0.5 and a maximum average optical density of 0.15. Similarly, one method of defining fire-resistant cables is by establishing a maximum allowable flame travel distance of 1.52 m (5 ft) when tested in accordance with the same test.~~
Substantiation: The FPN does not provide "information on various methods of defining smoke producing cables or fire-resistant cables". It refers to a single test method and defines the maximum values, which are not specified in the body of NFPA 262. Inclusion of the maximum values in the FPN are requirements and this violates 3.1.3 of the NEC Style Manual.

NFPA 262 defines the Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces but it does not specify any pass/fail criteria.

While the values specified for maximum peak optical density, maximum average optical density, and maximum allowable flame travel distance in the FPN are not included in the body of NFPA 262, they are contained in Annex A Explanatory Material. Addition of the words "and Annex A Explanatory Material" will reference the maximum values that are in the FPN and the proposed revised FPN will comply with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefore is not mandatory text. The submitter has provided new text that has not received public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-206 Log #1328 NEC-P03 **Final Action: Accept in Principle**
(760.176(C), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-305
Recommendation: 760.176 Listing and Marking of NPLFA Cables.
Non–power-limited fire alarm cables installed as wiring within buildings shall be listed in accordance with 760.176(A) and (B) and as being resistant to the spread of fire in accordance with 760.176(C) through (F), and shall be marked in accordance with 760.176(G). Cable used in a wet location shall be listed for use in wet locations or have a moisture impervious metal sheath.

(C) Type NPLFP. Type NPLFP non–power-limited fire alarm cable for use in other space used for environmental air shall be listed as being suitable for use in other space used for environmental air as described in 300.22(C) and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN: One method of defining low smoke producing and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.
Substantiation: Retain the FPN as written by CMP 3, but only if the FPNs from CMP 16 are changed to the same language. This comment is being written just in case CMP 3 is unwilling to change to existing NEC language.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-207 which meets the intent of the submitter.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-207 Log #1329 NEC-P03 **Final Action: Accept**
(760.176(C), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-305
Recommendation: 760.176 Listing and Marking of NPLFA Cables.
Non–power-limited fire alarm cables installed as wiring within buildings shall be listed in accordance with 760.176(A) and (B) and as being resistant to the spread of fire in accordance with 760.176(C) through (F), and shall be marked in accordance with 760.176(G). Cable used in a wet location shall be listed for use in wet locations or have a moisture impervious metal sheath.

(C) Type NPLFP. Type NPLFP non–power-limited fire alarm cable for use in other space used for environmental air shall be listed as being suitable for use in other space used for environmental air as described in 300.22(C) and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

~~FPN: One method of defining low smoke-producing and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.~~

FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.
Substantiation: This comment is intended to bring consistency to the NEC. In Articles 770, 800, 820 and 830, the FPN is worded as this comment (and the original proposal) recommends. The original proposal was already made in the 2005 and 2008 NEC cycles, but was caught up in the "plenum cable moratorium" in the opinion of CMP 3 but not of CMP 16. This wording also follows the requirements of the preceding section, which requires that the cable be listed as having both "adequate fire-resistant and low smoke-producing characteristics". The wording of the panel (although adequate also) does not explain what is needed to define a cable that is a "low smoke-producing and fire-resistant cable" by omitting the words "a cable that is".

With regard to the comment by Mr. Ayers, I agree with him, but the (incorrect) use of the term "fire-resistant cable" is consistent in not just the FPNs in all 6 relevant articles (725, 760, 770, 800, 820 and 830) but is also consistent with the use in the charging paragraph.

If CMP 3 and CMP 16 would both like to eliminate the term "fire-resistant cable", consistently in all locations, and replace it by a term such as "low flame spread cable", that would be an excellent idea, but it does require consistency (and probably a task group of both panels). In the meantime the use of the term "fire-resistant cable" is necessary to correlate with the charging paragraph.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-208 Log #2049 NEC-P03 **Final Action: Accept in Principle**
(760.176(C), FPN)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-305
Recommendation: Accept Proposal 3-306 without change.
Substantiation: The FPN text in Dr. Hirschler's proposal is identical to the text in Articles 770, 800, 820, & 830.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-207 which meets the intent of the submitter.
Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-209 Log #2828 NEC-P03 **Final Action: Reject**
(760.176(C), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-306
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-210 Log #732 NEC-P03 **Final Action: Accept in Part**
(760.176(D), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-307
Recommendation: The Proposal should be Accepted in Principle and revised as follows:
~~FPN~~ Informational Note: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the cables pass~~ ANSI/UL 1666-2002, *Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts.*
Substantiation: The existing phrase "…cables pass…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefore is not mandatory text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-211 Log #2829 NEC-P03 **Final Action: Reject**
(760.176(D), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-308
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-212 Log #733 NEC-P03 **Final Action: Accept in Part**
(760.176(E), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-309
Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:
~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray in~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.
Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
Substantiation: Acceptance of the revised wording shown above will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPN's not contain requirements. The pass/fail criteria are already defined in those two standards.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefore is not mandatory text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-213 Log #2830 NEC-P03 **Final Action: Reject**
(760.176(E), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-310
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-214 Log #734 NEC-P03 **Final Action: Accept in Part**
(760.176(F), FPN No. 2)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-312
Recommendation: The Proposal should be Accepted in Principle and reworded as follows:
~~FPN~~ Informational Note No. 2: One method of defining circuit integrity (CI) cable is ~~by establishing a minimum 2-hour fire resistance rating for the cable when tested~~ described in ~~accordance with~~ UL 2196-2002, *Standard for Tests of Fire Resistive Cables*.
Substantiation: Acceptance of the revised wording shown above will still provide the user with a reference to a method of defining "circuit integrity" and also comply with the NEC Style Manual that FPN's not contain requirements. The pass/fail criteria is already defined in the standard.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part

The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefore is not mandatory text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-215 Log #2831 NEC-P03 **Final Action: Reject**
(760.176(F), FPN 1)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-311
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-216 Log #2832 NEC-P03 **Final Action: Reject**
(760.176(F), FPN 2)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-313
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-217 Log #2050 NEC-P03 **Final Action: Reject**
(760.176(G))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-314
Recommendation: Accept Proposal 3-314.
Substantiation: The temperature requirements provide equivalency to Article 310.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-218 Log #2051 NEC-P03 **Final Action: Reject**
(760.176(H) and FPN (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-315
Recommendation: Accept the proposal and add a new PFN as follows:
(H) Non-Power-Limited Fire Alarm Cables Exposed to Oil or Gas. Non-power-limited fire alarm cables installed where exposed to oil or oil and gas shall be listed as suitable for those locations. Cables specified in 760.53 and installed locations exposed to oil or gas shall have the additional classification using the following suffixes: "-PR" for oil resistant, and "-GR" for gasoline and oil resistant.
FPN: One method of defining corrosion resistance is testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*
Substantiation: Presently, there is no marking that identifies which non-power-limited fire alarm cables are suitable for installation where exposed to oil or gas. It is important to have the correct cable for locations that have the potential to degrade cable and conductor insulation and cause system malfunction.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-219 Log #2052 NEC-P03 **Final Action: Reject**
(760.176(I) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-316
Recommendation: Accept Proposal 3-316 as revised below.
(I) Conductors and Cables in Wet Locations. Cables specified in 760.176(C, (D), and (E) shall be listed for installation in wet locations or shall have a moisture-impervious metal sheath and shall be Type NPLFP-WET, NPLFR-WET, or NPLF-WET.
(a) Conductors and cables installed in dry location shall not be required to have an additional suffix marking.
(b) Conductors and cables suitable for installation in wet locations shall be identified with the suffix "-WET". Conductors and cables listed for damp locations shall be suitable for installation in dry or damp locations. FPN: One method of defining suitability for installation in wet locations is by testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*
Substantiation: This comment provides listing requirements for cables in wet locations to correlate with the application requirements.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-220 Log #2053 NEC-P03 **Final Action: Reject**
(760.176(J))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-317
Recommendation: Accept Proposal 3-317.
Substantiation: This comment provides listing requirements for cables to correlate with the application requirements.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-221 Log #2054 NEC-P03 **Final Action: Reject**
(760.176(K) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-318
Recommendation: Accept Proposal 3-318.
Substantiation: Critical requirements need to be in the NEC. Right now users are clueless as to the temperature rating of cables, as the NEC provide no requirements.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: Marking requirements for cable temperatures in excess of 60 C is already covered by the UL product standard UL 1425, covering non-power-limited fire alarm cables. These cables are available based on the standard requirements for temperatures up to 250 C or 482 F. Where an application occurs with a temperature in excess of 140 F, a corresponding cable requirement would be to install a cable with a high enough temperature rating for the ambient temperature. Non-power-limited fire alarm cables would have very limited exposure to higher than normal ambient temperature and would certainly be installed in a very limited length in a metal wiring method within a fabricated duct based on 300.22(B)

Non-power-limited fire alarm cables are intended for use and tested for an operating temperature of 60 C, unless a higher temperature rating is marked on the cable. Section 1.1 of UL 1425 reads as follows: "This Standard states the construction, test, and marking requirements covering the safety of electrical and electrical/optical-fiber cables rated 60°C to 250°C and intended for 150-volt and lower-potential non-power-limited circuits that are controlled and powered by a fire-alarm system."

Where a high ambient temperature is encountered in the installation of non-power-limited fire alarm cables and conductors, higher temperature cables can be required, obtained, and installed. There was no technical substantiation provided to justify adding this requirement to the NEC.

Where a low ambient temperature is encountered, non-power-limited fire alarm cables can be purchased that have been subjected to a cold bend test to ensure bending capability for cold temperatures down to minus 70 C, however, this is not an installation temperature; it is an application temperature. Once the cable has been installed and connected, there would not normally be any bending of the conductor insulation. Again, the standard provides testing for this but there has been no substantiation provided to insert this into the NEC. In addition, the phrase the `lowest permitted temperature' does not have any meaning in an installation document such as the NEC.

3-222 Log #1338 NEC-P03 **Final Action: Accept**
(760.176(L) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-319
Recommendation: *Continue rejecting this proposal.*
Substantiation: The proposal introduces a definition of a term that is associated with fire testing/fire performance and is not defined anywhere. Therefore, not only does no application exist (as CMP 3 correctly pointed out) but no organization has developed criteria for such fire performance.

Non power limited fire alarm cables in the NEC can be listed as complying with one of the following 3 categories: NPLFP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), NPLFR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666) and NPLF (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581).

Nowhere does a definition exist for "very-low-smoke producing cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable. The proposed fire properties recommended for such a listing do not correspond to any listing developed by a nationally recognized listing organization, even when optional listings are taken into account. UL has developed UL Subject 2424, "Outline of Investigation for Cable Marked "Limited Combustible", which contains a set of listing criteria for which no application exists, but this document requires that cables also be tested in accordance with NFPA 259.

Cables listed to UL 2424 are already allowed by NFPA 90A to be used anywhere that plenum cables are required.

Both NFPA 90A and the mechanical codes (the IMC, International Mechanical Code, and the UMC, Uniform Mechanical Code) have requirements of 25/50 (flame spread index/smoke developed index, in accordance with ASTM E 84) for materials in plenums other than wires and cables (and some other materials). NFPA 13 (sprinkler standard) also made it clear that the use of plenum cables in plenums does not even introduce a fire hazard sufficient to require installation of sprinklers.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-223 Log #2055 NEC-P03 **Final Action: Reject**
(760.176(L) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-319
Recommendation: Accept Proposal 3-319.
Substantiation: There are cables available that would pass the UL 723 test, but it would be foolish for a manufacturer to submit a product for testing, as there is no marking available to differentiate a very low smoke cable from smoky cable.
Panel Meeting Action: Reject
Panel Statement: No new substantiation has been provided to change the position of the panel.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

STENE, S.: Based on the lack of any applications provided in proposals for 760.53(B), other than marking requirements, for dry, damp, wet, sunlight resistance, corrosive locations, very low smoke producing cables, and fire hazard cables, acceptance of listing requirements for these cables cannot be accepted in 760.176. In addition, nothing has been added covering these different cable types to the installation requirements in Part II of Article 760. Previous proposals by this submitter were provided to 760.3 for dry, damp, wet, sunlight resistance, corrosive locations, very low smoke producing cables, and fire hazard cables, to require compliance with 760.53(B) without any application information and no installation requirements.

3-224 Log #1339 NEC-P03 **Final Action: Accept**
(760.176(M) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-320
Recommendation: *Continue rejecting this proposal.*
Substantiation: The proposal introduces a definition of a term that is associated with fire testing/fire performance and is not defined anywhere. Therefore, not only does no application exist (as CMP 3 correctly pointed out) but no organization has developed criteria for such fire performance.

Non power limited fire alarm cables in the NEC can be listed as complying with one of the following 3 categories: NPLFP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), NPLFR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), and NPLF (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581).

Nowhere does a definition exist for "fire hazard cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable. The proposed fire properties recommended for such a listing do not correspond to any listing developed by a nationally recognized listing organization, even when optional listings are taken into account. UL has developed UL Subject 2424, "Outline of Investigation for Cable Marked "Limited Combustible", which contains a set of listing criteria for which no application exists, but this document requires that cables also be tested in accordance with UL 723 after oven aging.

Cables listed to UL 2424 are already allowed by NFPA 90A to be used anywhere that plenum cables are required.

Both NFPA 90A and the mechanical codes (the IMC, International Mechanical Code, and the UMC, Uniform Mechanical Code) have requirements of 25/50 (flame spread index/smoke developed index, in accordance with ASTM E 84) for materials in plenums other than wires and cables (and some other materials). NFPA 13 (sprinkler standard) also made it clear that the use of plenum cables in plenums does not even introduce a fire hazard sufficient to require installation of sprinklers.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-225 Log #2056 NEC-P03 **Final Action: Reject**
(760.176(M) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-320
Recommendation: Accept Proposal 3-320.
Substantiation: There are cables listed that meet UL 2424. Cables with the characteristics tested by UL 2424 are identified in NFPA 90A.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements of 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

STENE, S.: See the affirmative statement in Comment 3-223.

3-226 Log #1340 NEC-P03 **Final Action: Accept**
(760.179)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-322
Recommendation: *Continue rejecting this proposal.*
Substantiation: The proposal introduces terms that are associated with fire testing/fire performance and are not defined anywhere. Therefore, not only does no application exist (as CMP 3 correctly pointed out) but no organization has developed criteria for such fire performance.

Power limited fire alarm cables in the NEC can be listed as complying with one of the following 3 categories: FPLP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), FPLR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), and FPL (i.e. cables listed as general purpose, or tray, cables and that comply with the

requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581).

Nowhere does a definition exist for "very-low-smoke producing cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable.

Nowhere does a definition exist for "fire hazard cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-227 Log #2057 NEC-P03 **Final Action: Reject**
(760.179)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-322
Recommendation: Accept Proposal 3-322.
Substantiation: Acceptance of the proposal provides correlation with the application and listing of cables with suffix markings.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

STENE, S.: Based on the lack of any applications provided in proposals for 760.154, other than marking requirements, for dry, damp, wet, sunlight resistance, corrosive locations, very low smoke producing cables, and fire hazard cables, acceptance of listing requirements for these cables cannot be accepted in 760.179. In addition, nothing has been added covering these different cable types to the installation requirements in Part III of Article 760. Previous proposals by this submitter were provided to 760.3 for dry, damp, wet, sunlight resistance, corrosive locations, very low smoke producing cables, and fire hazard cables, to require compliance with 760.154 without any application information and no installation requirements.

3-228 Log #735 NEC-P03 **Final Action: Accept in Part**
(760.179(D), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-323
Recommendation: The Proposal should have been Accepted in Principle, revised and the following words "and Annex A Explanatory Material" added after "NFPA 262-2007" so the revised text reads as follows:
~~FPN~~ Informational Note: One method of defining low smoke-producing cable and fire-resistant cable is ~~by establishing an acceptable value of the smoke produced when tested in accordance with~~ described in NFPA 262-2007, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, and Annex A Explanatory Material. ~~, to a maximum peak optical density of 0.5 and a maximum average optical density of 0.15. Similarly, one method of defining fire-resistant cables is by establishing a maximum allowable flame travel distance of 1.52 m (5 ft) when tested in accordance with the same test.~~
Substantiation: The FPN does not provide "information on various methods of defining smoke producing cables or fire-resistant cables". It refers to a single test method and defines the maximum values, which are not specified in the body of NFPA 262. Inclusion of the maximum values in the FPN are requirements and this violates 3.1.3 of the NEC Style Manual.

NFPA 262 defines the Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces but it does not specify any pass/fail criteria.

While the values specified for maximum peak optical density, maximum average optical density, and maximum allowable flame travel distance in the FPN are not included in the body of NFPA 262, they are contained in Annex A Explanatory Material. Addition of the words "and Annex A Explanatory Material" will reference the maximum values that are in the FPN and the proposed revised FPN will comply with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part

The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefore is not mandatory text. The submitter has provided new text that has not received public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-229 Log #1330 NEC-P03 **Final Action: Accept in Principle**
(760.179(D), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-324
Recommendation: 760.179 Listing and Marking of PLFA Cables and Insulated Continuous Line-Type Fire Detectors. PLFA cables installed as wiring within buildings shall be listed as being resistant to the spread of fire and other criteria in accordance with 760.179(A) through (H) and shall be marked in accordance with 760.179(I). Insulated continuous line-type fire detectors shall be listed in accordance with 760.179(J). Cable used in a wet location shall be listed for use in wet locations or have a moisture-impervious metal sheath.

(D) Type FPLP. Type FPLP power-limited fire alarm plenum cable shall be listed as being suitable for use in ducts, plenums, and other space used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN: One method of defining low smoke producing and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.
Substantiation: Retain the FPN as written by CMP 3, but only if the FPNs from CMP 16 are changed to the same language. This comment is being written just in case CMP 3 is unwilling to change to existing NEC language.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-230 which addresses the submitter's concerns.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-230 Log #1331 NEC-P03 **Final Action: Accept**
(760.179(D), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-324
Recommendation: 760.179 Listing and Marking of PLFA Cables and Insulated Continuous Line-Type Fire Detectors. PLFA cables installed as wiring within buildings shall be listed as being resistant to the spread of fire and other criteria in accordance with 760.179(A) through (H) and shall be marked in accordance with 760.179(I). Insulated continuous line-type fire detectors shall be listed in accordance with 760.179(J). Cable used in a wet location shall be listed for use in wet locations or have a moisture-impervious metal sheath.

(D) Type FPLP. Type FPLP power-limited fire alarm plenum cable shall be listed as being suitable for use in ducts, plenums, and other space used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

~~FPN: One method of defining low smoke producing and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.~~

FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.
Substantiation: This comment is intended to bring consistency to the NEC. In Articles 770, 800, 820 and 830, the FPN is worded as this comment (and the original proposal) recommends. The original proposal was already made in the 2005 and 2008 NEC cycles, but was caught up in the "plenum cable moratorium" in the opinion of CMP 3 but not of CMP 16. This wording also follows the requirements of the preceding section, which requires that the cable be listed as having both "adequate fire-resistant and low smoke-producing characteristics". The wording of the panel (although adequate also) does not explain what is needed to define a cable that is a "low smoke-producing and fire-resistant cable" by omitting the words "a cable that is".

With regard to the comment by Mr. Ayers, I agree with him, but the (incorrect) use of the term "fire-resistant cable" is consistent in not just the

FPNs in all 6 relevant articles (725, 760, 770, 800, 820 and 830) but is also consistent with the use in the charging paragraph.

If CMP 3 and CMP 16 would both like to eliminate the term "fire-resistant cable", consistently in all locations, and replace it by a term such as "low flame spread cable", that would be an excellent idea, but it does require consistency (and probably a task group of both panels). In the meantime the use of the term "fire-resistant cable" is necessary to correlate with the charging paragraph.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-231 Log #2014 NEC-P03 **Final Action: Accept in Principle**
(760.179(D), FPN)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-324
Recommendation: Accept Proposal 3-324.
Substantiation: The text in Dr. Hirschler's proposal is identical to text in Articles 770, 800, 820, & 830.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-230 which addresses the submitter's concerns.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-232 Log #2833 NEC-P03 **Final Action: Reject**
(760.179(D), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-325
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-233 Log #736 NEC-P03 **Final Action: Accept in Part**
(760.179(E), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-326
Recommendation: The Proposal should be Accepted in Principle and revised as follows:
~~FPN~~ Informational Note: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the cables pass the requirements of~~ ANSI/UL 1666-2002, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts.*
Substantiation: The existing phrase "…cables pass the requirements of…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Accept in Part

The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.

Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefore is not mandatory text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-234 Log #2834 NEC-P03 **Final Action: Reject**
(760.179(E), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-327
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-235 Log #737 NEC-P03 **Final Action: Accept in Part**
(760.179(F), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-328
Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:
~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray in~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.

Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
Substantiation: Acceptance of the revised wording shown above will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPN's not contain requirements. The pass/fail criteria are already defined in those two standards.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Accept in Part

The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.

Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefore is not mandatory text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-236 Log #2835 NEC-P03 **Final Action: Reject**
(760.179(F), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-329
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-237 Log #738 NEC-P03 **Final Action: Accept in Part**
(760.179(G), FPN No. 2)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-331
Recommendation: The Proposal should be Accepted in Principle and reworded as follows:
~~FPN~~ Informational Note No. 2: One method of defining circuit integrity (CI) cable is ~~by establishing a minimum 2-hour fire resistance rating for the cable when tested~~ described in ~~accordance with~~ UL 2196-2002, *Standard for Tests of Fire Resistive Cables*.
Substantiation: Acceptance of the revised wording shown above will still provide the user with a reference to a method of defining "circuit integrity" and also comply with the NEC Style Manual that FPNs not contain requirements. The pass/fail criteria is already defined in the standard.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Accept in Part
The panel accepts the change "FPN" to "Informational Note" and rejects the remainder of the recommendation.
Panel Statement: The text proposed for deletion can be used to support the requirement. The explanatory material in this informational note is one method and not the only method of defining this cable and therefore is not mandatory text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-238 Log #2836 NEC-P03 **Final Action: Reject**
(760.179(G), FPN 1)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-330
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-239 Log #2838 NEC-P03 **Final Action: Reject**
(760.179(G), FPN 2)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-330
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-240 Log #2058 NEC-P03 **Final Action: Reject**
(760.179(I))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-333
Recommendation: Accept Proposal 3-333.
Substantiation: The goal is to have requirements equivalent to the tables in Article 310.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: See my affirmative statement in Comment 3-221.

3-241 Log #2059 NEC-P03 **Final Action: Reject**
(760.179(K) and FPN (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-334
Recommendation: Add new 760.179(K) and FPN as follows:
(K) Power-Limited Fire Alarm Cables Installed Exposed to Oil or Gas. Power-limited fire alarm cables installed where exposed to oil or gas and oil shall have the additional classification using the following suffixes "-PR" for oil resistant, and "-GR" for gasoline and oil resistant.
FPN: One method of defining corrosion resistance is testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*
Substantiation: There is a companion comment to establish application requirements.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: Based on the lack of any applications provided in proposals for 760.154, other than marking requirements, for dry, damp, wet, sunlight resistance, corrosive locations, very low smoke producing cables, and fire hazard cables, acceptance of listing requirements for these cables cannot be accepted in 760.179. In addition, nothing has been added covering these different cable types to the installation requirements in Part III of Article 760. Previous proposals by this submitter were provided to 760.3 for dry, damp, wet, sunlight resistance, corrosive locations, very low smoke producing cables, and fire hazard cables, to require compliance with 760.154 without any application information and no installation requirements. There is no prohibition in the NEC for additional suffix marking so cables are already permitted to be marked to indicate their optional ratings.
Corrosive locations include more than gas or oil exposure without any technical information provided for the additional corrosive issues. The installer and inspector should rely on listing standard, UL1424 Cables for Power-Limited Fire Alarm Cable, to define markings with this information readily available in the UL White Book on page 30 and 31 in the Wiring and Cable Marking Guide.

3-242 Log #2060 NEC-P03 **Final Action: Reject**
(760.179(L) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-335
Recommendation: Add new 760.179(L).
(L) Conductors and Cables in Wet Locations. Cables specified in 760.(179)(D), (E), and (F) shall be listed for installation in wet locations or shall have a moisture-impervious metal sheath and shall be marked with a suffix as required in 760.179(a) or (b).
(a) Conductors and cables installed in dry location shall not be required to have an additional suffix marking.
(c) Conductors and cables suitable for installation in wet locations shall be identified with the suffix "-WET". Conductors and cables listed for damp locations shall be suitable for installation in dry or damp locations. FPN: One method of defining suitability for installation in wet locations is by testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*
Substantiation: There is a companion comment to establish application requirements.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

Comment on Affirmative:
STENE, S.: See my affirmative statement in Comment 3-241.

3-243 Log #2061 NEC-P03 **Final Action: Reject**
(760.179(M) and FPN (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-336
Recommendation: Add new 760.179(M) and FPN as follows:
(M) Conductors and Cables Exposed to Direct Sunlight. Cables specified in 760.179(D), (E), and (F) installed exposed to direct sunlight shall be listed and shall be marked with the suffix "-SR".
FPN: One method of defining corrosion resistance is testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*
Substantiation: There is a companion comment to establish application requirements.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: See my affirmative statement in Comment 3-241.

3-244 Log #2062 NEC-P03 **Final Action: Reject**
(760.179(N) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-337
Recommendation: Accept Proposal 3-337.
Substantiation: It is important to establish temperature requirements in the NEC as a significant benefit to uses of the NEC and testing laboratories around the world.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: See my affirmative statement in Comment 3-241.

3-245 Log #1341 NEC-P03 **Final Action: Accept**
(760.179(O) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-338
Recommendation: *Continue rejecting this proposal.*
Substantiation: The proposal introduces a definition of a term that is associated with fire testing/fire performance and is not defined anywhere. Therefore, not only does no application exist (as CMP 3 correctly pointed out) but no organization has developed criteria for such fire performance.

Power limited fire alarm cables in the NEC can be listed as complying with one of the following 3 categories: FPLP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), FPLR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), and FPL (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581).

Nowhere does a definition exist for "very-low-smoke producing cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable. The proposed fire properties recommended for such a listing do not correspond to any listing developed by a nationally recognized listing organization, even when optional listings are taken into account. UL has developed UL Subject 2424, "Outline of Investigation for Cable Marked "Limited Combustible", which contains a set of listing criteria for which no application exists, but this document requires that cables also be tested in accordance with NFPA 259.

Cables listed to UL 2424 are already allowed by NFPA 90A to be used anywhere that plenum cables are required.

Both NFPA 90A and the mechanical codes (the IMC, International Mechanical Code, and the UMC, Uniform Mechanical Code) have requirements of 25/50 (flame spread index/smoke developed index, in accordance with ASTM E 84) for materials in plenums other than wires and cables (and some other materials). NFPA 13 (sprinkler standard) also made it clear that the use of plenum cables in plenums does not even introduce a fire hazard sufficient to require installation of sprinklers.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-246 Log #2063 NEC-P03 **Final Action: Reject**
(760.179(O) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-338
Recommendation: Accept Proposal 3-338.
Substantiation: There are cables available that would pass the UL 723 test, but it would be foolish for a manufacturer to submit a product for testing, as there is no marking available to differentiate a very los smoke cable from smoky cable.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
STENE, S.: Based on the lack of any applications provided in proposals for 760.53(B), other than marking requirements, for dry, damp, wet, sunlight resistance, corrosive locations, very low smoke producing cables, and fire hazard cables, acceptance of listing requirements for these cables cannot be accepted in 760.176. In addition, nothing has been added covering these different cable types to the installation requirements in Part II of Article 760. Previous proposals by this submitter were provided to 760.3 for dry, damp, wet, sunlight resistance, corrosive locations, very low smoke producing cables, and fire hazard cables, to require compliance with 760.53(B) without any application information and no installation requirements.

3-247 Log #1342 NEC-P03 **Final Action: Accept**
(760.179(P) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-339
Recommendation: *Continue rejecting this proposal.*
Substantiation: The proposal introduces a definition of a term that is associated with fire testing/fire performance and is not defined anywhere. Therefore, not only does no application exist (as CMP 3 correctly pointed out) but no organization has developed criteria for such fire performance.

Power limited fire alarm cables in the NEC can be listed as complying with one of the following 3 categories: FPLP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), FPLR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), and FPL (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581).

Nowhere does a definition exist for "fire hazard cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable. The proposed fire properties recommended for such a listing do not correspond to any listing developed by a nationally recognized listing organization, even when optional listings are taken into account. UL has developed UL Subject 2424, "Outline of Investigation for Cable Marked "Limited Combustible", which contains a set of listing criteria for which no application exists, but this document requires that cables also be tested in accordance with UL 723 after oven aging.

Cables listed to UL 2424 are already allowed by NFPA 90A to be used anywhere that plenum cables are required.

Both NFPA 90A and the mechanical codes (the IMC, International Mechanical Code, and the UMC, Uniform Mechanical Code) have requirements of 25/50 (flame spread index/smoke developed index, in accordance with ASTM E 84) for materials in plenums other than wires and cables (and some other materials). NFPA 13 (sprinkler standard) also made it clear that the use of plenum cables in plenums does not even introduce a fire hazard sufficient to require installation of sprinklers.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

3-248 Log #2064 NEC-P03 **Final Action: Reject**
(760.179(P) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 3-339
Recommendation: Accept Proposal 3-339.
Substantiation: There are cables listed that meet UL 2424. Cables with the characteristics tested by UL 2424 are identified in NFPA 90A.
Panel Meeting Action: Reject
Panel Statement: This information is found in the listing requirements for 110.3(B).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

Comment on Affirmative:
STENE, S.: See my affirmative statement in Comment 3-246.

ARTICLE 770 — OPTICAL FIBER CABLES AND RACEWAYS

16-2 Log #1267 NEC-P16 **Final Action: Accept in Principle**
(770)

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 16-29
Recommendation: I highly encourage CMP-16 to accept this proposal in principle and accept the coordinated set of comments that provide the completed revisions throughout Article 770.
Substantiation: This comment responds to action by CMP-5 to delete the term "grounding conductor" and revise the term "grounding electrode conductor." Two definitions that apply to a conductive path in the grounding scheme that functions as a grounding electrode conductor are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 770. The coordinated comments actually even correct misuse of grounding terms in a few locations that existed for a few cycles.

CMP-5 has responsibilities for defined grounding and bonding terms (Code wide). These proposed revisions are technically correct and result in grounding and bounding terms being used consistently with how they are defined. The term "grounding conductor" is too broad and has been part of a planned migration for removal since the 2005 edition. This planned revision is part of a larger plan implemented by the NEC-2008 TCC assigned grounding and bonding task group work. The grounding and bonding concepts are simple. If grounding happens, a connection is made to an electrode by use of a grounding electrode conductor. Bonding connected conductive parts to establish continuity and conductivity between them. The proposed revisions do not change anything technically in the article: they only make the use of grounding terms consistent with how they are defined, improving the current text. The only change proposed is in use of terms. All other rules such as sizing, installation and so forth remain as specified in this article as before.

Not accepting the proposed revisions shows a deliberate action to allow continued inconsistency and subjectivity to remain in the NEC. CMP-5 actions have deleted the term "grounding conductor" from Article 100 and revised the term "grounding electrode conductor" to work consistently with the requirements in Article 770. The term "grounding conductor" has been removed or replaced in Article 250 and other articles of the NEC. Not accepting the proposed revisions in the coordinated comments will result in the continued use of an orphaned term that is not specific and can lead to subjectivity. The proposed changes are technically correct and there have been no technical reasons brought forward to reject what is being proposed. I highly encourage CMP-16 to give strong consideration to the coordinated comments submitted that resolve these inconsistencies and improve clarity and usability within the limited energy articles with regards to grounding and bonding rules. The best approach in Code development is to look at the long range objectives and what would be best for the NEC. It needs to be practical, understandable, and enforceable. These proposed revisions are in the spirit of accomplishing all three of these objectives. It's not about who is right or wrong, it is about being successful and ending up with the best Code as a result.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-22.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-3 Log #29 NEC-P16 **Final Action: Reject**
(770.2)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-10
Recommendation: Reject Proposal 16-10 and delete the definition of optical fiber raceway (including the FPN) in the current (2008) Code.
Substantiation: The purpose of the proposal was to distinguish between plenum, riser and general-purpose optical fiber raceway and a chapter 3 raceway that has an optical fiber cable in it.

CMP 16 has begun simplifying the types of raceways by eliminating CATV raceways and permitting communications raceways to substitute for optical fiber raceways. The logical next step (next code cycle) would be to eliminate optical fiber raceways and use communications raceways as multipurpose raceways.

An optical fiber raceway is one of three types of raceway, 1) plenum optical fiber raceway, 2) riser optical fiber raceway or 3) general-purpose optical fiber raceway.

If the proposed definition of an optical fiber raceway violates the style manual, an alternative approach is to delete the current definition, which is wrong, and simply use the longer terms plenum optical fiber raceway, riser optical fiber raceway and general-purpose optical fiber raceway.
Panel Meeting Action: Reject
Panel Statement: The definition is needed.
See panel action and statement on Comment 16-10.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-4 Log #31 NEC-P16 **Final Action: Accept in Principle**
(770.2)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-9
Recommendation: Accept this proposal in principle by revising the definition of Conductive Optical Fiber Cable as follows:

Conductive Optical Fiber Cable. A factory assembly of one or more optical fibers, having an overall covering containing non–current-carrying conductive members such as metallic strength members, metallic vapor barriers, and metallic armor or sheath.
Substantiation: The recommended definition does not contain the term "optical fiber cable" as directed by the Technical Correlating Committee.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:

Conductive Optical Fiber Cable. A factory assembly of one or more optical fibers having an overall covering and containing non–current-carrying conductive member(s) such as metallic strength member(s), metallic vapor barrier(s), metallic armor or metallic sheath.
Panel Statement: The comma following "fibers" is superfluous.

Other editorial changes were made to remove the implication that the metallic components are specifically contained in the "overall covering". These changes meet the submitter's intent.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-5 Log #32 NEC-P16 **Final Action: Accept in Principle**
(770.2)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-11
Recommendation: Accept this proposal in principle by revising the definition of Nonconductive Optical Fiber Cable as follows:

Nonconductive Optical Fiber Cable. A factory assembly of one or more optical fibers, having an overall covering containing no metallic members and no other electrically conductive materials.
Substantiation: The recommended definition does not contain the term "optical fiber cable" as directed by the Technical Correlating Committee.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:

Nonconductive Optical Fiber Cable, A factory assembly of one or more optical fibers having an overall covering and containing no electrically conductive materials.
Panel Statement: The comma following "fibers" is superfluous.

The panel revised the submitter's text for simplicity and clarity. These changes meet the submitter's intent.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-6 Log #462 NEC-P16 **Final Action: Reject**
(770.2)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 16-5
Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:

Cable Sheath. A covering over the optical fiber assembly that includes one or more jackets and ~~may include~~ optionally includes one or more metallic members or strength members.
Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.

However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms may or can shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also

expressly states that "The term may shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."

Since the use of the term may in this Section does not meet these criteria, it should be changed.

Panel Meeting Action: Reject

Panel Statement: The submitter is referencing the wrong definition. Proposal 16-5 does not pertain to "Cable Sheath"; it pertains to "Exposed (to Accidental Contact)".

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-7 Log #533 NEC-P16 **Final Action: Accept in Principle**
(770.2)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)

Comment on Proposal No: 16-12

Recommendation: Revise the definition as follows: "**770.2. Cable Routing Assembly.** A structural system consisting of a single or multiple units and associated fittings used to support and protect optical fiber, communications and data cables."

Substantiation: As indicated in my affirmative ballot comment, the definition is incomplete. The Panel also needs to accommodate the TCC Action. The proposed revisions contained in this comment will complete the definition and satisfy the TCC's concerns. The 'requirement' that the assembly be listed can be included in the appropriate sections of the various Articles, e.g. 770.113(A).

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action on Comment 16-8.

The text meets the submitter's intent.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-8 Log #1626 NEC-P16 **Final Action: Accept**
(770.2)

Submitter: Craig Sato, Underwriters Laboratories Inc.

Comment on Proposal No: 16-12

Recommendation: Accept Proposal 16-12 in principle and revise the definition of a Cable Routing Assembly as follows:

Cable Routing Assembly. A single channel or connected multiple channels, as well as associated fittings, forming a structural system that is used to support, route and protect high densities of wires and cables, typically communications wires and cables, optical fiber and data (Class 2 and Class 3) cables associated with information technology and communications equipment.

Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

The TCC also directed that the proposed definition be rewritten to remove mandatory language. Accordingly, the recommend text no longer contains the word "listed".

The task group supports the panel action to shorten the name of the assembly by dropping "optical fiber/communications" and simply defining a "Cable Routing Assembly". The task group agrees with the sentiment expressed in the voting that the panel action may have over-simplified the definition
T he recommended text uses the term "channel" in the definition in order to distinguish a cable routing assembly from a cable tray.

"Cable Tray System. A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways." (From 392.2)

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-9 Log #290 NEC-P16 **Final Action: Accept**
(770.2.Conductive Optical Fiber Cable)

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 16-9

Recommendation: The Technical Correlating Committee directs that the action on this proposal be rewritten to comply with the NEC Style Manual so that the definition does not contain the term being defined.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to review the proposal to comply with the NEC Style Manual with respect to the use of mandatory language.

See panel action and statement on Comment 16-4.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-10 Log #291 NEC-P16 **Final Action: Accept**
(770.2.General-Purpose Optical Fiber Raceway)

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 16-10

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by complying with 2.2.2 of the NEC Style Manual to not contain mandatory text, such as "listed" and not contain the defined term.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Revise text to read as follows:

Optical Fiber Raceway. An enclosed channel of nonmetallic materials designed for holding optical fiber cables in plenum, riser and general-purpose applications.

Panel Statement: The panel accepts the direction of the TCC and provides a revised definition for optical fiber raceway.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-11 Log #292 NEC-P16 **Final Action: Accept**
(770.2.Nonconductive Optical Fiber Cable)

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 16-11

Recommendation: The Technical Correlating Committee directs that the action on this proposal be rewritten to comply with the NEC Style Manual with respect to the use of mandatory language.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to review the proposal to comply with the NEC Style Manual with respect to the use of mandatory language.

See panel action and statement on Comment 16-5.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-12 Log #20 NEC-P16 **Final Action: Accept**
(770.2, 800.2, 820.2 and 830.2)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-6
Recommendation: Continue to reject these proposals.
Substantiation: The current definitions abandoned cables are based on proposals and comments submitted for the 2002 and 2008 NEC. The table below shows the definitions of abandoned cables currently in the NEC and their genesis.

Genesis of Abandoned Cable Definitions

Article	Definition	Comment	Proposal
640	**Abandoned Audio Distribution Cable.** Installed audio distribution cable that is not terminated at equipment and not identified for future use with a tag.	2002 NEC Comment 16-3 by Carson	2002 NEC Proposal 16-1a by CMP 16
645	**Abandoned Supply Circuits and Interconnecting Cables.** Installed supply circuits and interconnecting cables that are not terminated at equipment and not identified for future use with a tag.		2008 NEC Proposal 12-106 by Trout
725	**Abandoned Class 2, Class 3, and PLTC Cable.** Installed Class 2, Class 3, and PLTC cable that is not terminated at equipment and not identified for future use with a tag.	2002 NEC Comment 16-21 by Jensen	2002 NEC Proposal 16-32 by Jensen
760	**Abandoned Fire Alarm Cable.** Installed fire alarm cable that is not terminated at equipment **other than a connector** and not identified for future use with a tag.	2002 NEC Comment 16-131 by Jensen	2002 NEC Proposal 16-109 by Jensen
770	**Abandoned Optical Fiber Cable.** Installed optical fiber cable that is not terminated at equipment **other than a connector** and not identified for future use with a tag.	2002 NEC Comment 16-190 by Jensen	2002 NEC Proposal 16-154 by Jensen
800	**Abandoned Communications Cable.** Installed communications cable that is not terminated **at both ends at a connector or other equipment** and not identified for future use with a tag.	2002 NEC Comment 16-247 by Jensen	2002 NEC Proposal 16-189 by Jensen
820	**Abandoned Coaxial Cable.** Installed coaxial cable that is not terminated at equipment **other than a coaxial connector** and not identified for future use with a tag.	2002 NEC Comment 16-314 by Jensen	2002 NEC Proposal 16-273 by Jensen
830	**Abandoned Network-Powered Broadband Communications Cable.** Installed network-powered broadband communications cable that is not terminated at equipment **other than a connector** and not identified for future use with a tag.	2002 NEC Comment 16-370a by Kaufman	2002 NEC Proposal 16-364 by Hirschler

A single definition of “abandoned cable” is inappropriate to cover signaling, fire alarm, optical fiber, communications, CATV and network-powered broadband because each of these cable types has its own installation practices that must be accommodated in the definition of “abandoned cable” to avoid inappropriate and unnecessary removal.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-13 Log #293 NEC-P16 **Final Action: Accept**
(770.2 Optical fiber/communications cable routing asembly)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-12
Recommendation: The Technical Correlating Committee directs that the action on this proposal be rewritten to comply with the NEC Style Manual with respect to the use of mandatory language.
The Technical Correlating Committee further directs that the Chairs of Code-Making Panels 3 and 16 form a Task Group to correlate the actions taken on this proposal and Proposal 3-196.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review the proposal to comply with the NEC Style Manual with respect to the use of mandatory language.
See panel action on Comment 16-8.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-14 Log #2324 NEC-P16 **Final Action: Accept**
(770.2, FPN)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 16-10
Recommendation: Delete the following Informational Note:
~~FPN: See Article 100 for a definition of Raceway.~~
Substantiation: With the acceptance of this proposal, the Informational Note is no longer needed.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-15 Log #474 NEC-P16 **Final Action: Accept in Principle**
(770.3)

Submitter: Code-Making Panel 14,
Comment on Proposal No: 16-16
Recommendation: This proposal should be rejected.
Substantiation: The suitability of equipment and wiring in Hazardous (Classified) Locations is covered in Articles 500-516 and is the responsibility of Panel 14.
This comment was developed by a CMP-14 Task Group and balloted through the entire panel with the following ballot results:
14 Eligible to vote
12 Affirmative
2 Ballots Not Returned (T. Beall and D.W. Zipse (Voting Alternate))
1 Comment on Affirmative Vote was received as follows:
D. Batta, Jr. stated: “I agree that the suitability of equipment and wiring in Hazardous (Classified) Locations is covered in Articles 500-516 and is the responsibility of Code-Making Panel 14.
770.154(F) approves several optical fiber cables for use in Hazardous (Classified) Locations that are not addressed in Articles 500-516. To avoid conflicts like this, the suitability of equipment and wiring for use in Hazardous (Classified) Locations should remain the responsibility of Panel 14.”

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

770.3 Other Articles. Installations of optical fiber cables and raceways shall comply with 770.3(A) and 770.3(B). Only those sections of Chapter 2 and Article 300 referenced in this article shall apply to optical fiber cables and raceways.

(A) Hazardous (Classified) Locations.

Listed optical fiber cables shall be permitted to be installed in hazardous (classified) locations. The cables shall be sealed in accordance with the requirements of 501.15, 502.15, 505.16, or 506.16, as applicable.

(B) Composite Cables. Composite optical fiber cables shall be classified as electrical cables in accordance with the type of electrical conductors. They shall be constructed, listed, and marked in accordance with the appropriate article for each type of electrical cable.

Panel Statement: CMP 16 understands the scope of CMP 14 relative to the suitability of equipment and wiring in Hazardous (Classified) Locations.

CMP 16 action on Proposal 16-16 moved the text of 770.154(F) to 770.3 (Other Articles). Acceptance of this comment would result in moving the requirement back to 770.154(F). The panel maintains relocation of the text to 770.3 and edits Section 770.3 to remove requirements for optical fiber raceway.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-16 Log #634 NEC-P16 **Final Action: Accept**
(770.3, 820.3, and 830.3)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.

Comment on Proposal No: 16-17

Recommendation: Continue to accept Proposals 16-18, 16-235, 16-238 and 16-298 and to accept in principle Proposal 16-17.

Substantiation: The Communications Cable & Connectivity Association supports the panel actions on Proposals 16-17, 16-18, 16-235, 16-238 and 16-298. The code will be more user-friendly with the deletion of redundant and confusing requirements.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation to continue to accept but does not necessarily agree with the submitter's substantiation.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-17 Log #795 NEC-P16 **Final Action: Reject**
(770.24)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 16-21

Recommendation: Accept the proposal with the following revisions:

Mechanical Execution Of Work. Optical fiber cables installed in or on buildings and other structures and not in raceway or cable tray or direct-buried, shall be secured to supports at intervals not to exceed 1.8 m (6 ft) and protected against physical damage by approved means. Such cables shall be secured by straps, staples, cable ties, hangers, or other approved means designed and installed so as to not damage the cable. The installation shall also comply with applicable provisions of Article 300. Exception: Support shall not be required for that portion of cables fished between access points through concealed spaces in finished buildings or structures and supporting is impractical.

Substantiation: Securing and supporting should be provided at specified intervals, as is done with most wiring methods. Applicable provisions of Article 300 such as 300.5, 300.6(C)(1) and (2), 300.11(A)(1) and(2), (C). An exception for fishing is warranted.

Panel Meeting Action: Reject

Panel Statement: Applying the securing and supporting requirements for electrical installations to optical fiber cables is not appropriate because installations of optical fiber cables do not present the same hazard.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-18 Log #1350 NEC-P16 **Final Action: Accept**
(770.24, FPN 2)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council

Comment on Proposal No: 16-23

Recommendation: FPN # 2; See NFPA 90A-2009, *Standard for Installation of Air-Conditioning and Ventilation Systems*, for discrete combustible components installed in accordance with 300.22(B) and (C).

Note to staff and TCC: See also FPNs to the following sections, which have no associated proposals: 424.66 and 640.3(B).

Substantiation: Please reference the updated edition of NFPA 90A: 2009.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-19 Log #534 NEC-P16 **Final Action: Accept**
(770.25)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)

Comment on Proposal No: 16-24

Recommendation: Continue to reject this proposal.

Substantiation: The submitter has provided no substantiation for the new requirement that is essentially unenforceable.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-20 Log #635 NEC-P16 **Final Action: Accept**
(770.25)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.

Comment on Proposal No: 16-24

Recommendation: Continue to reject this proposal.

Substantiation: Panel 1 rejected similar Proposals 1-139 and 1-146 with the statement "The submitter has not substantiated that a problem exists, or that the problem would be alleviated by removing abandoned cables and equipment neatly. Rather, the panel concludes, that in some cases, abandoned cables and equipment are best left abandoned. The proposed text is unnecessary as the section more appropriately applies to "Requirements for Electrical Installations" and "Mechanical Execution of Work.""

Panel 3 rejected similar Proposals 3-173 and 3-253 with the statement. "The submitter has not provided technical substantiation for the proposed change, and compliance with this requirement would be unenforceable. This is already covered under 90.4 and 110.2.

Panel 12 rejected similar Proposals 12-114, 12-146 with the statement. "The requirement is unenforceable. Disposition of removed materials is not a code responsibility. The remaining installation is required to be in accordance with 110.3, which is enforceable."

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-21 Log #1397 NEC-P16 **Final Action: Reject**
(770.26)

Submitter: Russell LeBlanc, The Peterson School

Comment on Proposal No: 16-25

Recommendation: The proposal should be accepted in principal but modified as follows:

If a conduit or raceway of metric designator 53 (trade size 2 inch) or larger, penetrates a fire-resistance-rated wall, partition, floor, or ceiling, and that same conduit or raceway also enters an enclosure of the ventilated type, that conduit or raceway shall be sealed or plugged with an approved fire stopping material at the point of entrance to the enclosure to prevent fire, smoke, or other products of combustion from passing through the raceway or conduit into other areas of the building or structure.

Substantiation: I have modified the wording for clarity and so the application is more focused, and less of a "sweeping" change.

In my original proposal I provided a first hand eyewitness account of what happened.

This was NOT a second hand or third hand story. I saw it happen with my own eyes! I am not a novice. I have been in the trade for over 25 years. I have also been teaching electrician classes for over 10 years. I am OSHA certified. I am an instructor approved by the Mass. Dept. of Education, and The Board of Examiners of Electricians. I have authored several other code changes. I am a member of NFPA. No, I am not a Fire chief or fire science engineer, or some other Fire Dept. Official. But I know what I saw, and it just did NOT seem right to me. I am very concerned. The smoke simply should NOT have been able to spread through the building via the raceways. What more technical substantiation is needed than that?

Lets break it down to simple science and logic.

If I build a fire in a fireplace, the smoke will go up the chimney flue, if the flue damper is OPEN.

If I build a fire in a fireplace, the smoke will NOT go up the chimney flue, if

the flue damper is CLOSED!

Try it!

Apply logic here.

If I am wrong then maybe we don't need to seal the raceway ends. But this "chimney effect" of the unsealed pipes has already happened once. I have seen it. If it happens again, the occupants may not be as lucky as the first time I saw this phenomenon happen.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The recommended text is vague, unenforceable and lacks specificity. Insufficient data has been provided to justify such a change. Selection of conduit size requiring fire stopping is arbitrary. This may be more of a building Code issue rather than an electrical Code issue.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 14 Negative: 1

Ballot Not Returned: 1 Esemplare, R.

Explanation of Negative:

IVANS, R.: The submitter identifies a concern associated with conduit providing a bypass of firebreaks between floors that should not be ignored. Although there may be issues associated with the general nature of the original proposal or the seemingly arbitrary selection of 2" conduit, the solutions are not technically insurmountable. I am aware of installations where such sealing of conduit was required by local building codes and effectively implemented This item should have been put on hold for further study rather than rejected.

16-22 Log #1890 NEC-P16 **Final Action: Accept in Principle**
(770.100(A) and (B))

Submitter: Phil Simmons, Simmons Electrical Services

Comment on Proposal No: 16-29

Recommendation: Revise text to read as follows:

770.100 Entrance Cable Bonding and Grounding. Where grounded, the non–current-carrying metallic members of optical fiber cables entering buildings shall be bonded or grounded as specified in 770.100(A) through (D).

(A) Bonding Conductor and Grounding Electrode Conductor.

(1) Insulation. The bonding conductor and grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.

(2) Material. The bonding conductor and grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.

(3) Size. The bonding conductor and grounding electrode conductor shall not be smaller than 14 AWG. It shall have a current-carrying capacity not less than that of the grounded metallic member(s). The bonding conductor and grounding electrode conductor shall not be required to exceed 6 AWG.

(4) Run in Straight Line. The bonding conductor and grounding electrode conductor shall be run to the grounding electrode in as straight a line as practicable.

(5) Physical Damage. Where necessary, the bonding conductor and grounding electrode conductor shall be guarded from physical damage. Where these ~~the grounding~~ conductors are installed ~~is run~~ in a metal raceway, both ends of the raceway shall be bonded to the contained ~~grounding~~ conductors or to the same terminal or electrode to which the ~~grounding~~ conductor(s) is (are) connected.

(B) Electrode. The bonding conductor and grounding electrode conductor shall be connected in accordance with 770.100(B)(1), (B)(2), or (B)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding conductor or grounding electrode conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In Existing Buildings or Structures Without an Intersystem Bonding Termination ~~with Grounding Means~~. If the existing building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to enclosures as covered in 250.94

(4) The nonflexible metallic power service raceway

(5) The service equipment enclosure

(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure

(7) The grounding conductor or the grounding electrode of a building or structure disconnecting means that is grounded to an electrode as covered in 250.32

(3) In Existing Buildings or Structures Without Intersystem Bonding Termination or Grounding Means. If the existing building or structure served has no intersystem bonding termination or grounding means, as described in 770.100(B)(2), the grounding electrode conductor shall be connected to either of the following:

(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4).

(2) If the building or structure served has no grounding means, as described in 770.100(B)(2) or (B)(3)(1), to an effectively grounded metal structure or to a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (1/2 in.) in diameter, driven, where practicable, into permanently damp earth and separated from lightning conductors as covered in 800.53 and at least 1.8 m (6 ft) from electrodes of other systems. Steam or hot water pipes or air terminal conductors (lightning-rod conductors) shall not be employed as electrodes for non-current-carrying metallic members.

Substantiation: This Comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in Article 770 and the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." Conductors that connect from a grounding point for these systems to an intersystem bonding termination are bonding conductors or jumpers and should be described as such in the NEC articles. This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 770.

These comments address the changes suggested in several proposals in each section within Article 770 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in this comment the term "grounding conductor" is replaced with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. In some cases, both terms are suggested as how the conductor is connected determines what it is. The revisions to each section are intended to improve clarity, maintain their meaning, and be consistent with the definitions in Article 100 as revised.

Other editorial changes are included to improve the syntax but intend to maintain the existing meaning without introducing a new concept. This includes adding "existing" to 770.100(B)(2) and (3). The provisions in these sections should properly apply to only existing installations to correlate with the rules in 250.94.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

770.100 Entrance Cable Bonding and Grounding. Where required ~~grounded~~, the non–current-carrying metallic members of optical fiber cables entering buildings shall be bonded or grounded as specified in 770.100(A) through (D).

(A) Bonding Conductor or ~~and~~ Grounding Electrode Conductor.

(1) Insulation. The bonding conductor or ~~and~~ grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.

(2) Material. The bonding conductor or ~~and~~ grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.

(3) Size. The bonding conductor or ~~and~~ grounding electrode conductor shall not be smaller than 14 AWG. It shall have a current-carrying capacity not less than that of the grounded metallic member(s). The bonding conductor or ~~and~~ grounding electrode conductor shall not be required to exceed 6 AWG.

(4) Run in Straight Line. The bonding conductor or ~~and~~ grounding electrode conductor shall be run ~~to the grounding electrode~~ in as straight a line as practicable.

(5) Physical Damage. Where necessary, the bonding conductor and grounding electrode conductor shall be guarded from physical damage. Where these ~~the grounding~~ conductors are installed ~~is run~~ in a metal raceway, both ends of the raceway shall be bonded to the contained ~~grounding~~ conductors or to the same terminal or electrode to which the ~~grounding~~ conductor(s) is (are) connected.

(B) Electrode. The bonding conductor and grounding electrode conductor shall be connected in accordance with 770.100(B)(1), (B)(2), or (B)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding conductor or grounding electrode conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In ~~Existing~~ Buildings or Structures ~~Without an Intersystem Bonding Termination with Grounding Means~~. If the ~~existing~~ building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to enclosures as covered in 250.94
(4) The nonflexible metallic power service raceway
(5) The service equipment enclosure
(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure of the power service, or
(7) The grounding conductor or the grounding electrode of a building or structure disconnecting means that is grounded to an electrode as covered in 250.32

(3) In ~~Existing~~ Buildings or Structures Without Intersystem Bonding Termination or Grounding Means. If the ~~existing~~ building or structure served has no intersystem bonding termination or grounding means, as described in 770.100(B)(2), the grounding electrode conductor shall be connected to either of the following:

(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4).

(2) If the building or structure served has no grounding means, as described in 770.100(B)(2) or (B)(3)(1), to an effectively grounded metal structure or to a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (1/2 in.) in diameter, driven, where practicable, into permanently damp earth and separated from lightning conductors as covered in 800.53 and at least 1.8 m (6 ft) from electrodes of other systems. Steam or hot water pipes or air terminal conductors (lightning-rod conductors) shall not be employed as electrodes for non-current-carrying metallic members.

Panel Statement: The panel agrees with the submitter's intent and edits the text for editorial clarification.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

BRUNSSEN, J.: 770.100(A)(5), first sentence, should state: "Where necessary, the bonding conductor or grounding electrode conductor …", for consistency with 770.100(A) (1) though (4). 770.100(A)(5), second sentence, should state: "Where the bonding conductor or grounding electrode conductor is installed in a metal raceway, both ends of the raceway shall be bonded to the contained conductor or to the same terminal or electrode to which the conductor is connected." "These conductors" is replaced by "the bonding conductor or grounding electrode conductor" for clarity. "Conductors" is made singular throughout the sentence as it is unlikely that there will be multiple bonding or grounding electrode conductors within the metal raceway. These changes provide correlation with 800.100(A)(6). 770.100(B)(1) should read: "If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding conductor shall be connected to the intersystem bonding termination." A grounding electrode conductor would not connect to a bonding termination but to a grounding electrode. 770.100(B)(3) should read as follows: "If the building or structure served has no intersystem bonding termination, or grounding means as described in 770.100(B)(2), …". The comma needs to be placed after "termination" and not after "means" to distinguish between buildings with an intersystem bonding termination as described in (B)(1) and buildings with grounding means as described in (B)(2).

OHDE, H.: As an electrical code instructor and as an advocate of good electrical code, it makes good code sense to agree with the submitter's intent and the panel action regarding this comment. The addition of the terms "grounding electrode conductor" and "bonding" and the deletion of the term "grounding conductor" provides consistency and correlation with remaining Code Articles regarding grounding. The term "grounding conductor" has been replaced with "grounding electrode conductor" or if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" was used.

16-23 Log #294 NEC-P16 **Final Action: Accept**
(770.100(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-29
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on Proposal 16-29.

The panel realizes the importance of listing in a communications environment.

The panel intends to require the use of listed insulated, covered or bare conductors in the communications industry.

The panel has obtained verification that listing exists for insulated, covered or bare wire. Listing covers testing and verification of insulation and conductor properties.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-24 Log #295 NEC-P16 **Final Action: Accept**
(770.100(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-30
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on Proposal 16-30.

The panel realizes the importance of listing in a communications environment.

The panel intends to require the use of listed insulated, covered or bare conductors in the communications industry.

The panel has obtained verification that listing exists for insulated, covered or bare wire. Listing covers testing and verification of insulation and conductor properties.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-25 Log #296 NEC-P16 **Final Action: Accept**
(770.100(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-32
Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal as the existing numbering complies with the NEC Style Manual, and is consistent with other lists in the code.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to to review the proposal to comply with the NEC Style Manual.

See action on Comment 16-26.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-26 Log #41 NEC-P16 **Final Action: Accept**
(770.100(B), 800.100(B), 820.100(B), and 830.100(B))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-32
Recommendation: Reject Proposals 16-32, 16-146, 16-256 and 16-324.
Substantiation: The current text in sections 770.100(B), 800.100(B), 820.100(B) and 830.100(B) complies with the style manual. Lists are required to be numbered, not lettered.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-27 Log #794 NEC-P16 **Final Action: Reject**
(770.100(B)(2)(4) and (D)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-35
Recommendation: Accept the proposal with the following revisions:

(B)(2)(4). The nonflexible electric lighting or power metallic service raceway. Latter part of (D;...and electric lighting or power service grounding electrode system.

Substantiation: "Power" may be inferred as not including services for lighting.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its action on Proposal 16-35.

The panel understands the submitter intended to add "electric lighting or" that provides no additional clarity. The text "nonflexible" was previously added.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-28 Log #1250 NEC-P16 **Final Action: Accept in Principle in Part (770.100(B)(3))**

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 16-36
Recommendation: Accept Proposal 16-36.
Substantiation: The issue addressed by this Proposal is in specifying a technically sound grounding electrode for grounding non-current-carrying metallic members of optical fiber systems, that will assure such systems are connected to earth in a manner that will limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines. This is the purpose of a grounding electrode regardless of the system.

The electrodes identified in 250.52(A)(4) through (A)(8) are intended as minimum required electrodes that are capable of limiting the voltage imposed on electric and electronic equipment by lightning, line surges, or unintentional contact with higher-voltage lines. The committee has seemingly sought to minimize the effects of such imposed faults by stating such faults or events such as lighting deal only in limited currents which is not necessarily true. In addition, limited currents have little to do with the adequacy of a grounding electrode and especially one with high resistance tendencies such as a 5 ft long ground rod. The claim by the committee that 5 ft long rods have "been used successfully and safely by the telecom industry for decades" is misrepresented as it is widely acknowledged that damage during thunderstorms often occurs to sensitive electronics that are connected to telecom wiring where grounding is often inadequate as lighting surges (direct or indirect) enter facilities on metallic carriers. The National Electrical Code is not about telecom the utility but is rather about protecting users from the consequences of lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. There is no justification in specifying inadequate grounding electrodes that have no independent record of performance and that are obviously technically inferior to those required by 250-52(A)(4) through (A)(8).

Utilizing a 5 ft long ground rod by a particular segment of industry, where that industry may be responsible for that electrode, does not provide technical substantiation as to the worth of that electrode. The "statement "very little resistance change will result from using larger sizes of electrodes" from *The ABCs of Grounding and Bonding* is misapplied in this context. One authoritative reference, the *Soares Book on Grounding* states that the diameter of a ground rod does not materially reduce the resistance of a ground rod but that rather that a ground rod's resistance is substantially reduced by extending the length of a ground rod into earth. By actual calculation this could be as much as a 40%+ reduction in resistance by doubling a 5 ft long ground rod's length to 10 ft. Therefore, the reference from *The ABCs of Grounding and Bonding*, when taken in context, agrees with Soares on the ineffectiveness of increasing the diameter of a ground rod, but the committee is negligent in not mentioning the effectiveness of increasing the length of a ground rod in the panel statement. Power utilities also realize the advantage of deeper, thus longer, electrodes when grounding distribution systems such as substations where sectional ground rods are commonly installed from 20 to 60 ft deep. In addition, it is unfathomable that the committee would indicate that requiring a minimum standard electrode would be too expensive when compared to the damage and expense a lightning strike could cause to a structure where inadequate grounding is installed and especially where any additional installation cost is negligible. It is also interesting to note that 820.100(B)(3)(2), as well as the inference in 810.21(F)(3), requires that a rod or pipe electrode shall meet the requirements of 250.52(A)(5) while 770.100(B)(3) allows the inferior12.7 mm by 5 ft rod or pipe electrode. This seems to be inconsistent concerning the various requirements between similar articles. Therefore it is difficult to understand the resistance of the Panel 16 members in not accepting Proposal 16-36 that would provide an acceptable minimum standard for grounding telecommunications systems that would help limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines.

There is no argument that bonding together the communications grounding electrode and power grounding electrode system is an important safety aspect. However that also is not the issue addressed by Proposal 16-36. The issue remains to be that ½ in. diameter by 5 ft long ground rods are not an adequate electrode for grounding telecommunication systems and that the electrodes utilized for systems installed as a part of the premise wiring system should meet the same minimum requirements as those in Article 250 as they serve the same purpose. The technical substantiation for this change was in Proposal 16-36 and is expanded in this Comment. Code-Making Panel 5 has the expertise on this subject and the users of the NEC as well as the public deserve a reliable minimum standard for grounding any and all telecommunications systems.

In addressing the last part of the panel statement, section 770.100(B)(3) addresses "In Buildings or Structures Without Intersystem Bonding Termination or Grounding Means", and 770.100(B)(2) addresses "In Buildings or Structures with Grounding Means." What possibly could the panel mean when it states "must be taken in context?" 770.100(B)(3) addresses buildings and structures without electrodes, thus there are no grounding electrode means at the building or structure to be identified. Paragraph 770.100(B)(3)(1) states "To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)", but these are not in existence according to the title of 770.100(B)(3). Therefore, the only choice left is 770.100(B)(3)(2) and that states the electrode shall be an effectively grounded metal structure, which again, is not in existence, or "a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (in.) in diameter, driven, where practicable, into permanently damp earth." A 12.7 mm pipe? Also, please note no inch-pound number is provided in the NEC for the pipe or rod diameter. A 12.7 mm pipe is approximately a 3/8-inch trade size which is half the required diameter of a pipe electrode of 3/4-inch required by 250.52(A)(5) for a pipe electrode which is considered to be the minimum size for durability that goes back to the 1925 NEC edition. As to a 5 ft rod or pipe being driven into permanently damp earth – where in the US could this be consistently accomplished? Also, the word "effectively" was dropped by Code-Making Panel 5 as being subjective and inadequate in determining if a metal structure is grounded. So, why does it remain in 770.100(B)(3)? The problems in this section alone justify the acceptance of Proposal 16-36.
Panel Meeting Action: Accept in Principle in Part
The panel accepts the part to delete the word "effectively" in 770.100(B)(3)(2). The panel rejects the remainder of the comment.
Panel Statement: See action and statement on Comment 16-30.

The panel reiterates its position as stated in the panel statement for the submitter's original proposal. The submitter has neither provided technical justification nor cited a safety issue to justify the elimination of the 5-foot communications ground rod that has been used successfully and safely by the communications industry for decades. It is unreasonable and unnecessary to require installation of such power-oriented grounding means as proposed by the submitter solely for communications applications where power fault and lightning currents are limited by the relatively fine gauge of communications conductors and cable shields.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 1
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:

BOYER, J.: Proposal 16-36 should be reconsidered and accepted as proposed. It is technically sound, reasonable and will aid in reducing losses from lightning, line surges and unintentional contact with higher-voltage lines. Furthermore, it would help stabilize the voltage to earth during normal operation.
Additionally, it is unclear as to what was Accepted in Principle in Part.

16-29 Log #297 NEC-P16 **Final Action: Accept (770.100(B)(3)(2))**

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-39
Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal since the phrase "effectively grounded" is no longer defined in the NEC.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider the action on Proposal 16-39.

See panel action and statement on Comment 16-30.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-30 Log #535 NEC-P16 **Final Action: Accept (770.100(B)(3)(2))**

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-39
Recommendation: Revise the text of 770.100(B)(3)(2) as follows: "(2) If the building or structure served has no grounding means, as described in 770.100(B)(2) or (B)(3)(1), to ~~an effectively grounded metal structure~~ any one of the individual electrodes described in 250.52(A)(7) and (A)(8) or to a ground rod or pipe not less than …".
Substantiation: The Technical Correlating Committee has directed CMP16 to reconsider their panel action on this proposal as "effectively grounded" is no longer defined in the NEC. ATIS initially opposed elimination of this term as it is used in the NESC. However, the NESC usage is associated with an "effectively grounded cable sheath", not an effectively grounded metallic structure. This comment aligns 770.100(B)(3)(2) with similar requirements in 800.100(B)(3)(2) and 830.100(B)(3)(2) that do not mention "effectively grounded", and provides correlation between 770, 800 and 830.
Panel Meeting Action: Accept
Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-31 Log #2323 NEC-P16 **Final Action: Accept in Principle**
(770.100(B)(3)(2))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 16-39
Recommendation: This proposal should have been accepted as submitted.
Substantiation: The term "effectively grounded" is no longer used in the NEC. The reason it is no longer used is that it is too vague and subjective—what is the difference between "grounded" and "effectively grounded." CMP-16 should follow the lead of CMP-5 in this endeavor.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-30.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-32 Log #1891 NEC-P16 **Final Action: Accept**
(770.106(A) and (B))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-42
Recommendation: Revise text to read as follows:
770.106 Grounding and Bonding of Entrance Cables at Mobile Homes.
(A) Grounding. Grounding shall comply with 770.106(A)(1) and (A)(2).
(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the ~~ground for~~ non-current-carrying metallic members of optical fiber cables entering the mobile home shall be grounded in accordance with 770.100(B)(3).
(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the ~~ground for~~ non-current-carrying metallic members of optical fiber cables entering the mobile home shall be grounded in accordance with 770.100(B)(3).
(B) Bonding. The grounding electrode shall be bonded to the metal frame or available grounding terminal of the mobile home with a copper ~~grounding~~ conductor not smaller than 12 AWG under either of the following conditions:
(1) Where there is no mobile home service equipment or disconnecting means as in 770.106(A)
(2) Where the mobile home is supplied by cord and plug
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." Other conductors are bonding jumpers or conductors. These revisions are made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 770.
These comments address the changes suggested in the noted proposal in each section within Article 770 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section are intended to improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.
There does not seem to be a valid reason to name the conductor in (A) or (B).
Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
BRUNSSEN, J.: Revise 770.106(A)(1) as follows for consistency with similar sections in Chapter 8: "(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the non-current-carrying metallic members of optical fiber cables entering the mobile home shall be connected to a grounding electrode in accordance with 770.100(B)(3).
Revise 770.106(A)(2) as follows for consistency with similar sections in Chapter 8: "(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the non-current-carrying metallic members of optical fiber cables entering the mobile home shall be connected to a grounding electrode in accordance with 770.100(B)(3).

16-33 Log #791 NEC-P16 **Final Action: Accept in Principle**
(770.110(A)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-47
Recommendation: Revise panel action text as follows:
(A)(1) Chapter 3 Raceways. Optical fiber cables shall be permitted to be installed in any approved raceway wiring method of Chapter 3.
Substantiation: "Any raceway included in Chapter 3" literally amends the uses permitted and uses not permitted provisions. This article does not have a section referring to application of other articles, and per 90.3 modifies them.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel has prepared tables that address this issue. See action and statement in Comment 16-44.
The panel does not agree with the submitter's substantiation that the changes made amend other Articles of the Code.
Section 770.110(A)(1) requires the raceways to be installed in accordance with the requirements of Chapter 3.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-34 Log #326 NEC-P16 **Final Action: Accept in Principle**
(770.113)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-48
Recommendation: Revise text to read as follows:
770.113 Installation of Optical Fiber Cables and Raceways, and Cable Routing Assemblies. Installation of optical fiber cables and raceways, and cable routing assemblies shall comply with 770.113 (A) through (J). Installation of raceways shall also comply with 770.12 and 770.110.
(A) Listing. Optical fiber cables and raceways, and cable routing assemblies installed in buildings shall be listed.
Exception: Optical fiber cables that comply with 770.48 shall not be required to be listed.
(B) Fabricated Ducts and Plenums Used for Environmental Air. The following cables shall be permitted in ducts and plenums, as described in 300.22(B) if they are directly associated with the air distribution system:
(1) Up to 1.22m (4 ft) of Types OFNP and OFCP
(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in raceways that are installed in compliance with 300.22(B).
Informational Note: See sections 4.3.4 & 4.3.11.3.3 of NFPA 90A-2009 *Standard for the Installation of Air-Conditioning and Ventilation Systems* for information on wires and cables in air ducts and apparatus casings plenums. See section 3.3.22 for the definition of an apparatus casing plenum.
(C) Other Spaces Used For Environmental Air (Plenums). The following cables and raceways shall be permitted in other spaces used for environmental air as described in 300.22(C):
(1) Types OFNP and OFCP
(2) Plenum optical fiber raceway
(3) Types OFNP and OFCP installed in plenum optical fiber raceway or plenum communications raceway
(4) Types OFNP and OFCP supported by metallic cable trays or cable tray systems
(5) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in raceways that are installed in compliance with 300.22(C).
Informational Note: See sections 4.3.11.2, 4.3.11.4 & 4.3.11.5 of NFPA 90A-2009 *Standard for the Installation of Air-Conditioning and Ventilation Systems* for information on wires, cables and raceways in ceiling cavity, raised floor and air-handling unit room plenums. See section 3.3.22 for plenum definitions.
(D) Risers-Cables, Raceways and Cable Routing Assemblies in Vertical Runs. The following cables, raceways and cable routing assemblies shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:
(1) Types OFNP, OFCP, OFNR and OFCRPlenum and riser optical fiber raceways
(2) Riser cable routing assemblies
(3) Types OFNP, OFCP, OFNR and OFCR installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) riser cable routing assembly
Informational Note: See770.26 for firestop requirements for floor penetrations.
(E) Risers-Cables and Raceways in Metal Raceways. The following cables and raceways shall be permitted in metal raceways in a riser having firestops at each floor:
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC

(2) Plenum, riser and general-purpose optical fiber raceways
(3) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
Informational Note: See 770.26 for firestop requirements for floor penetrations.

(F) Risers-Cables, Raceways and Cable Routing Assemblies in Fireproof Shafts.. The following cables, raceways and cable routing assemblies shall be permitted to be installed in fireproof riser shafts having firestops at each floor:
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Riser and general-purpose cable routing assemblies
(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly
Informational Note: See 770.26 for firestop requirements for floor penetrations.

(G) Risers-One- and Two-Family Dwellings. The following cables, raceways and cable routing assemblies shall be permitted in one- and two-family dwellings:
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Riser and general-purpose cable routing assemblies
(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly

(H) Cable Trays. The following cables and raceways shall be permitted to be installed in cable trays:
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway

(I) Distributing Frames and Cross-Connect Arrays. The following cables, raceways and cable routing assemblies shall be permitted to be installed in distributing frames and cross-connect arrays:
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Riser or general-purpose cable routing assemblies
(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly

(J) Other Building Locations. The following cables, raceways and cable routing assemblies shall be permitted to be installed in building locations other than the locations covered in 770.113(B) through (I):
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Riser and general-purpose cable routing assemblies
(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly

Substantiation: The panel action on the revision of 770.113 changed the title and included several applications of cable routing assemblies, but a few applications were missed. Also the current text of 770.154(B)(2) permits all optical fiber cable types in fireproof shafts and metal raceways in shafts but it does not explicitly permit optical fiber raceways. If bare cables are permitted, then cables in optical fiber raceways should be also be permitted. Cable routing assemblies should be permitted in fireproof shafts, but are clearly not suitable for installation inside metal raceway. In order to accommodate both optical fiber raceways and cable routing assemblies, the riser section on metal raceways or fireproof shafts was bifurcated. Repeated references to 770.110 can be replaced with a general requirement to install raceways in accordance with 770.110 and also 770.12. The title of the section was modified to clarify that it covers cable routing assemblies, not optical fiber cable routing assemblies.

Most of the text in this comment was submitted by Gerald Dorna as an affirmative ballot comment on this proposal. See the ROP.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-37.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-35 Log #489 NEC-P16 **Final Action: Reject**
(770.113)

Submitter: Code-Making Panel 3,
Comment on Proposal No: 16-48
Recommendation: The proposal should be Rejected.
Substantiation: At the direction of the Technical Correlating Committee, CMP- 3 formed a task group to provide a comment regarding this proposal. The CMP 3 members of the Task Group were Larry Ayer, Paul Casparro, David Mills, Mark Ode, Steve Owen, George Straniero, and Bob Walsh.
While the task group reviewed Proposal 16-48 it also reviewed the companion Proposal 16-56 that would adopt the use of an application table. Similar proposals were submitted to CMP-3 to apply parallel changes to Articles 725 and 760. These proposals were Rejected on the basis that the proposed table did not provide the same critical application information already located within the application section and that there was no technical substantiation provided in the proposal to justify the changes offered.

In addition, Proposal 16-48 requires taking section xxx.154 from articles 770, 800, 810, 820, and 830 and relocating them. CMP-16 stated that sections xxx.154 contain more than applications; they also contain installation rules and they are in the wrong place. As a result, the application requirements found within sections xxx.154 were moved to a new xxx.110 and similarly the installation requirements moved to a new xxx.113.

It would be difficult to do the same to Articles 725 and 760 during the ROC stage without the possibility of introducing new material which has not had public review. Article 725 deals with Class 1, Class 2, and Class 3 wiring methods and cables. The installation, application and separation requirements are spread throughout the Article and would affect the entire numbering structure. Similarly, Article 760 deals with both non-power-limited and power-limited cables with similar requirements spread throughout the Article.

This comment was developed by a CMP-3 Task Group and balloted through the entire panel with the following ballot results:
15 Eligible to vote
13 Affirmative (W.R. Whistler for T.F. Connaughton, S.D Burlison for J.C.

Menendez, and T.D. Mills for M.K. Sanders)

2 Ballots Not Returned (S.E. Egesdal and M.S. Sepulveda)

The following Affirmative Comment on Vote was received:

W.R. Whistler stated: "This issue needs to be addressed to ensure that consistent numbering throughout all of the affected articles is continued. If the proposed changes were to be implemented, it would make Articles 725 and 760 more usable as installation and application would be separated and not intertwined."

Panel Meeting Action: Reject

Panel Statement: The submitter noted that Proposal 16-48 had a companion Proposal 16-56 and that CMP 3 rejected companion proposals for Article 726 and 760. The submitter also noted that it would be difficult for CMP 3 to address the companion proposals for Articles 725 and 760 in the ROC stage without introducing new material that has not had public review.

In addition to the proposals for Article 770, CMP 16 processed companion proposals for Articles 800, 820 and 830. The submitter noted that CMP 3 had no technical substantiation. The CMP 16 proposals were developed by the CMP 16 Special Editorial Task Group. They had technical substantiation. In addition to the proposals for Article 770, CMP 16 processed companion proposals for Articles 800, 820 and 830.

In addition to the proposals submitted by the CMP 16 Special Editorial Task Group, actions on numerous other proposals were incorporated into the CMP 16 actions. There were so many interlocking actions that two members of the panel included a roadmap to the proposals in their affirmative ballot comments.

Proposal	Sections	Purpose	Action
16-48 & 56	770.154 & 770.113	Remove installation rules from the applications section 770.154 and relocate them in the installations section 770.113. Simplify cable applications by using a table.	AIP by clarifying the permitted cable applications, permitting communications raceways to substitute for optical fiber raceways, and correlating with, 1) NFPA 90A-2009 which limits cabling in air ducts, 2) proposal 3-94 which changed the NEC nomenclature for air handling spaces, 3) proposal 16-59 which permits metallic cable trays in plenums, 4) proposal 16-62 which simplifies the installation rules for risers and, 5) proposals 16-51, 52 & 57 which provide for the applications of cable routing assemblies.
16-160 & 172	800.154 & 800.113	Remove installation rules from the applications section 800.154 and relocate them in the installations section 800.113. Simplify cable applications by using a table.	AIP by clarifying the permitted cable applications and correlating with, 1) NFPA 90A-2009 which limits cabling in air ducts, 2) proposal 3-94 which changed the NEC nomenclature for air handling spaces, 3) proposal 16-175 which permits metallic cable trays in plenums, 4) proposal 16-179 which simplifies the installation rules for risers and, 5) proposals 16-165, 166 & 173 which provide for the applications of cable routing assemblies.
16-267 & 278	820.154 & 820.113	Remove installation rules from the applications section 820.154 and relocate them in the installations section 820.113. Simplify cable applications by using a table.	AIP by clarifying the permitted wire and cable applications, permitting communications raceways to be used in place of CATV raceways, and correlating with, 1) NFPA 90A-2009 which limits cabling in air ducts and only provides for optical fiber raceways and communications raceways, 2) proposal 16-289a which deleted the listing section for CATV raceways, 3) proposal 3-94 which changed the NEC nomenclature for air handling spaces, 4) proposal 16-280 which permits metallic cable trays in plenums, 5) proposal 16-282 which simplifies the installation rules for risers, and 6) proposals 16-272 & 273 which provide for the application of cable routing assemblies.
16-331, 339	830.151, 830.154 & 830.113	Remove installation rules from the applications sections 830.151 & 830.154 and relocate them in the installations section 830.113. Simplify cable applications by using a table.	AIP by clarifying the permitted cable applications and correlating with, 1) NFPA 90A-2009 which limits cabling in air ducts, 2) proposal 3-94 which changed the NEC nomenclature for air handling spaces, 3) proposal 16-340 which permits metallic cable trays in plenums and, 4) proposals 16-338 & 341 which simplify the installation rules for risers.

CMP 16 has reaffirmed its acceptance of the Special Editorial Task Group's proposals. See panel action on Comments 16-37, 16-44, 16-138, 16-148, 16-233, 16-239, 16-293 and 16-303 which were submitted by Craig Sato, Chairman of CMP 3 and 16 Reconciliation Task Group.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-36 Log #1620 NEC-P16 **Final Action: Hold**
(770.113)

TCC Action: The Technical Correlating Committee understands that only Comment 16-36 is being Held.

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-48
Recommendation: Revise proposed text t as follows:

770.113(B)(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in metal raceways ~~that are installed~~ in compliance with 300.22(B).

770.113(C)(5) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in metal raceways ~~that are installed~~ in compliance with 300.22(C).

770.113(D)(2) Delete this text.

770.113(D)(3) Renumber to (D)(2) and revise the text as follows:
Types OFNP, OFCP, OFNR, and OFCR installed in plenum optical fiber raceway, plenum communications raceway, riser optical fiber raceway, riser communications raceway or listed riser cable routing assemblies in accordance with 770.110.

770.113(E) Risers- Cables in Metal Raceways or ~~Fireproof~~ Fire-resistance-rated Shafts. Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC shall be permitted in metal raceway or in a ~~fireproof~~ fire-resistance-rated shaft with firestops at each floor.

770.113(F)(3) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in plenum, riser, or general-purpose optical fiber raceway or plenum, riser or general-purpose communications raceway or in a raceway permitted in Chapter 3~~.~~

770.113(G) Cable Trays. The following cables and raceways shall be permitted to be ~~installed~~ supported in cable trays: Cable trays and cables in plenums shall be installed in accordance with 300.22 and 800.113(C)(4).

Substantiation: In (B)(2), the word "metal" should be added to make this requirement very simple and very clear without having to refer to the entire text of 300.22, just as the Panel clarified in (C)(4) that only *metallic* cable trays are allowed. The informational note in this section refers to NFPA 90A which requires the use of metal raceways in these spaces.

In (C)(5) "metal" was added to clarify that these cables must be installed in metal raceways in accordance with the requirements in 300.22(C) and NFPA 90A.

Text in 770.113(D)(2) was deleted and the requirement combined with the text in (3), now renumbered to (2). This eliminates redundant text.

In (E) "Fireproof" was changed to "fire-resistance-rated", which is the appropriate terminology.

In (F)(3) text was added to include Chapter 3 raceways which can also be used in one and two family dwellings

In (G) the word "installed" was changed to "supported" to properly reflect the use of cable tray as a support method. Text was added to clarify special requirements for plenum applications. Most of the other sections of 770.113 are *locations* (spaces uses for environmental air, risers, other building locations, etc.) not *products*. The use of cable tray and the type of cables allowed in cable trays are dependent upon where the tray is installed. This gets lost in the current (G), since it appears as if you could use all types of optical fiber cables in cable trays no matter where the cable tray is installed.

Panel Meeting Action: Hold

Panel Statement: Changing "fireproof" to "fire-resistance rated" is a concept that has not had public review by being published in the ROP.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-37 Log #1627 NEC-P16 **Final Action: Accept in Principle (770.113)**

TCC Action: The Technical Correlating Committee directs that the phrase "and plenums" be removed from the title, the text, and the Informational Note in 770.113(B) as Accepted in the panel action text of Proposal 3-94.
Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-48
Recommendation: Revise text to read as follows:
770.113 Installation of Optical Fiber Cables and Raceways, and Cable Routing Assemblies. Installation of optical fiber cables and raceways, and cable routing assemblies shall comply with 770.113(A) through (J). Installation of raceways shall also comply with 770.12 and 770.110.
(A) Listing. Optical fiber cables and raceways, and cable routing assemblies installed in buildings shall be listed.
Exception: Optical fiber cables that comply with 770.48 shall not be required to be listed.
(B) Fabricated Ducts and Plenums Used for Environmental Air. The following cables shall be permitted in ducts and plenums, as described in 300.22(B) if they are directly associated with the air distribution system:
(1) Up to 1.22m (4 ft) of Types OFNP and OFCP
(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in raceways that are installed in compliance with 300.22(B).
Informational Note: For information on fire protection of wiring installed in fabricated ducts and plenums see Sections 4.3.4.1 (air ducts) and 4.3.11.3.3 (apparatus casings plenums) in NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*
(C) Other Spaces Used For Environmental Air (Plenums). The following cables and raceways shall be permitted in other spaces used for environmental air as described in 300.22(C):
(1) Types OFNP and OFCP
(2) Plenum optical fiber raceway
(3) Types OFNP and OFCP installed in plenum optical fiber raceway or plenum communications raceway
(4) Types OFNP and OFCP supported by metallic cable trays or cable tray systems
(5) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in raceways that are installed in compliance with 300.22(C).
Informational Note: For information on fire protection of wiring installed in other spaces used for environmental air see Sections 4.3.11.2 (ceiling cavity plenum), 4.3.11.4 (air-handling unit room plenum) and 4.3.11.5 (raised floor plenum) of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*
(D) Risers-Cables, Raceways and Cable Routing Assemblies in Vertical Runs. The following cables, raceways and cable routing assemblies shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:
(1) Types OFNP, OFCP, OFNR and OFCR
(2) Plenum and riser optical fiber raceways
(3) Riser cable routing assemblies
(4) Types OFNP, OFCP, OFNR and OFCR installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) riser cable routing assembly
Informational Note: See770.26 for firestop requirements for floor penetrations.
(E) Risers-Cables and Raceways in Metal Raceways. The following cables and raceways shall be permitted in metal raceways in a riser having firestops at each floor:
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
Informational Note: See 770.26 for firestop requirements for floor penetrations.
(F) Risers-Cables, Raceways and Cable Routing Assemblies in Fireproof Shafts. The following cables, raceways and cable routing assemblies shall be permitted to be installed in fireproof riser shafts having firestops at each floor:
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Riser and general-purpose cable routing assemblies
(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly
Informational Note: See 770.26 for firestop requirements for floor penetrations.
(G) Risers-One- and Two-Family Dwellings. The following cables, raceways and cable routing assemblies shall be permitted in one- and two-family dwellings:
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Riser and general-purpose cable routing assemblies
(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly
(H) Cable Trays. The following cables and raceways shall be permitted to be installed in cable trays:
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
(I) Distributing Frames and Cross-Connect Arrays. The following cables, raceways and cable routing assemblies shall be permitted to be installed in distributing frames and cross-connect arrays:
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Riser or general-purpose cable routing assemblies
(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly
(J) Other Building Locations. The following cables, raceways and cable routing assemblies shall be permitted to be installed in building locations other than the locations covered in 770.113(B) through (I):
(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC
(2) Plenum, riser and general-purpose optical fiber raceways
(3) Riser and general-purpose cable routing assemblies
(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC installed in:
a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly
Substantiation: The panel action on the revision of 770.113 changed the title and included several applications of cable routing assemblies, but a few applications were missed. Also the current text of 770.154(B)(2) permits all optical fiber cable types in fireproof shafts and metal raceways in shafts but it does not explicitly permit optical fiber raceways. If bare cables are permitted, then cables in optical fiber raceways should be also be permitted.
Cable routing assemblies should be permitted in fireproof shafts, but are clearly not suitable for installation inside metal raceway. In order to accommodate both optical fiber raceways and cable routing assemblies, the riser section on metal raceways or fireproof shafts was bifurcated.
Repeated references to 770.110 can be replaced with a general requirement to install raceways in accordance with 770.110 and also 770.12. The title of the

section was modified to clarify that it covers cable routing assemblies, not optical fiber cable routing assemblies.

The recommended text for the informational notes dealing with installations in air handling spaces have been modified to better reflect the contents of the mandatory text.

Most of the text in this comment was submitted by Randy Ivans and Gerald Dorna as an affirmative ballot comment on this proposal. See the ROP.

Panel Meeting Action: Accept in Principle

Revise 770.113 to read as follows:

770.113 Installation of Optical Fiber Cables and Raceways, and Cable Routing Assemblies. Installation of optical fiber cables and raceways, and cable routing assemblies shall comply with 770.113 (A) through (J). Installation of raceways shall also comply with 770.12 and 770.110.

(A) Listing. Optical fiber cables and raceways, and cable routing assemblies installed in buildings shall be listed.

Exception: Optical fiber cables that comply with 770.48 shall not be required to be listed.

(B) Fabricated Ducts and Plenums Used for Environmental Air. The following cables shall be permitted in ducts and plenums, as described in 300.22(B) if they are directly associated with the air distribution system:

(1) Up to 1.22m (4 ft) of Types OFNP and OFCP cables

(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables installed in raceways that are installed in compliance with 300.22(B).

Informational Note: For information on fire protection of wiring installed in fabricated ducts and plenums see sections 4.3.4.1 ~~(air ducts)~~ and 4.3.11.3.3 ~~(apparatus casings plenums)~~ in NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(C) Other Spaces Used For Environmental Air (Plenums). The following cables and raceways shall be permitted in other spaces used for environmental air as described in 300.22(C):

(1) Types OFNP and OFCP cables

(2) Plenum optical fiber raceway

(3) Types OFNP and OFCP cables installed in plenum optical fiber raceway or plenum communications raceway

(4) Types OFNP and OFCP cables and plenum optical fiber raceways supported by open metallic cable trays or cable tray systems

(5)Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables installed in raceways that are installed in compliance with 300.22(C)

(6) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, OFC cables and plenum optical fiber raceways, riser optical fiber raceways and general-purpose optical fiber raceways supported by solid bottom metal cable trays with solid metal covers in other spaces used for environmental air (plenums) as described in 300.22(C)

Informational Note: For information on fire protection of wiring installed in other spaces used for environmental air see sections 4.3.11.2 ~~(ceiling cavity plenum)~~, 4.3.11.4 ~~(air-handling unit room plenum)~~ and 4.3.11.5 ~~(raised floor plenum)~~ of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(D) Risers-Cables, Raceways and Cable Routing Assemblies in Vertical Runs. The following cables, raceways and cable routing assemblies shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:

(1) Types OFNP, OFCP, OFNR and OFCR cables

(2) Plenum and riser optical fiber raceways

(3) Riser cable routing assemblies

(4) Types OFNP, OFCP, OFNR and OFCR cables installed in:

a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) riser cable routing assembly

Informational Note: See770.26 for firestop requirements for floor penetrations.

(E) Risers-Cables and Raceways in Metal Raceways. The following cables and raceways shall be permitted in metal raceways in a riser having firestops at each floor:

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables

(2) Plenum, riser and general-purpose optical fiber raceways

(3) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables installed in:

a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway

Informational Note: See 770.26 for firestop requirements for floor penetrations.

(F) Risers-Cables, Raceways and Cable Routing Assemblies in Fireproof Shafts. The following cables, raceways and cable routing assemblies shall be permitted to be installed in fireproof riser shafts having firestops at each floor:

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables

(2) Plenum, riser and general-purpose optical fiber raceways

(3) Riser and general-purpose cable routing assemblies

(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables installed in:

a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly

Informational Note: See 770.26 for firestop requirements for floor penetrations.

(G) Risers-One- and Two-Family Dwellings. The following cables, raceways and cable routing assemblies shall be permitted in one- and two-family dwellings:

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables

(2) Plenum, riser and general-purpose optical fiber raceways

(3) Riser and general-purpose cable routing assemblies

(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables installed in:

a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly

(H) Cable Trays. The following cables and raceways shall be permitted to be supported by ~~installed in~~ cable trays:

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables

(2) Plenum, riser and general-purpose optical fiber raceways

(3) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables installed in:

a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway

(I) Distributing Frames and Cross-Connect Arrays. The following cables, raceways and cable routing assemblies shall be permitted to be installed in distributing frames and cross-connect arrays:

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables

(2) Plenum, riser and general-purpose optical fiber raceways

(3) Riser or general-purpose cable routing assemblies

(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables installed in:

a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly

(J) Other Building Locations. The following cables, raceways and cable routing assemblies shall be permitted to be installed in building locations other than the locations covered in 770.113(B) through (I):

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables

(2) Plenum, riser and general-purpose optical fiber raceways

(3) Riser and general-purpose cable routing assemblies

(4) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables installed in:

a) plenum optical fiber raceway
b) plenum communications raceway
c) riser optical fiber raceway
d) riser communications raceway
e) general-purpose optical fiber raceway
f) general-purpose communications raceway
g) riser cable routing assembly
h) general-purpose cable routing assembly

(5) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC cables installed in a raceway of a type recognized in Chapter 3

Panel Statement: The panel added text to recognize solid bottom cable trays with a solid covers.

The panel added text to permit plenum raceways to be supported by open cable trays.

The panel restored cable in metal raceways for general building use which the submitter had inadvertently left out.

The panel added the word “cables” after each cable type. See panel action and statement on Comment 16-39.

The panel changed "included" to "recognized" in reference to Chapter 3.

The panel changed "installed in" cable trays to "supported by" cable trays.

The panel accepts in principle the recommendations to revise the informational notes. The panel text provides information on air handling spaces using NEC terminology in lieu of NFPA 90A terminology as was used in the ROP text. The panel chooses not to include NFPA 90A "titles" in parenthesis following each section reference.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-38 Log #2420 NEC-P16 **Final Action: Accept in Principle in Part (770.113)**

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-48
Recommendation: Add a (4) to read: Add a new (4) to read: Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG OFN, and OFC installed in a circular raceway complying with Chapter 3.. Cable tray and raceway installed in environmental air space and plenums shall comply with 300.22.
Substantiation: There is no reason to exclude metal raceways from using cable tray as a support system. The text clarifies that Chapter 3 must be consulted as 300.22 has special cable tray requirements and not all cable trays and/or all raceways are permitted in all locations. Also, circular raceways are best suited for cable tray support.
Panel Meeting Action: Accept in Principle in Part

The panel accepts in principle the recommendation dealing with the installation of cables in raceways.

The panel does not accept the installation of cable trays and raceways in environmental air space, other than optical fiber raceways, is outside the scope of Article 770.

Panel Statement: See panel action and statement in Comment 16-37.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

BRUNSSEN, J.: The second sentence of the Panel Action should state: "The panel does not accept the installation of cable trays and raceways in environmental air space, other than optical fiber raceways, as they are outside the scope of Article 770." The sentence as presently stated is incomplete.

16-39 Log #1359 NEC-P16 **Final Action: Accept in Principle in Part (770.113(B), FPN and 770.113(C), FPN)**

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-48
Recommendation: (B) Fabricated Ducts and Plenums Used for Environmental Air. The following wires and cables shall be permitted in ducts and plenums, as described in 300.22(B), if they are directly associated with the air distribution system:

(1) Up to 1.22 m (4 ft) of Types OFNP and OFCP cables

(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC cables installed in raceways that are installed in compliance with 300.22(B)

FPN: See 4.3.4 and 4.3.11.3.3 of NFPA 90A-2009, *Standard for the Installation of Air- Conditioning and Ventilation Systems*, for information on wires and cables installed in fabricated ducts and plenums used for environmental air ~~wire and cables in air ducts and apparatus casings plenums. See 3.3.22 for the definition of an apparatus casing plenum~~.

(C) Other Spaces Used For Environmental Air (Plenums). The following wires, cables and raceways shall be permitted in other spaces used for environmental air as described in 300.22(C):

(1) Types OFNP and OFCP cables

(2) Plenum optical fiber raceways installed in compliance with 770.110

(3) Types OFNP and OFCP cables installed in plenum optical fiber raceways or plenum communications raceways

(4) Types OFNP and OFCP cables supported by metallic cable trays or cable tray systems

(5) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC cables and listed optical fiber wires and cables installed in raceways that are installed in compliance with 300.22(C).

FPN: See 4.3.11.2, 4.3.11.4, and 4.3.11.5 of NFPA 90A-2009, *Standard for the Installation of Air- Conditioning and Ventilation Systems*, for information on wires, cables and raceways installed in other spaces used for environmental air (plenums) ~~wire, cables, and raceways in ceiling cavity, raised floor, and air-handling unit room plenums. See 3.3.22 for plenum definitions~~ .
Substantiation: This comment is intended to bring consistency to this section. The FPN nomenclature or terminology needs to correspond to the terminology in the charging paragraph.

The term "air duct" is not used in this section or elsewhere in the article. The definitions from NFPA 90A are not necessary since this FPN sends the NEC user directly to the relevant sections for the requirements.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept in Principle in Part
The panel accepts in principle the recommendations to revise the informational notes. As recommended by the submitter, the panel text provides information on air handling spaces using NEC terminology in lieu of NFPA 90A terminology as was used in the ROP text.
The panel does not accept the recommendations to include "wires" in the text because there are no wires in Article 770, only optical fiber cables.

The panel accepts in principle adding the word "cables" after each cable type.

Panel Statement: See panel action and statement on Comment 16-37.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-40 Log #2421 NEC-P16 **Final Action: Hold (770.113(D))**

TCC Action: The Technical Correlating Committee understands that the panel is holding only Comment 16-40.
Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-48
Recommendation: Revise the title of 770.113(D) to read: **Cable, Non-metallic Optical Fiber Raceways and Non-metallic Cable Routing Assemblies in Vertical Runs.**
Change the charging paragraph to read "...optical fiber cables...".

Also, change the charging paragraph to read: "...in vertical runs in a fire-resistive-rated shaft.
Substantiation: This correlates with 770.113(E) that stipulates metal and requires a "fireproof" shaft; this is also needed for non-metallic. ASTM and various codes now use the correct term "fire-resistance- rated" instead of "fireproof". We have submitted a comment to facilitate that term in 770.113(E). The term "optical fiber" is inserted for clarity and consistency.
Panel Meeting Action: Hold
Panel Statement: Changing "fireproof" to "fire-resistance rated" is a concept that has not had public review by being published in the ROP.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-41 Log #1628 NEC-P16 **Final Action: Accept in Principle (770.133(B))**

TCC Action: In order to correlate with the action on Comment 3-96, the Technical Correlating Committee changes the action on Comment 16-41 from "Accept" to "Accept in Principle" and directs that the text of 770.133 be revised to read as follows:

"(B) With Communications Cables. Optical fibers shall be permitted in the same cable, and conductive and nonconductive optical fiber cables shall be permitted in the same cable tray, enclosure, raceway or cable routing assembly with conductors of any of the following:

(1) Communications circuits in compliance with Parts I and IV of Article 800.

(2) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820.

(3) Low-power network-powered broadband communications circuits in compliance with Parts I and IV of Article 830.

(C) With Other Circuits. Optical fibers shall be permitted in the same cable, and conductive and nonconductive optical fiber cables shall be permitted in the same cable tray, enclosure or raceway with conductors of any of the following:

(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits
in compliance with Parts I and III of Article 725.

(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760."

Revise existing (C) to (D).

Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-51
Recommendation: Continue to accept Proposal 16-51 in principle in part.
Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

The task group supports the panel action on the proposal to incorporate cable routing assemblies into the section.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
DORNA, G.: The Panel 3 & 16 Reconciliation Task Group submitted Comments 3-96, 16-41, 16-143, 16-236 and 16-296, all dealing with the commingling of cables in raceways, cable trays, enclosures and cable routing assemblies. In the ROP, CMP 16 had had taken actions (accept, accept in principle, accept in principle in part) to treat cable routing assemblies in the same manner as raceways, cable trays, and enclosures, while CMP 3 had rejected the coordinating proposals. The Reconciliation Task Group's comments recommended that CMP 16 continue its direction, and that CMP 3 recognize cable routing assemblies and provide for their use. CMP 16 accepted the Reconciliation Task Group's comments and CMP 3 rejected them.
The CMP 3 rejection statement on Comment 3-96 included an alert to the TCC: "In addition it is brought to the attention of the technical correlating committee that CMP 16 has accepted changes that will allow the use of cable routing assemblies for the installation of Class 2 & 3 circuits and power-limited fire alarm circuits."
The text of 770.133(B) as modified by proposal 16-51 is shown below. (Comment 16-41 simply supported the panel action on Proposal 16-51.)The underlining was added for emphasis.
(B) With Other Conductors. Optical fibers shall be permitted in the same cable, and conductive and nonconductive optical fiber cables shall be permitted in the same cable tray, enclosure, raceway, or cable routing assembly with conductors of any of the following:
(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and III of Article 725
(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760
(3) Communications circuits in compliance with Parts I and IV of Article 800
(4) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820
(5) Low-power network-powered broadband communications circuits in compliance with Parts I and IV of Article 830
The text of 770.133(B) clearly shows that optical fiber cables are permitted to be installed in cable routing assemblies along with other cables that are installed in accordance with their own articles. Class 2 and Class 3 cables must be installed compliant with Article 725. Likewise, power-limited fire alarm cables must be installed compliant with Article 760.
The CMP 3 statement that "CMP 16 has accepted changes that will allow the use of cable routing assemblies for the installation of Class 2 & 3 circuits and power-limited fire alarm circuits" is not correct.
The Panel 16 actions on Proposal 16-51 and Comment 16-41 permit optical fiber cables to be installed in the same routing assembly with Class 2, Class 3 and power-limited fire alarm cables only if the Class 2, Class 3 and power-limited fire alarm cables are installed in compliance with Articles 725 and 760. Obviously, CMP 16 has taken no actions that change the cable installation requirements in Articles 725 and 760.
See also, my affirmative comments on Comments 16-143 and 16-236.

16-42 Log #793 NEC-P16 **Final Action: Reject**
(770.153(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-55
Recommendation: Accept the proposal intended for 770.133(A) as follows:
Second paragraph: Add "cabinet or other enclosure" after "raceway" in two places.
Substantiation: "Cabinet or other enclosure" is included in the third and fourth paragraphs and is appropriate for inclusion.
Panel Meeting Action: Reject
Panel Statement: Cabinets are already included in the third and fourth paragraphs. The submitter has not specified exactly where to include the recommended text.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-43 Log #327 NEC-P16 **Final Action: Accept in Principle**
(770.154)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-56
Recommendation: Revise text to read as follows:
770.154 Applications of Listed Optical Fiber Cables and Raceways, and Cable Routing Assemblies. Permitted and non-permitted applications of listed optical fiber cables and raceways, and cable routing assembly types shall be as indicated in Table 770.154(A). The permitted applications are subject to the installation rules of 770.110 and 770.113. The substitutions for optical fiber cables listed in Table 770.154(B) and illustrated in Figure 770.154 shall be permitted.

See Table 770.154(A) on Page 579

(Renumber Table 770.154(E) and Figure 770.154(E) to Table 770.154(B) and Figure 770.154 and insert them here.)
Substantiation: Multiple changes are recommended to improve the clarity of the new Table 770.154(A).
The applications are grouped in 1) in air-handling spaces, 2) in risers and 3) in all other spaces.
The column for hazardous locations was deleted to correlate with the panel action of proposal 16-16 which moved the hazardous locations requirements to 770.3. This move makes Article 770 parallel to articles 800 and 820.
NFPA 90A does not permit nonmetallic raceway in air ducts so the permitted use of plenum optical fiber raceway in 300.22(B) space was changed to a "N".
The column "In risers in metal raceways or fireproof shafts" was split into two columns because the permitted wiring methods in a raceway differ from the permitted wiring methods in a fireproof shaft. Obviously cable routing assemblies can be used in a fireproof shaft but not inside a raceway.
The titles of the table, the first column and the last two columns were modified to add cable routing assemblies to correlate with the panel actions on proposal 16-48.
The panel action permitted general-purpose cable in a riser in a vertical run. This was changed to an "N" to correlate with the panel action of proposals 16-48 & 16-62.
The column "In building locations other than fabricated ducts and plenums, other spaces used for environmental air (plenums), risers distributing frames and cross connect arrays" can simply be replaced with "General" to correlate with the titles of 800.154(C)(1) and, 820.154(C)(1).
The title of new Table 770.154 contains the word "listed" to correlate with the title of the section.
The two rows dealing with cable routing assemblies were moved above the raceways to bring the blank area of the table to the lower right-hand corner. This is an editorial change to improve the appearance of the table.
This comment is based on the affirmative ballot comment submitted by Gerald Dorna on this proposal. See the ROP.
Panel Meeting Action: Accept in Principle
Panel Statement: See action and statement on Comment 16-44.
Number Eligible to Vote: 16

Table 770.154(A), Applications of Listed Optical Fiber Cables and Raceways, and Cable Routing Assemblies

Cable, Raceway and Cable Routing Assembly Types	Applications												
	In Air-Handling Spaces		In Risers				Within Buildings In Other Than Air-Handling Spaces and Risers						
	In fabricated ducts and plenums as described in 300.22(B)	In other spaces used for environmental air (plenums) as described in 300.22(C)	In vertical runs	In metal raceways	In fireproof shafts	In one- and two-family dwellings	General	In cable trays	In distributing frames and cross connect arrays	In any raceway in Chapter 3	In plenum optical fiber and communi-cations raceways	In riser optical fiber and communi-cations raceways and riser cable routing assemblies	In general-purpose optical fiber and communications raceways and general-purpose cable routing assemblies
OFNP, OFCP	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
OFNR, OFCR	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
OFNG, OFCG, OFN, OFC	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Riser Cable Routing Assemblies	N	N	Y	N	Y	Y	Y	N	Y	N	N	N	N
General-Purpose Cable Routing Assemblies	N	N	N	N	Y	Y	Y	N	Y	N	N	N	N
Plenum Optical Fiber Raceways	N	Y	Y	Y	Y	Y	Y	Y	Y	Y			
Riser Optical Fiber Raceways	N	N	Y	Y	Y	Y	Y	Y	Y	Y			
General-Purpose Optical Fiber Raceways	N	N	N	Y	Y	Y	Y	Y	Y	Y			

Note: An 'N' in the table indicates that the cable, raceway or cable routing assembly type shall not be permitted to be installed in the application. A 'Y' indicates that the cable, raceway or cable routing assembly type shall be permitted to be installed in the application, subject to the limitations described in 770.110 and 770.113.

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-44 Log #1622 NEC-P16 **Final Action: Accept in Principle**
(770.154)

TCC Action: The Technical Correlating Committee directs that the phrase "and plenums" be removed from the application columns in Table 770.154(A).

See the Technical Correlating Committee note on Comment 16-37.

Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-56
Recommendation: Revise text to read as follows:

770.154 Applications of Listed Optical Fiber Cables and Raceways, and Cable Routing Assemblies. Permitted and non-permitted applications of listed optical fiber cables and raceways, and cable routing assembly types shall be as indicated in Table 770.154(A). The permitted applications are subject to the installation rules of 770.110 and 770.113. The substitutions for optical fiber cables listed in Table 770.154(B) and illustrated in Figure 770.154 shall be permitted.

See Table 770.154(A) on Page 581

Renumber Table 770.154(E) to become Table 770.154(B)) and Renumber Figure 770.154(E) to become Table Figure 770.154(B).
Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

Multiple changes are recommended to improve the clarity of the new Table 770.154(A).

The Table has been reformatted in 'landscape' and is recommended by the Task Group to be presented this way in the Code to enhance readability and use.

The applications are grouped in 1) in air-handling spaces, 2) in risers and 3) in all other spaces.

The column for hazardous locations was deleted to correlate with the panel action of Proposal 16-16 which moved the hazardous locations requirements to 770.3. This move makes Article 770 parallel to Articles 800 and 820.

NFPA 90A does not permit nonmetallic raceway in air ducts so the permitted use of plenum optical fiber raceway in 300.22(B) space was changed to a "N".

The column "In risers in metal raceways or fireproof shafts" was split into two columns because the permitted wiring methods in a raceway differ from the permitted wiring methods in a fireproof shaft. Obviously cable routing assemblies can be used in a fireproof shaft but not inside a raceway.

The titles of the table, the first column and the last two columns were modified to add cable routing assemblies to correlate with the panel actions on Proposal 16-48.

The panel action permitted general-purpose cable in a riser in a vertical run. This was changed to an "N" to correlate with the panel action of Proposals 16-48 and 16-62.

The column "In building locations other than fabricated ducts and plenums, other spaces used for environmental air (plenums), risers distributing frames and cross connect arrays" can simply be replaced with "General" to correlate with the titles of 800.154(C)(1) and, 820.154(C)(1).

The title of new Table 770.154 contains the word "listed" to correlate with the title of the section.

The two rows dealing with cable routing assemblies were moved above the raceways to bring the blank area of the table to the lower right-hand corner. This is an editorial change to improve the appearance of the table.

This comment is based on the affirmative ballot comments submitted by Gerald Dorna and Randy Ivans on this proposal. See the ROP.
Panel Meeting Action: Accept in Principle

See TG revised Table 770.154(A) on Page 582

Panel Statement: "Y" was changed to "Y*" to emphasize to the user that installation rules apply.

Add "In..." to the second column in Table 770.154(A) as a prefix to each phrase.

"Chapter 3 raceway" was changed to "In any raceway recognized in Chapter 3 " for consistency with the installation rules.

See panel action on Comment 16-39.

The panel added eight rows to clarify the issues raised in Comment 16-36 including adding rows dealing with installations in raceways and cable trays. An editorial change was made to clarify that air handling spaces refers to 300.22(B) and (C) spaces.

The box "In Air-Handling Spaces" was divided into the component sections "In Fabricated Ducts and Plenums as Described in 300.22(B)" and "In Other Spaces Used for Environmental Air as Described in 300.22(C)" in order to reduce repetition in the next column.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-45 Log #2419 NEC-P16 **Final Action: Reject**
(770.154)

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-56
Recommendation: Revise the first sentence to read: Permitted and non-permitted applications of listed cables and raceways shall be ~~as indicated in Table 770.154(A)~~ in accordance with 770.110 and 770.113.
Substantiation: A comment has been submitted to delete Table 770.154(A). 770.154 will need to be revised for correlation if the Table is deleted.
The following is our reason for deleting the Table.
Table 770.154(A) is very confusing and will lead to misapplication. A number of notes are needed if this table moves forward. Many users will simply take the table as fact without reading limiting requirements applicable per 800.10 and 800.13 A simple "yes" or "no" does not always fit and will lead to misinterpretation.

Several cycles ago both CMP 8 and CMP 7 rewrote their articles. At that time both attempted to develop tables such as 770.154A. There was such a hue and cry against this and so many notes needed to explain what is actually permitted both Panels dropped the tables. Most tables in the NEC are there to clarify special conditions, not normal use. Text, as opposed to tables, is much easier to interpret and enforce correctly.

Just in case the Panel rejects this comment and continues with the Table, we have submitted a separate comment for 16-56 containing notes to the table. **However, REMOVING THE TABLE IS MUCH MORE USER FRIENDLY AS PAST CODE DEVELOPMENT HAS SHOWN.** Thorough reading of 770-110 and 770-113 by users will lead to easier and better enforcement and avoid installers having to remove and redo an installation due to noncompliance.
Panel Meeting Action: Reject
Panel Statement: The recommended action was intended to correlate with the acceptance of Comment 16-46. The panel rejected Comment 16-46.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-46 Log #2422 NEC-P16 **Final Action: Reject**
(Table 770.154(A))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-56
Recommendation: Delete Table 770.154(A).
Substantiation: This is a companion comment for revision of 770.154.

See also comment to add notes to Table 770.154(A) if this comment is not accepted.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no substantiation for the recommended action.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-47 Log #2423 NEC-P16 **Final Action: Hold**
(Table 770.154(A))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-56
Recommendation: For the purpose of this comment the columns are referenced numerically from left to right and as shown in the draft.

Revise column headings as follows:

Column 1. Add "Specifically" before "Fabricated"; delete "and plenums"

Column 4. Change "fireproof" to "fire-resistance- rated."
Substantiation: 1. To correlate with the title of 300.22(B) and avoid confusion.

4. The term "fireproof " is being replaced with the correct description "fire-resistance-rated" throughout ASTM fire related standards and other codes. It is

Table 770.154(A), Applications of Listed Optical Fiber Cables and Raceways, and Cable Routing Assemblies

Applications		Cable, Raceway, and Cable Routing Assembly Type							
		OFNP, OFCP	OFNR, OFCR	OFNG, OFCG, OFN, OFC	Riser Cable Routing Assemblies	General-use Cable Routing Assemblies	Plenum Optical Fiber Raceway	Riser Optical Fiber Raceway	General-Purpose Optical Fiber Raceway
In Air-Handling Spaces	Fabricated ducts and plenums as described in 300.22(B)	Y	N	N	N	N	N	N	N
	Other spaces used for environmental air (plenums) as described in 300.22(C)	Y	N	N	N	N	Y	N	N
In Risers	Vertical runs	Y	Y	N	Y	N	Y	Y	N
	Metal raceways	Y	Y	Y	N	N	Y	Y	Y
	Fireproof shafts	Y	Y	Y	Y	Y	Y	Y	Y
	One- and two-family dwellings	Y	Y	Y	Y	Y	Y	Y	Y
Within Buildings in other than Air-Handling Spaces and Risers	General	Y	Y	Y	Y	Y	Y	Y	Y
	Cable trays	Y	Y	Y	N	N	Y	Y	Y
	Distributing frames and cross connect arrays	Y	Y	Y	Y	Y	Y	Y	Y
	Chapter 3 raceway	Y	Y	Y	N	N	Y	Y	Y
	Plenum optical fiber and communications raceway	Y	Y	Y	N	N			
	Riser optical fiber and communications raceway, and riser cable routing assemblies	Y	Y	Y	N	N			
	General-purpose optical fiber and communications raceway, and general-purpose cable routing assemblies	Y	Y	Y	N	N			

Note: An ‘N’ in the table indicates that the cable type shall not be permitted to be installed in the application. A ‘Y’ indicates that the cable shall be permitted to be installed in the application, subject to the limitations described in 770.110 and 770.113.

Table 770.154(A)
Applications of Listed Optical Fiber Cables and Raceways, and Cable Routing Assemblies in Buildings

Applications		Cable, Raceway, and Cable Routing Assembly Type							
		OFNP, OFCP	OFNR, OFCR	OFNG, OFCG, OFN, OFC	Riser Cable Routing Assemblies	General-purpose Cable Routing Assemblies	Plenum Optical Fiber Raceway	Riser Optical Fiber Raceway	General-Purpose Optical Fiber Raceway
In Fabricated Ducts and Plenums as Described in 300.22(B)	In fabricated ducts and plenums	Y*	N	N	N	N	N	N	N
	In metal raceway that complies with 300.22(B)	Y*	Y*	Y*	N	N	Y*	Y*	Y*
In Other Spaces Used for Environmental Air as Described in 300.22(C)	In other spaces used for environmental air	Y*	N	N	N	N	Y*	N	N
	In metal raceway that complies with 300.22(C)	Y*	Y*	Y*	N	N	Y*	Y*	Y*
	In plenum optical fiber and communications raceways	Y*	N	N	N	N			
	Supported by open metal cable trays	Y*	N	N	N	N	Y*	N	N
	Supported by solid bottom metal cable trays with solid metal covers	Y*	Y*	Y*	N	N	Y*	Y*	Y*
In Risers	In vertical runs	Y*	Y*	N	Y*	N	Y*	Y*	N
	In metal raceways	Y*	Y*	Y*	N	N	Y*	Y*	Y*
	In fireproof shafts	Y*	Y*	Y*	Y*	Y*	Y*	Y*	Y*
	In plenum optical fiber and communications raceways	Y*	Y*	N	N	N			
	In riser optical fiber and communications raceways	Y*	Y*	N	N	N			
	In riser cable routing assemblies	Y*	Y*	N	N	N	N	N	N
	In one- and two-family dwellings	Y*	Y*	Y*	Y*	Y*	Y*	Y*	Y*
Within Buildings in other than Air-Handling Spaces and Risers	General	Y*	Y*	Y*	Y*	Y*	Y*	Y*	Y*
	Supported by cable trays	Y*	Y*	Y*	N	N	Y*	Y*	Y*
	In distributing frames and cross connect arrays	Y*	Y*	Y*	Y*	Y*	Y*	Y*	Y*
	In any raceway recognized in Chapter 3	Y*	Y*	Y*	N	N	Y*	Y*	Y*
	In plenum optical fiber and communications raceway	Y*	Y*	Y*	N	N			
	In riser optical fiber and communications raceway, and riser cable routing assemblies	Y*	Y*	Y*	N	N			
	In general-purpose optical fiber and communications raceway, and general-purpose cable routing assemblies	Y*	Y*	Y*	N	N			

Note: An ‘N’ in the table indicates that the cable type shall not be permitted to be installed in the application. A ‘Y*’ indicates that the cable shall be permitted to be installed in the application, subject to the limitations described in 770.110 and 770.113.

Informational Note 1: Part V of Article 770 covers installation methods within buildings. This table covers the applications of listed optical fiber cables and raceways, and cable routing assemblies in buildings. The definition of point of entrance is in 770.2. Optical fiber entrance cables that have not emerged from the rigid metal conduit or intermediate metal conduit are not considered to be in the building.

Informational Note No. 2: For information on the restrictions to the installation of optical fiber cables in fabricated ducts and plenums see 770.113(B).

a known fact that that "fireproof" is not a legally defensible term. A comment has been submitted to change the term in 770.113(E).
Panel Meeting Action: Hold
Panel Statement: Changing "fireproof" to "fire-resistance rated" is a concept that has not had public review by being published in the ROP.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-48 Log #2424 NEC-P16 **Final Action: Accept in Principle in Part (Table 770.154(A))**

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-56
Recommendation: If the Table is not deleted as proposed in a separate comment, revise Table 770.154(A) as follows:

Add Notes to clarify and change some Y(es) and N(o) permitted uses.

For reference purposes the columns of the draft Table have been numbered in numerical sequence from left to right. The cable and/or raceway types are for identification as shown in the far left product column. It is the intent that a parenthetical note number be placed with the identified product Y or N, with the corresponding note(s) at the bottom of the Table.

Column one –**OFNP and OFCP** – Indicate Note (1) Text: Note (1). OFNP and OFCP Cable in free air in a 300.22(B) location must be directly associated with the air distribution system and is limited to 1.22mm (4 ft); the length limitation does not apply where the cable is installed in a raceway complying with 300.22(B).

Columns one and two – **OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OPC** -- Indicate Note (2). Change N to Y for these cables and apply Note (2).

Text: Note 2. In 300.22(B) and (C) locations these cables are permitted in raceways that comply with 300.22(B) and C).

Column seven -- **OFNP, OFCP, OFNR and OFCR** -- Indicate Note (3). Text: Note 3. In 300.22 locations cable tray is required to be solid metal bottom with solid metal cover.

Column ten -- **OFNP, and OFCP, OFNR, OFCR, OFNG, OFCG, OFN, OPC, and Plenum, Riser, and General –Purpose Optical Fiber Raceways**-- Indicate Note (4) Text: Note 4. Where these cables and optical fiber raceways are installed in a Chapter 3 raceway located in 300.22 area the raceway must comply with 300.22 (A) and (B).

Column eleven– **OFNR, OFCR, OFNG, OFCG, OFN and OFC** -- Indicate Note (5) Text: Note 5. Although permitted in plenum communications raceways in locations other than plenums and environmental air spaces, this combination of raceway and cable is not permitted in 300.22 locations. Cables must be CMP.

Column twelve-- **OFNG, OFCG, CFN, OFC**-- Indicate Note (6). Text: Note 6. Although permitted in riser communications raceways in other locations, this combination of raceway and cable is not permitted in riser applications. The cable must be riser cable.

Column thirteen – **OFNP, OFCP, OFNR, OFCR** -- Indicate Note 7). Text: Note 7. These cables in General Purpose Communications Raceway do not constitute a plenum or riser complying installation.

Substantiation: Notes were developed from the following references:

Note (1). Per 77**0.113(B)**.

Note (2) Per 77**0.113(B)**(2) and 77**0.113(C)**(5).

Note (3) Per 770**.113 (B2), (C)(5) and (G)**

Note (4) This note is needed to assure that "any raceway in Chapter 3" is not misapplied.

Notes (5) and (6) are intended to clarify that when plenum or riser raceways are used that does not translate to a plenum or riser installation unless CMP or Riser cable (as applicable) are used.

Note (7) is intended to clarify that the use of plenum or riser cable in a General Purpose Communications Raceway still is suitable for only a general purpose application.

The Sections permitting the use of Plenum, Riser and General Purpose Raceway do not make it clear which cables have to be installed in which raceway to qualify for a specific application. These notes are also intended to clarify that when these raceways are used as liners in Chapter 3 raceways the location of the installation determines the appropriate Chapter 3 raceway.

Several comments have been submitted to770.113 that clarify metal and other Chapter 3 raceways are permitted. That fact is missing in some sections of 770.113. Developing these notes to the Table emphasized the misinterpretations and difficulty of applying the Table to the text. Column ten is a good example of crossover with Columns one and two and could easily be misinterpreted to use any Chapter 3 raceway anywhere with any cable. We urge the Panel to delete this Table, but offer these notes for consideration in the event you do not.

Panel Meeting Action: Accept in Principle in Part

The panel accepts in principle recommendation 1. See Informational Note No 2 in Table 770.154(A).

The panel accepts in principle recommendation 2. See the row "In metal raceway that complies with 300.22(B)".

The panel accepts in principle recommendation 3. See the row "In metal raceway that complies with 300.22(B)" and the row "In metal raceway that complies with 300.22(C)".

The panel does not accept recommendation 4. Section 300.22(A) states "No wiring systems of any type shall be installed in ducts used to transport dust, loose stock, or flammable vapors."

The panel does not accept recommendation 5. The installation of Type CMP is covered in Article 800.

The panel accepts in principle recommendations 6 and 7. See the row "In plenum optical fiber and communications raceways" and the row "In riser optical fiber and communications raceways."

Panel Statement: See panel action on Comments 16-37 and 16-44.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-49 Log #616 NEC-P16 **Final Action: Accept (770.154(A), 800.154(A), 820.154(A), and 830.154(B))**

TCC Action: The Technical Correlating Committee understands that the actions on Proposals 16-59, 16-175, and 16-280 were "Accepted in Principle".
Submitter: Jarrett Shinoski, CommScope, Inc. / Rep. Insulated Cable Engineers Association, Inc.
Comment on Proposal No: 16-59
Recommendation: Continue to accept Proposals 16-59, 16-175, 16-280, and to accept in principle Proposal 16-340.
Substantiation: The Insulated Cable Engineers Association supports the panel action clarify that metal cable trays and metal cable tray systems are permitted to be used in other space used for environmental air. These cable trays are commonly used in ceiling plenums and underfloor plenums.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-50 Log #636 NEC-P16 **Final Action: Accept (770.154(B)(1))**

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-62
Recommendation: Continue to accept this proposal in principle.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel action to accept this proposal in principle. We agree with Jerry Dorna's ballot comment:

The current riser requirements are so complicated that they could be considered to be a "vague and unenforceable".

Section 770.154(B)(1) requires that "Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type OFNR or OFCR. Floor penetrations requiring Type OFNR or OFCR shall contain only cables suitable for riser or plenum use". Consequently at least two floor penetrations are required, one for plenum and riser cables and another for general-purpose cables.

The panel action on this proposal greatly simplifies the installation rules for cables in risers in other than one and two-family dwellings. The installation rules for one and two-family dwellings are already simplified since any listed cable is permitted.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-51 Log #639 NEC-P16 **Final Action: Accept (770.154(B)(1))**

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-62
Recommendation: Continue to accept this proposal in principle.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel action to accept this proposal in principle. We agree with Jerry Dorna's ballot comment:

The current riser requirements are so complicated that they could be considered to be a "vague and unenforceable".

Section 770.154(B)(1) requires that "Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type OFNR or OFCR. Floor penetrations requiring Type OFNR or OFCR shall contain only cables suitable for riser or plenum use". Consequently at least two floor penetrations are required, one for plenum and riser cables and another for general-purpose cables.

The panel action on this proposal greatly simplifies the installation rules for cables in risers in other than one and two-family dwellings. The installation rules for one and two-family dwellings are already simplified since any listed cable is permitted.
Panel Meeting Action: Accept
Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-52 Log #790 NEC-P16 **Final Action: Reject**
(770.154(B)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-61
Recommendation: Accept the proposal with the following provisions:
Vertical runs of cables shall be supported if the vertical rise exceeds 30 m (100 ft). The support shall be provided at the tope of the run or as close to the top as practical. Intermediate supports shall be provided to limit supported length to no greater than 30 m (100 ft).
Substantiation: Provisions similar to Table 300.19(A) should be required to prevent strain and damage.
Panel Meeting Action: Reject
Panel Statement: The submitter's substantiation has not addressed a safety issue.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-53 Log #475 NEC-P16 **Final Action: Accept in Principle**
(770.154(F))

Submitter: Code-Making Panel 14,
Comment on Proposal No: 16-63
Recommendation: This proposal should be rejected.
Substantiation: The suitability of equipment and wiring in Hazardous (Classified) Locations is covered in Articles 500-516 and is the responsibility of Panel 14.
This comment was developed by a CMP-14 Task Group and balloted through the entire panel with the following ballot results:
14 Eligible to vote
12 Affirmative
2 Ballots Not Returned (T. Beall and D.W. Zipse (Voting Alternate))
1 Comment on Affirmative Vote was received as follows:
D. Batta, Jr. stated: "I agree that the suitability of equipment and wiring in Hazardous (Classified) Locations is covered in Articles 500-516 and is the responsibility of Code-Making Panel 14.
770.154(F) approves several optical fiber cables for use in Hazardous (Classified) Locations that are not addressed in Articles 500-516. To avoid conflicts like this, the suitability of equipment and wiring for use in Hazardous (Classified) Locations should remain the responsibility of Panel 14."
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-15.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-54 Log #1366 NEC-P16 **Final Action: Accept**
(770.154(H) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-64
Recommendation: Continue rejecting this proposal.
Substantiation: The proposal introduces terms that are associated with fire testing/fire performance and are not defined anywhere. Therefore, not only does no application exist (as CMP 16 correctly pointed out) but no organization has developed criteria for such fire performance.
Optical fiber cables in the NEC can be listed as complying with one of the following 4 categories: OFNP and OFCP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), OFNR and OFCR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), OFNG and OFCG (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of CSA FT4) and OFN and OFC (i.e. alternate cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581).
Nowhere does a definition exist for "very-low-smoke producing cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable.
Nowhere does a definition exist for "fire hazard cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable.
Note that there was not even a proposal addressing a recommended set of fire tests for optical fiber "fire hazard" cables.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation to continue to reject but does not necessarily agree with the submitter's substantiation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-55 Log #2065 NEC-P16 **Final Action: Reject**
(770.154(H) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-64
Recommendation: Add new 770.154(H).
(H) Cables With Suffix Markings. Nonconductive and conductive optical fiber cables with single or multiple suffix markings shall be permitted where required to meet special applications.
(1) Cables for Wet Locations. Nonconductive and conductive optical fiber cables installed in wet locations shall be Types OFNP-WET, OFCP-WET, OFNPR-WET, OFCPR-WET, OFNG-WET, OFCG-WET, OFN-WET, OR OFC-WET.
(2) Cables Exposed to Direct Sunlight. Nonconductive and conductive optical fiber cables installed exposed to direct sunlight shall be Types OFNP-SR, OFCP-SR, OFNPR-SR, OFCPR-SR OFNG-SR, OFCG-SR OFN-SR OR OFC-SR.
(3) Cables in Corrosive Locations. Nonconductive and conductive optical fiber cables installed where exposed to oil shall be Types OFNP-PR, OFCP-PR,, OFNPR-PR, OFCPR-PR, OFNG-PR, OFCG-PR, OFN-PR, OR OFC-PR. Nonconductive and conductive optical fiber cables installed where exposed to oil and gas shall be Types OFNP-GR, OFCP-GR, OFNPR-GR, OFCPR-GR, OFNG-GR, OFCG-GR, OFN-GR, or OFC-GR.
(4) Very-Low-Smoke Producing Cables. Nonconductive and conductive optical fiber very-low-smoke producing cables installed to provide low flame spread and very-low-smoke emissions shall be Types OFNP-50, OFCP-50, OFNPR-50, OFCPR-50, OFNG-50, OFCG-50, OFN-50, OR OFC-50.
(5) Fire Hazard Cables. Nonconductive and conductive optical fiber fire hazard cables installed to provide low flame spread, very-low-smoke, and known potential heat release shall be Types OFNP-FHC, OFCP-FHC, OFNPR-FHC, OFCPR-FHC, OFNG-FHC, OFCG-FHC, OFN-FHC, OR OFC-FHC.
Substantiation: This comment provides the application information missing from the proposal, as noted by Panel 16.
Panel Meeting Action: Reject
Panel Statement: Requiring that optical fiber installed in wet locations be listed for wet locations conflicts with 770.48 which permits 50 feet of unlisted cable to enter the building. Likewise, requiring that optical fiber cables that are exposed to direct sunlight be listed for exposure to sunlight also conflicts with 770.48. The requirements of 770.48 recognize that outside plant cables, which are designed for exposure to sunlight and water, need to be brought into buildings in order to connect with listing building cables. Indoor/outdoor listed cables are available that are designed to be used in wet locations and exposed to sunlight.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-56 Log #21 NEC-P16 **Final Action: Accept**
(Table 770.179)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-56
Recommendation: Delete the "Reference" column in Table 770.179.
Substantiation: The panel action on proposal 16-56 changed the references to 770.154. Rather than correcting the references, simply delete the "Reference" column because it is not needed. See Tables 725.179 and 760.179(I) which have no "Reference" column.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-57 Log #2066 NEC-P16 **Final Action: Reject**
(770.179)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-65
Recommendation: Accept Proposal 16-65.
Substantiation: There are companion comments to establish applications for the cables.
Panel Meeting Action: Reject
Panel Statement: The panel has not accepted any of the proposals or comments for new cable types, therefore, markings are not required.
Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-58 Log #637 NEC-P16 **Final Action: Accept**
(770.179(A), FPN)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-66
Recommendation: Continue to reject this proposal.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel that the FPNs are more user-friendly in current locations.

This FPN information is valuable for the user of the code and the user should not have to go back to an annex to find it.

We also support the panel in rejecting similar Proposals 16-68, 16-71, 16-74, 16-85, 16-87, 16-87, 16-89 and 16-189 as well as companion Proposal 16-351.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-59 Log #992 NEC-P16 **Final Action: Reject**
(770.179(A), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-66
Recommendation: The Proposal should be Accepted in Principle, revised and the following words "and Annex A Explanatory Material" added after "NFPA 262-2007" so the revised text reads as follows:
~~FPN~~ Informational Note: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is ~~that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with~~ described in NFPA 262-2007, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, and Annex A Explanatory Material.
Substantiation: The FPN refers to a single test method and defines the maximum values, which are not specified in the body of NFPA 262. Inclusion of the maximum values in the FPN are requirements and this violates 3.1.3 of the NEC Style Manual.

NFPA 262 defines the Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces but it does not specify any pass/fail criteria.

While the values specified for maximum peak optical density, maximum average optical density, and maximum allowable flame travel distance in the FPN are not included in the body of NFPA 262, they are contained in Annex A Explanatory Material. Addition of the words "and Annex A Explanatory Material" will reference the maximum values that are in the FPN and the proposed revised FPN will comply with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Reject
Panel Statement: The comment is on Proposal 16-66 but the recommended text does not address the subject of Proposal 16-66 which recommends moving the informational notes to an annex.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-60 Log #1360 NEC-P16 **Final Action: Reject**
(770.179(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-66
Recommendation: 770.179 Optical Fiber Cables.

Optical fiber cables shall be listed in accordance with 770.179(A) through (D) and shall be marked in accordance with Table 770.179.

(A) Types OFNP and OFCP. Types OFNP and OFCP nonconductive and conductive optical fiber plenum cables shall be listed as being suitable for use in ducts, plenums, and other space used for environmental air and shall also be listed as having adequate fire resistant and low smoke producing characteristics.

FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.*
Substantiation: Retain the FPN as in the current NEC, but only if the FPNs from CMP 3 are not changed to the same language. This comment is being written just in case CMP 3 is willing to change to existing NEC language.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Reject
Panel Statement: The panel upholds its position to not change the FPN.

The panel agrees with the submitter's statement that "the FPN is worded correctly".

See panel action and statement on Comment 16-61.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-61 Log #1361 NEC-P16 **Final Action: Reject**
(770.179(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-66
Recommendation: 770.179 Optical Fiber Cables.

Optical fiber cables shall be listed in accordance with 770.179(A) through (D) and shall be marked in accordance with Table 770.179.

(A) Types OFNP and OFCP. Types OFNP and OFCP nonconductive and conductive optical fiber plenum cables shall be listed as being suitable for use in ducts, plenums, and other space used for environmental air and shall also be listed as having adequate fire resistant and low smoke producing characteristics.

FPN: One method of defining low smoke producing and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.*

~~FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.*~~
Substantiation: This comment is intended to bring consistency to the NEC. In Articles 770, 800, 820 and 830, the FPN is worded correctly but different from what CMP 3 recommended. The original proposal I made to CMP 3 and CMP 16 was already made in the 2005 and 2008 NEC cycles, but was caught up in the "plenum cable moratorium" in the opinion of CMP 3 but not of CMP 16. The present wording also follows the requirements of the preceding section, which requires that the cable be listed as having both "adequate fire-resistant and low smoke-producing characteristics". The wording of CMP 3 (although adequate also) does not explain what is needed to define a cable that is a "low smoke-producing and fire-resistant cable" by omitting the words "a cable that is". However, if CMP 16 makes this change consistency is achieved in the NEC.

With regard to the comment by Mr. Ayers to the proposals in CMP 3, I agree with him, but the (incorrect) use of the term "fire-resistant cable" is consistent in not just the FPNs in all 6 relevant articles (725, 760, 770, 800, 820 and 830) but is also consistent with the use in the charging paragraph.

If CMP 3 and CMP 16 would both like to eliminate the term "fire-resistant cable", consistently in all locations, and replace it by a term such as "low flame spread cable", that would be an excellent idea, but it does require consistency (and probably a task group of both panels). In the meantime the use of the term "fire-resistant cable" is necessary to correlate with the charging paragraph.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Reject
Panel Statement: The panel upholds its position to not change the FPN.

The panel agrees with the submitter's statement that "the FPN is worded correctly".
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-62 Log #2839 NEC-P16 **Final Action: Reject**
(770.179(A), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 16-66
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that "the FPNs are more user-friendly in current locations" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by

multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: This FPN information is valuable for the user of the Code and the user should not have to go back to an annex to find it.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-63 Log #993 NEC-P16 **Final Action: Reject**
(770.179(B), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-67
Recommendation: The Proposal should be Accepted in Principle and revised as follows:
~~FPN~~ Informational Note: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the cables pass the requirements of~~ ANSI/UL 1666-2002, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts.*
Substantiation: The existing phrase "…is that the cables pass the requirements…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining the fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-64 Log #2840 NEC-P16 **Final Action: Reject**
(770.179(B), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 16-68
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that "the FPNs are more user-friendly in current locations" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: This FPN information is valuable for the user of the Code and the user should not have to go back to an annex to find it.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-65 Log #994 NEC-P16 **Final Action: Reject**
(770.179(C), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-70
Recommendation: The Proposal should be Accepted in Principle and the text revised as shown:
~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
Substantiation: Acceptance of the revised wording shown above will still provide the user with a reference to a method of "defining resistant to the spread of fire" and also comply with the NEC Style Manual that FPNs not contain requirements. The pass/fail criteria is already defined in the standard.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining resistant to the spread of fire.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-66 Log #2841 NEC-P16 **Final Action: Reject**
(770.179(C), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 16-71
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that "the FPNs are more user-friendly in current locations" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: This FPN information is valuable for the user of the Code and the user should not have to go back to an annex to find it.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-67 Log #995 NEC-P16 **Final Action: Reject**
(770.179(D), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-73
Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:
~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray in~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.
Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
Substantiation: Acceptance of the revised wording shown above will still provide the user with the references to two methods of "defining resistant to the spread of fire" and also comply with the NEC Style Manual that FPNs not contain requirements. The pass/fail criteria are already defined in those two standards.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on two methods of defining "resistant to the spread of fire".
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-68 Log #2842 NEC-P16 **Final Action: Reject**
(770.179(D), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 16-74
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that "the FPNs are more user-friendly in current locations" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: This FPN information is valuable for the user of the Code and the user should not have to go back to an annex to find it.
Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-69 Log #2067 NEC-P16 **Final Action: Reject**
(770.179(E))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-76
Recommendation: Add new 770.179(E)

(E) Cables in Wet Locations. Nonconductive and conductive optical fiber cables specified in 770.154(A), (B), and (C) shall be listed for installation in wet locations, or shall have a moisture-impervious metal sheath, and shall be marked with a suffix as required in 770.179(E)(a) or (b).
(a) Cables installed in dry location shall not be required to have an additional suffix marking.
(b) Cables suitable for installation in wet locations shall be identified with the suffix "-WET". Conductors and cables listed for damp locations shall be suitable for installation in dry or damp locations. FPN: One method of defining suitability for installation in wet locations is by testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*

Substantiation: A companion comment provides application requirements.
Panel Meeting Action: Reject
Panel Statement: Section 770.179 contains listing requirements only. The recommended text is a mixture of listing requirements and installation requirements. The recommended text is inappropriate for a listing section.

Adding a metal sheath on a nonmetallic cable is inappropriate.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-70 Log #2144 NEC-P16 **Final Action: Accept in Principle**
(770.179(E) (New))

Submitter: Edward Walton, WC Services
Comment on Proposal No: 16-77
Recommendation: Add new text as follows:
770-179(E) Fiber Optic Circuit Integrity (CI) Cables. Cables suitable for use in systems to ensure survivability of critical circuits and pathways during a specified time under fire conditions shall be additionally listed as circuit integrity (CI) cable. Cables identified in 770.179(A) through (D) that meet the requirements for circuit integrity shall have the additional classification using the suffix "CI."

FPN: One method of defining circuit integrity (CI) cable is by establishing a minimum 2-hour fire resistance rating for the cable when tested in accordance with UL 2196-2001, Standard for Tests of Fire Resistive Cable.
Substantiation: In addressing the panel's statement, I believe the copy I have provided of Chapter 12 from NFPA 72 – 2010 makes it clear that there is a need for fiber optic cables that resist attack by fire. One of the best ways to provide this is to allow the designation of "CI" as proposed. This has worked well in Article 760 and would offer the user a better option than requiring an "electrical circuit protective system" or enclosure/protected area as the other options contained in Chapter 12 of NFPA 72 – 2010.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle

Add new text as follows:
770-179(E) Optical Fiber Circuit Integrity (CI) Cables. Cables suitable for use in systems to ensure survivability of critical circuits and pathways during a specified time under fire conditions shall be additionally listed as circuit integrity (CI) cable. Cables identified in 770.179(A) through (D) that meet the requirements for circuit integrity shall have the additional classification using the suffix "CI."

Informational note: One method of defining circuit integrity (CI) cable is by establishing a minimum 2-hour fire resistance rating for the cable when tested in accordance with UL 2196-2001, Standard for Tests of Fire Resistive Cable.
Panel Statement: The panel recognizes that the requirements of NFPA 72, National Fire Alarm and Signaling Code have broadened in new Chapter 12, Circuits and Pathways.

The 2008 NEC, Articles 725, 760 and 800 have provisions for circuit integrity (CI) cables. The user should also have the option of a circuit integrity optical fiber cable.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-71 Log #2068 NEC-P16 **Final Action: Reject**
(770.179(F))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-78
Recommendation: Accept Proposal 16-78.
Substantiation: It is important for cable exposed to sunlight to be listed and marked for the purpose.
Panel Meeting Action: Reject
Panel Statement: Section 770.179 contains listing requirements only. The recommended text is a mixture of listing requirements and installation requirements. The recommended text is inappropriate for a listing section.

The submitter's substantiation that cables are not marked for exposure to direct sunlight is incorrect. There are cables marked as suitable for installation in direct sunlight.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-72 Log #2069 NEC-P16 **Final Action: Accept in Principle**
(770.179(G))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-79
Recommendation: Accept Proposal 16-79.
Substantiation: It is important for industries to have temperature rating information.
Panel Meeting Action: Accept in Principle

Revise 770.179 to read as follows:

770.179 Optical Fiber Cables. Optical fiber cables shall be listed in accordance with 770.179(A) through (D) and shall be marked in accordance with Table 770.179. Optical fiber cables shall have a temperature rating of not less than 60°C (140°F).
Panel Statement: Adding this last sentence will bring about parallelism with 800.179 which states "Communications wires and cables shall have a temperature rating of not less than 60°C."
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-73 Log #2070 NEC-P16 **Final Action: Reject**
(770.179(H) and FPN)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-80
Recommendation: Add new 770.179(H) and FPN as follows:
(H) Cables Installed Exposed to Oil or Gas. Nonconductive and conductive optical fiber cables installed where exposed to oil or gas and oil shall have the additional classification using the following suffixes: "-PR" for oil resistant, and "-GR" for gasoline and oil resistant.
FPN: One method of defining corrosion resistance is testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*
Substantiation: Presently, there is no marking that identifies cables as being suitable for installation where exposed to oil or gas. It is important to have the correct cable for locations that have the potential to degrade cable and conductor insulation and cause system malfunction.
Panel Meeting Action: Reject
Panel Statement: Section 770.179 contains listing requirements only. The recommended text is a mixture of listing requirements and installation requirements. The recommended text is inappropriate for a listing section.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-74 Log #2071 NEC-P16 **Final Action: Reject**
(770.179(I))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-81
Recommendation: Accept Proposal 16-81.
Substantiation: There are cables available that would pass the UL 723 test, but it would be foolish for a manufacturer to submit a product for testing, as there is no marking available to differentiate a very low smoke cable from smoky cable.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided sufficient additional technical information for the panel to reverse its position.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-75 Log #1367 NEC-P16 **Final Action: Accept**
(770.179(L) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-81
Recommendation: Continue rejecting this proposal.
Substantiation: The proposal introduces a definition of a term that is associated with fire testing/fire performance and is not defined anywhere. Therefore, not only does no application exist (as CMP 16 correctly pointed out) but no organization has developed criteria for such fire performance.

Optical fiber cables in the NEC can be listed as complying with one of the following 4 categories: OFNP and OFCP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), OFNR and OFCR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), OFNG and OFCG (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of CSA FT4) and OFN and OFC (i.e. alternate cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581).

Nowhere does a definition exist for “very-low-smoke producing cables”; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable. The proposed fire properties recommended for such a listing do not correspond to any listing developed by a nationally recognized listing organization, even when optional listings are taken into account. UL has developed UL Subject 2424, “Outline of Investigation for Cable Marked “Limited Combustible”, which contains a set of listing criteria for which no application exists, but this document requires that cables also be tested in accordance with NFPA 259.

Cables listed to UL 2424 are already allowed by NFPA 90A to be used anywhere that plenum cables are required.

Both NFPA 90A and the mechanical codes (the IMC, International Mechanical Code, and the UMC, Uniform Mechanical Code) have requirements of 25/50 (flame spread index/smoke developed index, in accordance with ASTM E 84) for materials in plenums other than wires and cables (and some other materials). NFPA 13 (sprinkler standard) also made it clear that the use of plenum cables in plenums does not even introduce a fire hazard sufficient to require installation of sprinklers.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation to continue to reject but does not necessarily agree with the submitter’s substantiation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-76 Log #617 NEC-P16 **Final Action: Accept**
(770.182)

Submitter: Jarrett Shinoski, CommScope, Inc. / Rep. Insulated Cable Engineers Association, Inc.
Comment on Proposal No: 16-83
Recommendation: Continue to reject this proposal.
Substantiation: The Insulated Cable Engineers Association supports the panel action to reject this proposal. All listed optical fiber cables are suitable for use in cable trays. An additional listing category and marking is not needed.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-77 Log #1629 NEC-P16 **Final Action: Accept**
(770.182)

Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-82
Recommendation: Continue to accept Proposal 16-82 in principle and revise the FPNs as follows:

(B) Riser Optical Fiber Raceways and Cable Routing Assemblies. ……

Informational Note: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is that the raceways and cable routing assemblies pass the requirements of the test for flame propagation (riser) in UL 2024, *Standard for Optical Fiber Cable Raceway*, or UL2024A, *Outline of Investigation for ~~Optical Fiber~~ Cable Routing Assemblies, as applicable.*

(C) General-Purpose Optical Fiber Cable Raceways and Cable Routing Assemblies. ……

Informational Note: One method of defining resistance to the spread of fire is that the raceways and cable routing assemblies pass the requirements of the vertical-tray flame test (general use) in UL 2024, *Standard for Optical Fiber Cable Raceway*, or UL2024A, *Outline of Investigation for ~~Optical Fiber~~ Cable Routing Assemblies, as applicable.*
Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

Cable routing assemblies were omitted from the FPNs. Acceptance of this comment will correct that oversight.

UL has changed the title and has expanded the scope of Outline of Investigation Subject 2024A and its associated Guide Information Page (White Book, QBAA). The title of the UL Outline has been changed from “Optical Cable Routing Assemblies” to “Cable Routing Assemblies” and the title of the QBAA Guide Information Page has been changed from “Optical Fiber/ Communications Cable Routing Assemblies for Use in Telecommunications Installations” to “Cable Routing Assemblies.” The scope has been broadened to include the application of cable routing assemblies with communications wires and Class 2, Class 3, power-limited fire alarm, and low-power network-powered broadband communications cables.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-78 Log #2072 NEC-P16 **Final Action: Accept**
(770.182)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-82
Recommendation: Continue to Accept in Principle.
Substantiation: AFAA supports the panel 16 action on this proposal.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-79 Log #996 NEC-P16 **Final Action: Reject**
(770.182(A), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-84
Recommendation: The Proposal should be Accepted in Principle and revised to read as shown:

~~FPN:~~ Informational Note: One method of defining that an optical fiber raceway is a low smoke producing raceway and a fire-resistant raceway is described in ~~that the raceway exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with~~ the plenum test in UL 2024, Standard for Optical Fiber Cable Raceway.
Substantiation: UL 2024 defines the test method and the pass/fail criteria. The present FPN specifies the requirements when tested in accordance with UL 2024; that very clearly stipulates a requirement and a test method, which is not permitted in a FPN. Acceptance of the revised wording will provide the user with the reference to one method of determining that an optical fiber raceway is a low smoke producing raceway and a fire-resistant raceway and also comply with the NEC Style Manual.

Changing “FPN” to “Informational Note” provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method

of defining an optical fiber raceway that is low smoke producing and fire resistant.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-80 Log #2843 NEC-P16 **Final Action: Reject**
(770.182(A), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 16-85
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that "the FPNs are more user-friendly in current locations" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: This FPN information is valuable for the user of the Code and the user should not have to go back to an annex to find it.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-81 Log #997 NEC-P16 **Final Action: Reject**
(770.182(B), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-86
Recommendation: The Proposal should be Accepted in Principle and revised as follows:
~~FPN~~ Informational Note: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the raceways pass the requirements of~~ the Test for Flame Propagation (Riser) in UL 2024, *Standard for Optical Fiber Cable Raceway.*
Substantiation: The existing phrase "…that the raceways pass the requirements of…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining fire-resistant characteristics capable of carrying fire floor to floor.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-82 Log #2844 NEC-P16 **Final Action: Reject**
(770.182(B), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 16-87
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that "the FPNs are more user-friendly in current locations" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: This FPN information is valuable for the user of the Code and the user should not have to go back to an annex to find it.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-83 Log #998 NEC-P16 **Final Action: Reject**
(770.182(C), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-88
Recommendation: The Proposal should be Accepted in Principle and revised as follows:
~~FPN~~ Informational Note: One method of defining resistance to the spread of fire is ~~that the raceways pass the requirements of~~ described in the Vertical-Tray Flame Test (General Use) in UL 2024, Standard for Optical Fiber Cable Raceway.
Substantiation: The existing phrase "…raceways pass the requirements of…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.
Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining resistance to the spread of fire.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-84 Log #2845 NEC-P16 **Final Action: Reject**
(770.182(C), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 16-89
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that "the FPNs are more user-friendly in current locations" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: This FPN information is valuable for the user of the Code and the user should not have to go back to an annex to find it.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15

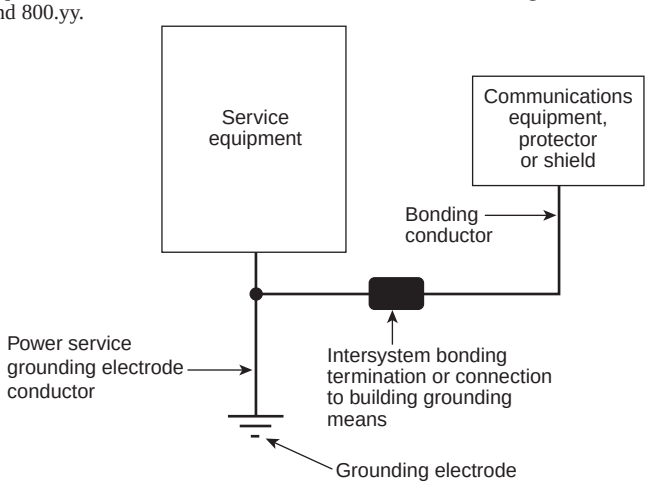
Ballot Not Returned: 1 Esemplare, R.

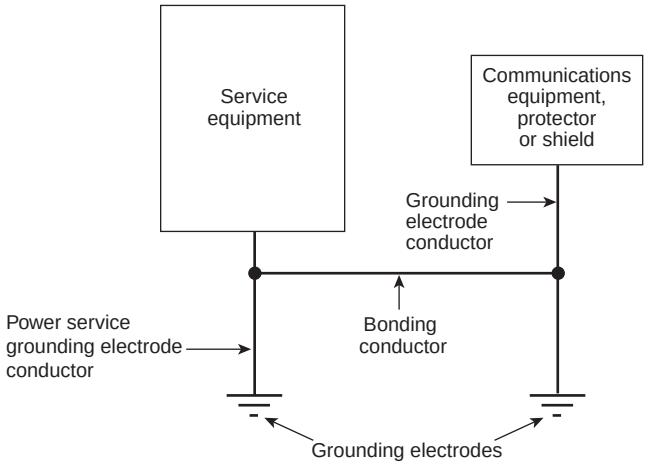
ARTICLE 800 — COMMUNICATIONS CIRCUITS

16-84a Log #CC1600 NEC-P16 **Final Action: Accept**
(800)

Submitter: Code-Making Panel 16,
Comment on Proposal No: 16-91
Recommendation: Insert the following informational note immediately following the number reference and title to Article 800 to read as follows:

Informational Note: The general term "Grounding Conductor" as previously used in this Article is replaced by either "Bonding Conductor" or "Grounding Electrode Conductor (GEC)" where applicable to more accurately reflect the application and function of the conductor. See Informational Figures 800.xx and 800.yy.





Insert the following informational note immediately following the number reference and title to Articles 770, 810, 820 and 830 to read as follows:

Informational Note: The general term "Grounding Conductor" as previously used in this Article is replaced by either "Bonding Conductor" or "Grounding Electrode Conductor (GEC)" where applicable to more accurately reflect the application and function of the conductor.

Substantiation: The panel adds an informational note to clarify the change relative to the use of the new terms "Bonding Conductor" or "Grounding Electrode Conductor (GEC)" which now replace the general term "Grounding Conductor". Two Figures are added to provide clarity.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

BRUNSSEN, J.: It is imperative that the Informational Note (IN) contained in this comment become a part of the 2011 NEC. It provides a clear and concise explanation of the 'grounding conductor' revisions implemented by the Panel, as well as describing the application and functionality of the conductor. This is especially important as Panel 5 has acted to revert to the 2008 NEC definition of 'grounding electrode conductor' (GEC) (i.e., there will be no mention of communications in the definition of GEC in Article 100), while continuing to eliminate 'grounding conductor' from the Art. 100 definitions. Additionally, Panel 5 has substantiated their Panel Action on comments related to this issue based upon Panel 16 Panel Actions and the inclusion of the IN contained in this Panel Comment. Without the new IN and accompanying diagrams, and with no mention of communications in the Article 100 definition of GEC, I believe that total confusion in Article 770 and Chapter 8 will result.

IVANS, R.: While the general changes regarding the elimination of the term "Grounding Conductor" and replacing it with either "Grounding Electrode Conductor" or "Bonding Conductor" are intended to better align Chapter 8 and Article 770 with the rest of the Code, it represents a significant change to the communications industry and the terminology used in installation practices for many years. I fully support the inclusion of the informational figures into Article 800 with additional reference notes in the rest of the Chapter 8 Articles and Article 770. I will emphasize the importance of this by saying that without the inclusion of this explanatory material, I would likely not cast an affirmative vote for any of the proposals related to the elimination of the term "Grounding Conductor" on the basis that the change in terminology without clarifying explanations could lead to confusion and result in unsafe installations.

OHDE, H.: We support this CMP 16 comment and action regarding the addition of the informational note and the two informational figures to be located following the number reference and article title. This informational note and informational figures will provide the end user with language clarity relative to the use of the new terms "bonding conductor" or "grounding electrode conductor" where used appropriately throughout these articles.

16-85 Log #542 NEC-P16 **Final Action: Reject**
(800)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-91
Recommendation: Continue to reject the proposal.
Substantiation: The panel statement has correctly identified several criteria that make the "grounding electrode conductor" unique and different from a communications "grounding conductor". They include: connection of the grounded conductor (neutral) and the equipment grounding conductor from within the power service equipment to the grounding electrode/ grounding electrode system at the premises, specific requirements for material, installation, sizing and accessibility, and service as the interconnection point for other equipment/systems required to be grounded. Communications grounding conductors do not have the required attributes to serve these important functions. Identifying them as such will lead to confusion, misapplication of grounding rules and inadequate grounding. See my affirmative ballot comment on Proposal 16-91.

The Panel might consider, as a response to this comment, 'relocating' the existing definition of "Grounding Conductor" from Article 100 to Sections 770.2, 800.2, 820.2, 830.2 and 840.2 with no technical change, or revising the definition in Article 100 to suit communications applications as indicated in my affirmative ballot comment on Proposal 16-91.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the submitter.

The panel has reviewed the proposed CMP 5 grounding terminology changes and has accepted the changes with editorial revisions in an effort to ensure consistent terminology throughout the Code.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

PIRKLE, W.: The terms "bonding conductor" and " grounding electrode conductor" provide clarity and consistency through out the code. The new terms better defines the function of the conductors.

16-86 Log #611 NEC-P16 **Final Action: Accept in Principle**
(800)

Submitter: Travis Lindsey, Travis Lindsey Consulting Services
Comment on Proposal No: 16-91
Recommendation: Replace the term "~~grounding conductor~~", with the term "grounding electrode conductor", throughout this article.
Substantiation: The term "grounding electrode conductor", is a specific term and thus it is easier for most people in the industry to understand the purpose. The generic term "grounding conductor" is so general that most people can misunderstand the application. It cannot be held to be in the best interest of safety for a general misunderstanding of terms to be an allowable mode in the NEC process.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-125.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-87 Log #1268 NEC-P16 **Final Action: Accept in Principle**
(800)

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 16-91
Recommendation: I highly encourage CMP-16 to accept this proposal in principle and accept the coordinated set of comments that provide the completed revisions throughout Article 800.
Substantiation: This comment responds to action by CMP-5 to delete the term "grounding conductor" and revise the term "grounding electrode conductor." Two definitions that apply to a conductive path in the grounding scheme that functions as a grounding electrode conductor are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 800. The coordinated comments actually even correct misuse of grounding terms in a few locations that existed for a few cycles.

CMP-5 has responsibilities for defined grounding and bonding terms (Code wide). This comment respects the independence of CMP-16 regarding Chapter 8 based on 90.3: this work is not an effort to remove that independence. These proposed revisions are technically correct and result in grounding and bonding terms being used consistently with how they are defined. The term "grounding conductor" is too broad and has been part of a planned migration for removal since the 2005 edition. This planned revision is part of a larger plan implemented by the NEC-2008 TCC assigned grounding and bonding task group work. The grounding and bonding concepts are simple. If grounding happens, a connection is made to an electrode by use of a grounding electrode conductor. Bonding connected conductive parts to establish continuity and conductivity between them. The proposed revisions do not change anything technically in the article: they only make the use of grounding terms consistent with how they are defined, improving the current text. The only change proposed is in use of terms. All other rules such as sizing, installation and so forth remain as specified in this article, as before.

Not accepting the proposed revisions shows a deliberate action to allow continued inconsistency and subjectivity to remain in the NEC. CMP-5 actions have deleted the term "grounding conductor" from Aarticle 100 and revised the term "grounding electrode conductor" to work consistently with the limited energy articles in Chapter 8. The term "grounding conductor" has been removed or replaced in Article 250 and other articles of the NEC. Not accepting the proposed revisions in the coordinated comments will result in the continued use of an orphaned term that is not specific and can lead to subjectivity. The proposed changes are technically correct and there have been no technical reasons brought forward to reject what is being proposed. I highly encourage CMP-16 to give strong consideration to the coordinated comments submitted that resolve these inconsistencies and improve clarity and usability within the limited energy articles with regards to grounding and bonding rules. The best approach in Code development work is to look at the long range objectives and what would be best for the NEC. It needs to be practicable, understandable, and enforceable. These proposed revisions are in the spirit of accomplishing all three of these objectives. It's not about who is right or wrong, it is about being successful and ending up with the best Code as a result.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel disagrees with the submitter. The panel has reviewed the proposed grounding terminology changes and has accepted the changes with editorial revisions in an effort to ensure consistent terminology throughout the Code.
See panel action and statement on Comment 16-125.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-88 Log #1996 NEC-P16 **Final Action: Accept in Principle**
(800)

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 16-91
Recommendation: Replace the term "grounding conductor" with "grounding electrode conductor" throughout this Article.
Substantiation: I agree with the submitter that the term "grounding conductor" and "grounding electrode conductor" are all but identical. The term "grounding electrode conductor" will not be mistaken in the field for the grounded conductor and refers to any point on the grounding electrode system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-125.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22

16-89 Log #2095 NEC-P16 **Final Action: Accept in Principle**
(800)

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 16-91
Recommendation: Revise the proposal as follows: Replace the term "grounding conductor" with "bonding conductor" or "grounding electrode conductor" throughout the article as appropriate.
Substantiation: The present term "grounding conductor" is proposed to be deleted by CMP5. The present term is not correct in most applications. I was part of a CMP-5 and CMP-16 Task Group that could not come to a consensus. The members of CMP-5 went through all the sections in Articles 770, 800, 810, 830 and the proposed new Article 840. The proposed changes are being presented by Phil Simmons and I urge the code panel to either agree with the submitter or make additional changes as needed to remove the term "grounding conductor from these articles.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-125.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22

16-90 Log #2220 NEC-P16 **Final Action: Accept in Principle**
(800)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-91
Recommendation: Accept Proposal 16-91 as intended to delete the term "grounding conductor" and replace it with the term "grounding electrode conductor" throughout Article 800.
Substantiation: Proposal 5-13 deleted the definition of "Grounding Conductor" in Article 100 during the 2011 ROP stage as well as the revision of the term "Grounding Electrode Conductor". The revision of the term "grounding electrode conductor" in Article 100 included wording necessary for the Chapter 8 Articles, therefore, the term "grounding conductor" is no longer needed or required. The term "grounding electrode conductor" is more correct than the term "grounding conductor". Proposal 5-18 which was accepted in principle and revised by CMP-1 reads as follows:

Grounding Electrode Conductor (GEC). A conductor used to connect the system grounded conductor, equipment, communications system protectors, antenna discharge units, communications system protectors, antenna discharge units, communications cables or network interface units to a grounding electrode or to a point on the grounding system.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-125.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-91 Log #2268 NEC-P16 **Final Action: Accept in Principle**
(800)

Submitter: Terry C. Coleman, National Joint Apprentice & Training Committee / Rep. IBEW
Comment on Proposal No: 16-91
Recommendation: Accept Proposal 16-91 as intended to delete the term "grounding conductor" and replace it with the term "grounding electrode conductor" throughout this Article 800.
Substantiation: Proposal 5-13 deleted the definition of "Grounding Conductor" in Article 100 during the 2011 ROP stage as well as the revision of the term "Grounding Electrode Conductor. "The revision of the term "grounding electrode conductor" in Article 100 included wording necessary for the Chapter 8 Articles, therefore, the term "grounding conductor" is no longer needed or required. The term "grounding electrode conductor" is more correct than the term "grounding conductor". Proposal 5-18 which was accepted in principle and revised by CMP-1 reads as follows:

Grounding Electrode Condcutor (GEC). A conductor used to connect the system grounded conductor, equipment, communications system protectors, antenna discharge units, communications cables or network interface units to a grounding electrode or to a point on the grounding system.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-125.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-92 Log #38 NEC-P16 **Final Action: Accept**
(800.1, FPN 6 (New))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-99
Recommendation: Accept proposal 16-99 in principle in part by taking the following action.

Renumber the new 800.3(F) Optical Fiber Cable established by panel action on proposal 16-133 to 800.3(G) Optical Fiber Cable.

Reject the proposed new FPN No. 6 and instead adopt a new 800.3(F) which reads as follows:

(F) Premises-Powered Broadband Communications Systems. Article 840 shall apply to premises-powered broadband communications systems.

Substantiation: Acceptance of this comment will provide parallel references to Articles 830 and 840. See panel action on proposals 16-93 and 16-97 which deleted the FPN referring to Article 830 because there already was a reference to Article 830 in 800.3. Moving the subsection on optical fiber cables down one letter with place the subsection on premises-powered broadband immediately after the subsection on network-powered broadband.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-93 Log #536 NEC-P16 **Final Action: Accept**
(800.1, FPN 6 (New))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-98
Recommendation: Continue to reject the proposal.
Substantiation: The panel has correctly observed that the submitter's proposed FPN directs the reader to a document that applies to facilities identified in 90.2(B)(4) as not covered by the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-94 Log #40 NEC-P16 **Final Action: Accept**
(800.2)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-105
Recommendation: Accept proposal 16-105 in principle by revising the definition of communications raceway to read as follows:
Communications Raceway. An enclosed channel of nonmetallic materials designed for holding communications wires and cables in plenum, riser and general-purpose applications.
Substantiation: The Technical Correlating Committee directed that the panel clarify the panel action on this proposal by complying with 2.2.2 of the NEC Style Manual to not contain mandatory text, such as "listed" and not contain the defined term. The recommended text complies with the Technical Correlating Committee directive.

The definition of raceway in Article 100 is:
"**Raceway.** An enclosed channel of metal or nonmetallic materials designed expressly for holding wires, cables, or busbars, with additional functions as permitted in this *Code*. Raceways include, but are not limited to, rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible conduit, flexible metallic tubing, flexible metal conduit, electrical nonmetallic tubing, electrical metallic tubing, underfloor raceways, cellular concrete floor raceways, cellular metal floor raceways, surface raceways, wireways, and busways."

The beginning text recommended by this comment "An enclosed channel of nonmetallic materials designed for holding communications wires and cables..." is based on the definition of raceway in Article 100. The end of the definition which states that the raceways are designed for "plenum, riser and general-purpose applications" is intended to differentiate between plenum, riser and general-purpose communications raceways and a Chapter 3 raceway that is holding a communications cable.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-95 Log #463 NEC-P16 **Final Action: Reject**
(800.2)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 16-100
Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:

Exposed (to Accidental Contact). A circuit that is in such a position that, in case of failure of supports or insulation, contact with another circuit ~~may~~ result<u>s</u>.

Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.

However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms may or can shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term may shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."

Since the use of the term may in this Section does not meet these criteria, it should be changed.
Panel Meeting Action: Reject
Panel Statement: The submitter's proposed text indicates that in the event of a failure of supports or insulation, contact with an electrical circuit **will** result. Such contact is a possibility but not a certainty.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-96 Log #537 NEC-P16 **Final Action: Accept in Principle**
(800.2)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-108
Recommendation: Revise the definition as follows: "**800.2. Cable Routing Assembly.** A structural system consisting of a single or multiple units and associated fittings used to support and protect optical fiber, communications and data cables."
Substantiation: As indicated in my affirmative ballot comment, the definition is incomplete. The Panel also needs to accommodate the TCC Action. The proposed revisions contained in this comment will complete the definition and satisfy the TCC's concerns. The 'requirement' that the assembly be listed can be included in the appropriate sections of the various Articles, e.g. 800.113(A).
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-99.
The text meets the submitter's intent.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-97 Log #788 NEC-P16 **Final Action: Reject**
(800.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-101
Recommendation: Revise the definition of "premises" as follows:
The land and buildings or other structures located on the user side of the utility-user network point of demarcation.
Substantiation: Structures which are not "buildings" should be included.
Panel Meeting Action: Reject
Panel Statement: Adding "structures" would include telephone poles which support outside plant cables. Outdoor communications wiring, except drop wire, is outside the scope of this Article.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-98 Log #789 NEC-P16 **Final Action: Reject**
(800.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-100
Recommendation: Revise the definition of "Exposed" (to accidental contact) as follows:
A wire or cable, that in case of failure of supports or insulation, is likely to contact another conductor(s).
Substantiation: Failure can result in contact with other conductors which are not "circuits", such as a grounding conductor. "Likely" is a term used many times in the NEC. Per 3.1.2 of the NECStyle Manual, "may" shall only be used as a discretionary judgement by the Authority Having Jurisdiction.
Panel Meeting Action: Reject
Panel Statement: The term "may" as used in the present text connotes "a possibility"; the term "likely" connotes "is probable". The panel does not agree that these are probable events. Of concern is contact with other electric circuits that could energize the communications circuit resulting in an electrical safety hazard. Contact with "other conductors" such as "grounding conductors" would not result in an electrical safety hazard.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-99 Log #1630 NEC-P16 **Final Action: Accept**
(800.2)

Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-108
Recommendation: Accept Proposal 16-108 in principle in part by taking the following actions:
Reject including the definition of cable routing assembly in Article 800.
Instead add a new 800.3(G) as follows:
(G) Cable Routing Assemblies. The definition in 770.2, the applications in 770.154 and installation rules in 770.113 shall apply to Article 800.
Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.
Panel 16 accepted a definition of a cable routing assembly in multiple articles. It also established installation rules and listing requirements in multiple articles. The task group recommends that panel 16 simplify the multiple sections dealing with cable routing assemblies by placing the definition and installation rules in one article only. Since the primary application of cable routing assemblies is currently with optical fiber cables, the task group chose Article 770.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-100 Log #298 NEC-P16 **Final Action: Accept**
(800.2.Communications Raceway)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-105
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by complying with 2.2.2 of the NEC Style Manual to not contain mandatory text, such as "listed" and not contain the defined term.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review the proposal to comply with the NEC Style Manual with respect to the use of mandatory language.
See panel action and statement on Comment 16-94.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-101 Log #299 NEC-P16 **Final Action: Accept**
(800.2.Optical fiber /communications cable routing assembly)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-108
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by complying with 2.2.2 of the NEC Style Manual to not contain mandatory text, such as "listed" and not contain the defined term.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review the proposal to comply with the NEC Style Manual with respect to the use of mandatory language.
See panel action on Comment 16-99.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-102 Log #2425 NEC-P16 **Final Action: Accept in Principle**
(800.2.Point of Entrance)

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-91
Recommendation: Revise text to read as follows:
Point of Entrance. The point within a building at which the wire or cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC) connected by a grounding electrode conductor to an electrode in accordance with 800.100(B).
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.
From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-103.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-103 Log #1892 NEC-P16 **Final Action: Accept in Principle**
(800.2 Point of Entrance)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-91
Recommendation: Revise text to read as follows:
Point of Entrance. The point within a building at which the wire or cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC) connected by a grounding electrode conductor to an electrode in accordance with 800.100(B).
Substantiation: This comment responds to the action of CMP-5 to delete the term "grounding conductor" and revise the term "grounding electrode conductor." Two definitions that apply to a conductive path in the grounding scheme that functions as a grounding electrode conductor are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 800.
Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
Point of Entrance. The point within a building at which the wire or cable emerges from an external wall, from a
concrete floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC) connected
by a bonding conductor or grounding electrode conductor ~~to an electrode~~ in accordance with 800.100(B).
Panel Statement: The panel agrees with the submitter and edits the text as 800.100(B) includes both bonding conductors and grounding electrode conductors.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-104 Log #1345 NEC-P16 **Final Action: Accept**
(800.2, FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-104
Recommendation: Article 800 Communications Circuits.
~~*FPN: Rules that are followed by a reference in brackets contain text that has been extracted from NFPA 90A–2002, Standard for the Installation of Air-Conditioning and Ventilating Systems. Only editorial changes were made to the extracted text to make it consistent with this Code.*~~
Substantiation: This text needs to be deleted as the extract text (definition of air duct) has been deleted by the proposal.
It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-105 Log #300 NEC-P16 **Final Action: Accept**
(800.3(A) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-110
Recommendation: The Technical Correlating Committee directs that the panel reconsider its action on this proposal since there is no need to duplicate 90.3 in accordance with 4.1 of the NEC Style Manual.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review its action on Proposal 16-110.
See panel action and statement on Comment 16-106.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-106 Log #538 NEC-P16 **Final Action: Reject**
(800.3(A) (New))

TCC Action: In accordance with 4.1 of the NEC Style Manual, the Technical Correlating Committee directs that this comment and Proposal 16-110 be reported as "Reject" since there is no need to duplicate part of 90.3.
Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-110
Recommendation: Revise the Panel Action to "Accept in Part". Accept the part as follows that states: "Re-letter the existing (A) to (B), (B) to (C), etc. and establish a new (A). **(A) Chapters 1 through 7.** The requirements of Chapters 1 through 7 shall not apply to Article 800 except where the requirements are specifically referenced in Article 800."
Delete the part that states: "See 90.3."
Substantiation: Removes the reference to 90.3 as flagged by the Technical Correlating Committee.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-107 Log #530 NEC-P16 **Final Action: Accept**
(800.3(D))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-112
Recommendation: Continue to reject this proposal.
Substantiation: The Panel Statement has correctly identified that Article 800 cables and wires contain very low power levels. They are essentially power-limited by the resistance of the battery-feed circuits and conductor lengths involved. If cut, it may be an inconvenience, but it does not constitute an electrical safety hazard. Where greater network power levels are used, such as in Article 830, *Network-Powered Broadband Communications Systems*, burial depths as specified in Table 830.47 apply.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation to continue to reject but does not necessarily agree with the submitter's substantiation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-108 Log #433 NEC-P16 **Final Action: Reject**
(800.10(C))

Submitter: William Q. Cellini, Jr., Ardmore, PA
Comment on Proposal No: 16-114
Recommendation: New text to read as follows:
Service conductors & cables on exterior walls shall be installed in metallic conduit, for protection against burglars & arson; residential, etc., including telephone, security & fire alarm.
Substantiation: My original comment refers to the responsibility of the service provider & installer or owner/customer; whoever has jurisdiction.
Panel Meeting Action: Reject
Panel Statement: The submitter is referencing to a nonexistent section in the NEC. 800.10(C) is nonexistent.
The panel reiterates its position that a broad-based requirement, as proposed by the submitter, is inappropriate as only a small portion of communications installations are used for such purposes. Responsibility for physical protection to deter burglary/arson should accrue to the alarm service provider and/or customer, not the communications utility. The NEC cannot assign implementation responsibility.
Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-109 Log #1346 NEC-P16 **Final Action: Accept**
(800.24, FPN 2)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-121
Recommendation: FPN # 2; See NFPA 90A-2009, *Standard for Installation of Air-Conditioning and Ventilation Systems*, for discrete combustible components installed in accordance with 300.22(B) and (C).

Note to staff and TCC: See also FPNs to the following sections, which have no associated proposals: 424.66 and 640.3(B).
Substantiation: Please reference the updated edition of NFPA 90A: 2009.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-110 Log #539 NEC-P16 **Final Action: Accept**
(800.25)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-122
Recommendation: Continue to reject this proposal.
Substantiation: The submitter has provided no substantiation for the new requirement that is essentially unenforceable.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-111 Log #638 NEC-P16 **Final Action: Accept**
(800.25)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-122
Recommendation: Continue to reject this proposal.
Substantiation: Panel 1 rejected similar Proposals 1-139 and 1-146 with the statement "The submitter has not substantiated that a problem exists, or that the problem would be alleviated by removing abandoned cables and equipment neatly. Rather, the panel concludes, that in some cases, abandoned cables and equipment are best left abandoned. The proposed text is unnecessary as the section more appropriately applies to "Requirements for Electrical Installations" and "Mechanical Execution of Work.""

Panel 3 rejected similar Proposals 3-173 and 3-253 with the statement. "The submitter has not provided technical substantiation for the proposed change, and compliance with this requirement would be unenforceable. This is already covered under 90.4 and 110.2.

Panel 12 rejected similar Proposals 12-114, 12-146 with the statement. "The requirement is unenforceable. Disposition of removed materials is not a code responsibility. The remaining installation is required to be in accordance with 110.3, which is enforceable."
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-112 Log #1398 NEC-P16 **Final Action: Reject**
(800.26)

Submitter: Russell LeBlanc, The Peterson School
Comment on Proposal No: 16-123
Recommendation: The proposal should be accepted in principal but modified as follows:

If a conduit or raceway of metric designator 53 (trade size 2 inch) or larger, penetrates a fire-resistance-rated wall, partition, floor, or ceiling, and that same conduit or raceway also enters an enclosure of the ventilated type, that conduit or raceway shall be sealed or plugged with an approved fire stopping material at the point of entrance to the enclosure to prevent fire, smoke, or other products of combustion from passing through the raceway or conduit into other areas of the building or structure.
Substantiation: I have modified the wording for clarity and so the application is more focused, and less of a "sweeping" change.

In my original proposal I provided a first hand eyewitness account of what happened.

This was NOT a second hand or third hand story. I saw it happen with my own eyes! I am not a novice. I have been in the trade for over 25 years. I have also been teaching electrician classes for over 10 years. I am OSHA certified. I am an instructor approved by the Mass. Dept. of Education, and The Board of Examiners of Electricians. I have authored several other code changes. I am a member of NFPA. No, I am not a Fire chief or fire science engineer, or some other Fire Dept. Official. But I know what I saw, and it just did NOT seem right to me. I am very concerned. The smoke simply should NOT have been able to spread through the building via the raceways. What more technical substantiation is needed than that?

Lets break it down to simple science and logic.

If I build a fire in a fireplace, the smoke will go up the chimney flue, if the flue damper is OPEN.

If I build a fire in a fireplace, the smoke will NOT go up the chimney flue, if the flue damper is CLOSED!

Try it!

Apply logic here.

If I am wrong then maybe we don't need to seal the raceway ends. But this "chimney effect" of the unsealed pipes has already happened once. I have seen it. If it happens again, the occupants may not be as lucky as the first time I saw this phenomenon happen.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The recommended text is vague, unenforceable and lacks specificity. Insufficient data has been provided to justify such a change. Selection of conduit size requiring fire stopping is arbitrary. This may be more of a building Code issue rather than an electrical Code issue.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 1
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:

IVANS, R.: The submitter identifies a concern associated with conduit providing a bypass of firebreaks between floors that should not be ignored. Although there may be issues associated with the general nature of the original proposal or the seemingly arbitrary selection of 2" conduit, the solutions are not technically insurmountable. I am aware of installations where such sealing of conduit was required by local building codes and effectively implemented This item should have been put on hold for further study rather than rejected.

16-113 Log #618 NEC-P16 **Final Action: Accept**
(800.47)

Submitter: Jarrett Shinoski, CommScope, Inc. / Rep. Insulated Cable Engineers Association, Inc.
Comment on Proposal No: 16-129
Recommendation: Continue to accept Proposal 16-129 in principle.
Substantiation: The Insulated Cable Engineers Association supports the panel action to clarify that entrance cables do not need to be listed for wet applications.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-114 Log #2325 NEC-P16 **Final Action: Reject**
(800.47)

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 16-129
Recommendation: Accept the proposal as originally submitted.
Substantiation: The panel did not substantiate the removal of 310.8(B) from the original proposal. The submitter is correct that 310.8(B) needs to be exempted from this rule, as it applies to damp locations. The same substantiation exempting 310.8(C) applies to damp locations.
Panel Meeting Action: Reject
Panel Statement: The panel action satisfied the submitter's intent concerning wet locations.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-115 Log #301 NEC-P16 **Final Action: Accept**
(800.90)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-133
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal relating to the exact location of the proposed text.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review the

panel action.

The text is located in 800.90(B), second paragraph following the fine print note (Informational Note). Note that the text is correct in the draft.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-116 Log #1893 NEC-P16 **Final Action: Accept in Principle (800.90(A) and (B))**

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-91
Recommendation: Revise text to read as follows:

The opening paragraph of 800.90(A) is unchanged by this Comment.

(A)(1) Fuseless Primary Protectors. Fuseless-type primary protectors shall be permitted under any of the conditions given in (A)(1)(a) through (A)(1)(e).

(a) Where conductors enter a building through a cable with grounded metallic sheath member(s) and where the conductors in the cable safely fuse on all currents greater than the current-carrying capacity of the primary protector and of the primary protector grounding electrode conductor

(b) Where insulated conductors in accordance with 800.50(A) are used to extend circuits to a building from a cable with an effectively grounded metallic sheath member(s) and where the conductors in the cable or cable stub, or the connections between the insulated conductors and the plant exposed to accidental contact with electric light or power conductors operating at greater than 300 volts to ground, safely fuse on all currents greater than the current-carrying capacity of the primary protector, or the associated insulated conductors and of the primary protector grounding electrode conductor

(c) Where insulated conductors in accordance with 800.50(A) or (B) are used to extend circuits to a building from other than a cable with metallic sheath member(s), where (1) the primary protector is listed as being suitable for this purpose for application with circuits extending from other than a cable with metallic sheath members, and (2) the connections of the insulated conductors to the plant exposed to accidental contact with electric light or power conductors operating at greater than 300 volts to ground or the conductors of the plant exposed to accidental contact with electric light or power conductors operating at greater than 300 volts to ground safely fuse on all currents greater than the current-carrying capacity of the primary protector, or associated insulated conductors and of the primary protector grounding electrode conductor

800.90(A)(1)(d) is not changed by this Comment.

(e) Where insulated conductors in accordance with 800.50(A) are used to extend circuits to a building from cable with an effectively grounded metallic sheath member(s), and where (1) the combination of the primary protector and insulated conductors is listed as being suitable for this purpose for application with circuits extending from a cable with an effectively grounded metallic sheath member(s), and (2) the insulated conductors safely fuse on all currents greater than the current-carrying capacity of the primary protector and of the primary protector grounding electrode conductor

800.90(A)(2) is not changed by this Comment.

Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 800.

These comments address the changes suggested in proposal 16-91 in each section within Article 800 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.

Panel Meeting Action: Accept in Principle
Revise text to read as follows:

The opening paragraph of 800.90(A) is unchanged by this Comment.

(A)(1) Fuseless Primary Protectors. Fuseless-type primary protectors shall be permitted under any of the conditions given in (A)(1)(a) through (A)(1)(e).

(a) Where conductors enter a building through a cable with grounded metallic sheath member(s) and where the conductors in the cable safely fuse on all currents greater than the current-carrying capacity of the primary protector and of the primary protector bonding conductor or grounding electrode conductor

(b) Where insulated conductors in accordance with 800.50(A) are used to extend circuits to a building from a cable with an effectively grounded metallic sheath member(s) and where the conductors in the cable or cable stub, or the connections between the insulated conductors and the plant exposed to accidental contact with electric light or power conductors operating at greater than 300 volts to ground, safely fuse on all currents greater than the current-carrying capacity of the primary protector, or the associated insulated conductors and of the primary protector bonding conductor or grounding electrode conductor

(c) Where insulated conductors in accordance with 800.50(A) or (B) are used to extend circuits to a building from other than a cable with metallic sheath member(s), where (1) the primary protector is listed as being suitable for this purpose for application with circuits extending from other than a cable with metallic sheath members, and (2) the connections of the insulated conductors to the plant exposed to accidental contact with electric light or power conductors operating at greater than 300 volts to ground or the conductors of the plant exposed to accidental contact with electric light or power conductors operating at greater than 300 volts to ground safely fuse on all currents greater than the current-carrying capacity of the primary protector, or associated insulated conductors and of the primary protector bonding conductor or grounding electrode conductor

800.90(A)(1)(d) is not changed by this Comment.

(e) Where insulated conductors in accordance with 800.50(A) are used to extend circuits to a building from cable with an effectively grounded metallic sheath member(s), and where (1) the combination of the primary protector and insulated conductors is listed as being suitable for this purpose for application with circuits extending from a cable with an effectively grounded metallic sheath member(s), and (2) the insulated conductors safely fuse on all currents greater than the current-carrying capacity of the primary protector and of the primary protector bonding conductor or grounding electrode conductor

800.90(A)(2) is not changed by this Comment.

Panel Statement: The panel accepts the submitter's text and adds "bonding conductor or" in four (4) locations. This ensures consistent terminology throughout the Code.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-117 Log #2426 NEC-P16 **Final Action: Accept in Principle (800.90(A) and (B))**

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-91
Recommendation: Revise text to read as follows:

The opening paragraph of 800.90(A) is unchanged by this Comment.

(A)(1) Fuseless Primary Protectors. Fuseless-type primary protectors shall be permitted under any of the conditions given in (A)(1)(a) through (A)(1)(e).

(a) Where conductors enter a building through a cable with grounded metallic sheath member(s) and where the conductors in the cable safely fuse on all currents greater than the current-carrying capacity of the primary protector and of the primary protector grounding electrode conductor

(b) Where insulated conductors in accordance with 800.50(A) are used to extend circuits to a building from a cable with an effectively grounded metallic sheath member(s) and where the conductors in the cable or cable stub, or the connections between the insulated conductors and the plant exposed to accidental contact with electric light or power conductors operating at greater than 300 volts to ground, safely fuse on all currents greater than the current-carrying capacity of the primary protector, or the associated insulated conductors and of the primary protector grounding electrode conductor

(c) Where insulated conductors in accordance with 800.50(A) or (B) are used to extend circuits to a building from other than a cable with metallic sheath member(s), where (1) the primary protector is listed as being suitable for this purpose for application with circuits extending from other than a cable with metallic sheath members, and (2) the connections of the insulated conductors to the plant exposed to accidental contact with electric light or power conductors operating at greater than 300 volts to ground or the conductors of the plant exposed to accidental contact with electric light or power conductors operating at greater than 300 volts to ground safely fuse on all currents greater than the current-carrying capacity of the primary protector, or associated insulated conductors and of the primary protector grounding electrode conductor

800.90(A)(1)(d) is not changed by this Comment.

(e) Where insulated conductors in accordance with 800.50(A) are used to extend circuits to a building from cable with an effectively grounded metallic sheath member(s), and where (1) the combination of the primary protector and insulated conductors is listed as being suitable for this purpose for application with circuits extending from a cable with an effectively grounded metallic sheath member(s), and (2) the insulated conductors safely fuse on all currents greater than the current-carrying capacity of the primary protector and of the primary protector grounding electrode conductor

800.90(A)(2) is not changed by this Comment.

Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal

and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-116.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-118 Log #405 NEC-P16 **Final Action: Accept**
(800.90(A), FPN No. 2(3))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 16-135
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.

Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-119 Log #302 NEC-P16 **Final Action: Accept**
(800.90(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-136
Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal since the phrase "effectively grounded" is no longer defined in the NEC.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review the panel action.

The panel has reconsidered the panel action on this proposal and determined that the use of the term "effectively grounded" is appropriate in this case. It is important in the use of fuseless protectors that service drops/wires extend from a cable with an effectively grounded metallic sheath to limit power fault and lightning currents. This is an essential requirement and is inherent in the listing and proper application of fuseless protectors. Use of the term "effectively grounded" provides correlation between the NEC and the NESC.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-120 Log #540 NEC-P16 **Final Action: Accept**
(800.90(A)(1))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-136
Recommendation: Continue to reject the proposal.
Substantiation: It is an important safety consideration that cables from which circuits are extended to a building have a grounded metallic sheath. Section 800.90(A)(1) deals with the use of fuseless protectors and it is important, when using these protectors, that service drops/wires extend from a cable with a grounded metallic sheath to limit power fault and lightning currents. This is an essential requirement and is inherent in the listing and proper application of fuseless protectors. The cables addressed in this section are 'outside plant' cables that are covered by the NESC where the term "effectively grounded" is used. To delete "effectively" will reduce correlation between the NEC and the NESC. Note that this is an entirely different situation than that of Proposal 16-39 where the term "effectively" may be deleted (see my comment to Proposal 16-39).

Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-119.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-121 Log #2326 NEC-P16 **Final Action: Reject**
(800.90(A)(1))

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 16-136
Recommendation: This proposal should have been accepted as submitted.
Substantiation: The term "effectively grounded" is no longer used in the NEC. The reason it is no longer used is that it is too vague and subjective—what is the difference between "grounded" and "effectively grounded." CMP-16 should follow the lead of CMP-5 in this endeavor.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-119.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-122 Log #1894 NEC-P16 **Final Action: Accept**
(800.90(B))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-91
Recommendation: Revise text to read as follows:

(B) Location. The primary protector shall be located in, on, or immediately adjacent to the structure or building served and as close as practicable to the point of entrance.

Informational Note: See 800.2 for the definition of *Point of Entrance*.

For purposes of this section, primary protectors located at mobile home service equipment within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, or at a mobile home disconnecting means connected to an electrode by a grounding electrode conductor in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, shall be considered to meet the requirements of this section.

Informational Note: Selecting a primary protector location to achieve the shortest practicable primary protector grounding electrode conductor helps limit potential differences between communications circuits and other metallic systems.

Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 800.

These comments address the changes suggested in proposal 16-91 in each section within Article 800 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.

Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-123 Log #2427 NEC-P16 **Final Action: Accept**
(800.90(B))

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-91
Recommendation: Revise text to read as follows:
(B) Location. The primary protector shall be located in, on, or immediately adjacent to the structure or building served and as close as practicable to the point of entrance.

Informational Note: See 800.2 for the definition of *Point of Entrance*.

For purposes of this section, primary protectors located at mobile home service equipment within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, or at a mobile home disconnecting means connected to an electrode by a grounding electrode conductor in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, shall be considered to meet the requirements of this section.

Informational Note: Selecting a primary protector location to achieve the shortest practicable primary protector grounding electrode conductor helps limit potential differences between communications circuits and other metallic systems.

Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-124 Log #541 NEC-P16 **Final Action: Accept**
(800.100 (New))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-139
Recommendation: Continue to reject this proposal.
Substantiation: The proposed revision is unnecessary. The Panel Statement has correctly indicated that all Article 250 grounding requirements that are applicable to communications are presently fully covered in Article 800, IV, *Grounding Methods*, with reference to specific sections of Article 250 as appropriate. Further, the NEC Style Manual prohibits reference to complete articles.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-125 Log #1886 NEC-P16 **Final Action: Accept in Principle**
(800.100(A) and (B))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-91
Recommendation: Revise text to read as follows:
800.100 Cable and Primary Protector Bonding and Grounding. The primary protector and the metallic member(s) of the cable sheath shall be bonded or grounded as specified in 800.100(A) through (D).

(A) Bonding Conductor or Grounding Electrode Conductor.

(1) Insulation. The bonding conductor or grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.

(2) Material. The bonding conductor or grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.

(3) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 14 AWG. It shall have a current-carrying capacity not less than the grounded metallic sheath member(s) and protected conductor(s) of the communications cable. The bonding conductor or grounding electrode conductor shall not be required to exceed 6 AWG.

(4) Length. The primary protector bonding conductor or grounding electrode conductor shall be as short as practicable. In one- and two-family dwellings, the primary protector bonding conductor or grounding electrode conductor shall be as short as practicable, not to exceed 6.0 m (20 ft) in length.

Informational Note: Similar grounding electrode conductor length limitations applied at apartment buildings and commercial buildings help to reduce voltages that may be developed between the building's power and communications systems during lightning events.

Exception: In one- and two-family dwellings where it is not practicable to achieve an overall maximum primary protector bonding conductor or grounding electrode conductor length of 6.0 m (20 ft), a separate communications ground rod meeting the minimum dimensional criteria of 800.100(B)(2)(2) shall be driven, the primary protector shall be connected to the communications ground rod in accordance with 800.100(C), and the communications ground rod shall be connected to the power grounding electrode system in accordance with 800.100(D).

(5) Run in Straight Line. The bonding conductor or grounding electrode conductor shall be run to the grounding electrode in as straight a line as practicable.

(6) Physical Protection. ~~The~~ Bonding conductors and grounding electrode conductors shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is installed ~~run~~ in a metal raceway, both ends of the raceway shall be bonded to the ~~grounding~~ contained conductor or to the same terminal or electrode to which the bonding conductor or grounding electrode conductor is connected.

(B) Electrode. The bonding conductor or grounding electrode conductor shall be connected in accordance with 800.100(B)(1), (B)(2), or (B)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.
Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In Existing Buildings or Structures Without an Intersystem Bonding Termination ~~Grounding Means~~.
If the existing building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on one of the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to enclosures as covered in 250.94 Exception

(4) The nonflexible metallic power service raceway

(5) The service equipment enclosure

(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure

(7) The grounding electrode conductor or the grounding electrode of a building or structure disconnecting means that is grounded to an electrode as covered in 250.32

A bonding device intended to provide a termination point for the grounding electrode conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is nonremovable.

For purposes of this section, the mobile home service equipment or the mobile home disconnecting means, as described in 800.90(B), shall be considered accessible.

(3) In Existing Buildings or Structures Without an Intersystem Bonding Termination or Grounding Electrode(s) ~~Means~~. If the existing building or structure served has no intersystem bonding termination or grounding electrode(s) ~~means, as described in 800.100(B)(2),~~ the grounding electrode conductor shall be connected to either of the following:

(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)

(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 800.100(B)(2) or (B)(3)(1), to any one of the individual grounding electrodes described in 250.52(A)(7) and (A)(8) or to a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (1/2 in.) in diameter, driven, where practicable, into permanently damp earth and separated from lightning conductors as covered in 800.53 and at least 1.8 m (6 ft) from electrodes of other systems. Steam or hot water pipes or air terminal conductors (lightning-rod conductors) shall not be employed as electrodes for protectors and grounded metallic members.

Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms

in Article 100 and not result in the use of an orphaned undefined term in Article 800.

These comments address the changes suggested in proposal 16-91 in each section within Article 800 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Other editorial changes are included to improve the syntax but intend to maintain the existing meaning without introducing a new concept. This includes adding "existing" to 800.100(B)(2) and (3). The provisions in these sections should properly apply to only existing installations to correlate with the rules in 250.94.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

800.100 Cable and Primary Protector Bonding and Grounding. The primary protector and the metallic member(s) of the cable sheath shall be bonded or grounded as specified in 800.100(A) through (D).

(A) Bonding Conductor or Grounding Electrode Conductor.

(1) Insulation. The bonding conductor or grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.

(2) Material. The bonding conductor or grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.

(3) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 14 AWG. It shall have a current-carrying capacity not less than the grounded metallic sheath member(s) and protected conductor(s) of the communications cable. The bonding conductor or grounding electrode conductor shall not be required to exceed 6 AWG.

(4) Length. The primary protector bonding conductor or grounding electrode conductor shall be as short as practicable. In one- and two-family dwellings, the primary protector bonding conductor or grounding electrode conductor shall be as short as practicable, not to exceed 6.0 m (20 ft) in length.

Informational Note: Similar bonding conductor or grounding electrode conductor length limitations applied at apartment buildings and commercial buildings help to reduce voltages that may be developed between the building's power and communications systems during lightning events.

Exception: In one- and two-family dwellings where it is not practicable to achieve an overall maximum primary protector bonding conductor or grounding electrode conductor length of 6.0 m (20 ft), a separate communications ground rod meeting the minimum dimensional criteria of 800.100(B)(32)(2) shall be driven, the primary protector shall be connected to the communications ground rod in accordance with 800.100(C), and the communications ground rod shall be connected to the power grounding electrode system in accordance with 800.100(D).

(5) Run in Straight Line. The bonding conductor or grounding electrode conductor shall be run ~~to the grounding electrode~~ in as straight a line as practicable.

(6) Physical Protection. ~~The~~ Bonding conductors and grounding electrode conductors shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is installed ~~run~~ in a metal raceway, both ends of the raceway shall be bonded to the ~~grounding~~ contained conductor or to the same terminal or electrode to which the bonding conductor or grounding electrode conductor is connected.

(B) Electrode. The bonding conductor or grounding electrode conductor shall be connected in accordance with 800.100(B)(1), (B)(2), or (B)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In ~~Existing~~ Buildings or Structures Wit~~hout an Intersystem Bonding Termination~~ Grounding Means.

If the ~~existing~~ building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on one of the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to enclosures as covered in 250.94 Exception

(4) The nonflexible metallic power service raceway

(5) The service equipment enclosure

(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure of the power service, or

(7) The grounding electrode conductor or the grounding electrode of a building or structure disconnecting means that is grounded to an electrode as covered in 250.32

A bonding device intended to provide a termination point for the grounding electrode conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is nonremovable.

For purposes of this section, the mobile home service equipment or the mobile home disconnecting means, as described in 800.90(B), shall be considered accessible.

(3) In ~~Existing~~ Buildings or Structures Without an Intersystem Bonding Termination or Grounding Means. If the ~~existing~~ building or structure served has no intersystem bonding termination or grounding means, as described in 800.100(B)(2), the grounding electrode conductor shall be connected to either of the following:

(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)

(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 800.100(B)(2) or (B)(3)(1), to any one of the individual grounding electrodes described in 250.52(A)(7) and (A)(8) or to a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (1/2 in.) in diameter, driven, where practicable, into permanently damp earth and separated from lightning conductors as covered in 800.53 and at least 1.8 m (6 ft) from electrodes of other systems. Steam or hot water pipes or air terminal conductors (lightning-rod conductors) shall not be employed as electrodes for protectors and grounded metallic members.

Panel Statement: The panel agrees with the submitter's intent and edits the text for editorial clarification.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

Comment on Affirmative:

BRUNSSEN, J.: 800.100(A)(6), first sentence, should state: "The bonding conductor or grounding electrode conductor shall be …", for consistency with 800.100(A) (1) though (5). 800.100(B)(3) should read as follows: "If the building or structure served has no intersystem bonding termination, or grounding means as described in 800.100(B)(2), …". The comma needs to be placed after "termination" and not after "means" to distinguish between buildings with an intersystem bonding termination as described in (B)(1) and buildings with grounding means as described in (B)(2).

OHDE, H.: See our affirmative comment for Comment 16-22.

16-126 Log #2428 NEC-P16 **Final Action: Accept in Principle (800.100(A) and (B))**

Submitter: Keith Lofland, IAEI

Comment on Proposal No: 16-91

Recommendation: Revise text to read as follows:

800.100 Cable and Primary Protector Bonding and Grounding. The primary protector and the metallic member(s) of the cable sheath shall be bonded or grounded as specified in 800.100(A) through (D).

(A) Bonding Conductor or Grounding Electrode Conductor.

(1) Insulation. The bonding conductor or grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.

(2) Material. The bonding conductor or grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.

(3) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 14 AWG. It shall have a current-carrying capacity not less than the grounded metallic sheath member(s) and protected conductor(s) of the communications cable. The bonding conductor or grounding electrode conductor shall not be required to exceed 6 AWG.

(4) Length. The primary protector bonding conductor or grounding electrode conductor shall be as short as practicable. In one- and two-family dwellings, the primary protector bonding conductor or grounding electrode conductor shall be as short as practicable, not to exceed 6.0 m (20 ft) in length.

Informational Note: Similar grounding electrode conductor length limitations applied at apartment buildings and commercial buildings help to reduce voltages that may be developed between the building's power and communications systems during lightning events.

Exception: In one- and two-family dwellings where it is not practicable to achieve an overall maximum primary protector bonding conductor or grounding electrode conductor length of 6.0 m (20 ft), a separate communications ground rod meeting the minimum dimensional criteria of 800.100(B)(2)(2) shall be driven, the primary protector shall be connected to the communications ground rod in accordance with 800.100(C), and the communications ground rod shall be connected to the power grounding electrode system in accordance with 800.100(D).

(5) Run in Straight Line. The bonding conductor or grounding electrode

conductor shall be run to the grounding electrode in as straight a line as practicable.

(6) Physical Protection. ~~The~~ Bonding conductors and grounding electrode conductors shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is installed ~~run~~ in a metal raceway, both ends of the raceway shall be bonded to the ~~grounding~~ contained conductor or to the same terminal or electrode to which the bonding conductor or grounding electrode conductor is connected.

(B) Electrode. The bonding conductor or grounding electrode conductor shall be connected in accordance with 800.100(B)(1), (B)(2), or (B)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In Existing Buildings or Structures Without an Intersystem Bonding Termination ~~Grounding Means~~.

If the existing building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on one of the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to enclosures as covered in 250.94 Exception

(4) The nonflexible metallic power service raceway

(5) The service equipment enclosure

(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure

(7) The grounding electrode conductor or the grounding electrode of a building or structure disconnecting means that is grounded to an electrode as covered in 250.32

A bonding device intended to provide a termination point for the grounding electrode conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is nonremovable.

For purposes of this section, the mobile home service equipment or the mobile home disconnecting means, as described in 800.90(B), shall be considered accessible.

(3) In Existing Buildings or Structures Without an Intersystem Bonding Termination or Grounding Electrode(s) ~~Means~~. If the existing building or structure served has no intersystem bonding termination or grounding electrode(s) ~~means, as described in 800.100(B)(2),~~ the grounding electrode conductor shall be connected to either of the following:

(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)

(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 800.100(B)(2) or (B)(3)(1), to any one of the individual grounding electrodes described in 250.52(A)(7) and (A)(8) or to a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (1/2 in.) in diameter, driven, where practicable, into permanently damp earth and separated from lightning conductors as covered in 800.53 and at least 1.8 m (6 ft) from electrodes of other systems. Steam or hot water pipes or air terminal conductors (lightning-rod conductors) shall not be employed as electrodes for protectors and grounded metallic members.

Substantiation: Proposals have been submitted and at current, have been accepted to delete the term “grounding conductor” in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a “Ufer” ground or refer to nonmetallic-sheathed cable as “romex”. For the NEC to use incomplete or inadequate terms such as “grounding conductor” is equally if not more damaging to the learning environment.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 16-125.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-127 Log #303 NEC-P16 **Final Action: Accept**
(800.100(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 16-140

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on Proposal 16-140.

The panel realizes the importance of listing in a communications environment.

The panel intends to require the use of listed insulated, covered or bare conductors in the communications industry.

The panel has obtained verification that listing exists for insulated, covered or bare wire. Listing covers testing and verification of insulation and conductor properties.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-128 Log #304 NEC-P16 **Final Action: Accept**
(800.100(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 16-141

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on Proposal 16-141.

The panel realizes the importance of listing in a communications environment.

The panel intends to require the use of listed insulated, covered or bare conductors in the communications industry.

The panel has obtained verification that listing exists for insulated, covered or bare wire. Listing covers testing and verification of insulation and conductor properties.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-129 Log #798 NEC-P16 **Final Action: Reject**
(800.100(A)(3))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 16-141a

Recommendation: Revise text to read as follows:

The grounding conductor shall not be smaller than 14 AWG. It shall have an ampacity not less than the grounded metallic sheath member(s) and protected conductors of the communications cable. (remainder unchanged.)

Substantiation: Grounding conductor current-carrying capacity should be designated “ampacity,”per 3.2.5.1 of the NEC Style Manual.

Panel Meeting Action: Reject

Panel Statement: The submitter has not identified the proposed revised text. The panel assumes the submitter intended to replace “a current-carrying capacity” with “an ampacity”. Communications grounding conductors are subject to transient conditions resulting from power fault and lightning events. “Ampacity” applies to a continuous (i.e., steady-state) condition and is inappropriate for communications grounding conductors.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-130 Log #1251 NEC-P16 **Final Action: Reject**
(800.100(A)(4) Exception)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 16-143

Recommendation: Accept Proposal 16-143.

Substantiation: Whether or not 800.100(B)(1) through (3) presents a logical sequence for selecting the appropriate telecommunications grounding electrode, in order of preference, was not addressed by Proposal 16-143 and certainly not the purpose of the proposal.

The issue is in specifying a technically sound grounding electrode for electrical systems, such as telecommunications systems, that will assure such systems are connected to earth in a manner that will limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. This is the purpose of a grounding electrode regardless of the system. The acceptance of both Proposal 16-143 and Proposal 16-151 would assure that appropriate electrodes would be utilized when the “primary protector” (grounding electrode

conductor as defined in Article 100) grounding length exceeds 20 feet and where the building or structure served has no natural grounding electrodes.

The electrodes identified in 250.52(A)(4) through (A)(8) are intended as minimum required electrodes that are capable of limiting the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. Note that the key word for electrodes specified by 250.52 is "minimum." The limited currents of telecommunications have little to do with the adequacy of a grounding electrode and especially one with high resistance tendencies such as a 5 ft long ground rod in dry earth. The claim by the committee that 5 ft long rods have "been used successfully and safely by the telecom industry for decades" is misrepresented as it is widely acknowledged that damage during thunderstorms often occurs to sensitive electronics that are connected to telecom wiring where grounding is often inadequate as lighting surges (direct or indirect) enter facilities on telecom lines. The National Electrical Code is not about telecom the utility but is rather about protecting users from the consequences of lightning, line surges, or unintentional contact with higher-voltage lines. There is no justification in specifying inadequate grounding electrodes that have no independent record of performance and that are obviously technically inferior to those require by 250-52(A)(4) through (A)(8).

Utilizing a 5 ft long ground rod by a particular segment of industry, where that industry may be responsible for that electrode, does not provide technical substantiation as to the worth of that electrode. The "statement "very little resistance change will result from using larger sizes of electrodes" is misapplied in this context. One authoritative reference, the *Soares Book on Grounding* states that the diameter of a ground rod does not materially reduce the resistance of a ground rod but that rather that a ground rod's resistance is substantially reduced by extending the length of a ground rod into earth. By actual calculation this could be as much as a 40%+ reduction in resistance by doubling a 5 ft long ground rod's length to 10 ft. It is assumed that the reference to 16-151 in the panel statement was to the tutorial, *The ABCs of Grounding and Bonding* that states, "Very little resistance change will result from using larger sizes of electrodes." This reference, when taken in context, agrees with Soares on the ineffectiveness of increasing the diameter of a ground rod, but the committee is negligent in not mentioning the effectiveness of increasing the length of a ground rod which is agreed upon in both *Soares Book on Grounding* and *The ABCs of Grounding and Bonding*. Power utilities also realize the advantage of deeper, thus longer, electrodes when grounding distribution systems such as substations where sectional ground rods are commonly installed from 20 to 60 ft deep. In addition, it is unfathomable that the committee would indicate that requiring a minimum standard electrode would be too expensive when compared to the damage and expense a lightning strike could cause to a structure where inadequate grounding is installed and especially where any additional cost is negligible. It is also interesting to note that 820.100(B)(3)(2), as well as the inference in 810.21(F)(3), requires that a rod or pipe electrode shall meet the requirements of 250.52(A)(5) while 800.100(B)(3)(2) allows a ½ inch by 5 ft rod or pipe electrode. This seems to be inconsistent concerning the various requirements between similar articles. Therefore, it is difficult to understand the resistance of the Panel 16 members in not accepting Proposals 16-143 and 16-151 that would provide an acceptable minimum standard for grounding telecommunications systems that would help limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation.

There is no argument that bonding together the communications grounding electrode and power grounding electrode system is an important safety aspect. However that also is not the issue addressed by Proposals 16-143 and 16-151. The issue remains to be that ½ in. diameter by 5 ft long ground rods are not an adequate electrode for grounding telecommunication systems and that the electrodes utilized for telecommunication systems installed as a part of the premise wiring system should meet the same minimum requirements as those in Article 250 as they serve the same purpose. The technical substantiation for this change was in Proposal 16-143 and 16-151 and is expanded in this Comment. Code-Making Panel 5 has the expertise on this subject and the users of the NEC as well as the public deserve a reliable minimum standard for grounding their telecommunications systems.

Panel Meeting Action: Reject

Panel Statement: The submitter has neither provided technical justification nor cited a safety issue to justify the elimination of the 5-foot communications ground rod.

See panel action and statement on Comment 16-28.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 14 Negative: 1

Ballot Not Returned: 1 Esemplare, R.

Explanation of Negative:

BOYER, J.: Proposal 16-143 should be reconsidered and accepted as proposed. It is technically sound, reasonable and will aid in reducing losses from lightning, line surges and unintentional contact with higher-voltage lines. Furthermore, they would help stabilize the voltage to earth during normal operation.

16-131 Log #305 NEC-P16 **Final Action: Accept**
(800.100(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-146

Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal as the existing numbering complies with the NEC Style Manual and, is consistent with other lists in the code.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to to review the proposal to comply with the NEC Style Manual.

See panel action on Comment 16-26.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-132 Log #877 NEC-P16 **Final Action: Reject**
(800.100(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-325a

Recommendation: Accept the proposal and revise as follows:

(B)(2)(3) The electric power or lighting service accessible means external to enclosures as covered in 250.94.

(B)(2)(4) The nonflexible electric lighting or power metallic service raceway.

Substantiation: "Power" may be deemed not to include services that supply only lighting loads.

Panel Meeting Action: Reject

Panel Statement: The submitter's proposed text is unrelated to Proposal 16-325a.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-133 Log #306 NEC-P16 **Final Action: Accept**
(800.100(B)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-147

Recommendation: The Technical Correlating Committee directs that the panel clarify that the panel action text on this proposal does not change "intersystem bonding termination" to "intersystem grounding termination" in the title and in the text of the requirement.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to clarify that the panel action on Proposal 16-147.

The Panel clarifies that "intersystem bonding termination" is the correct text. (Note to Staff. The text is correct in the 2011 NEC Draft.)

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-134 Log #1252 NEC-P16 **Final Action: Reject**
(800.100(B)(3))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 16-151

Recommendation: Accept Proposal 16-151.

Substantiation: The issue addressed by this Proposal is in specifying a technically sound grounding electrode for electrical systems, such as telecommunications systems, that will assure such systems are connected to earth in a manner that will limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. This is the purpose of a grounding electrode regardless of the system. The acceptance of both Proposal 16-151 and Proposal 16-143 would assure that appropriate electrodes would be utilized when the "primary protector" (grounding electrode conductor as defined in

Article 100) grounding length exceeds 20 feet and where the building or structure served has no natural grounding electrodes.

The electrodes identified in 250.52(A)(4) through (A)(8) are intended as minimum required electrodes that are capable of limiting the voltage imposed on electric and electronic equipment by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. The committee has seemingly sought to minimize the effects of such imposed faults by stating such faults or events such as lighting deal only in limited currents which is not necessarily true. In addition, limited currents have little to do with the adequacy of a grounding electrode and especially one with high resistance tendencies such as a 5 ft long ground rod. The claim by the committee that 5 ft long rods have "been used successfully and safely by the telecom industry for decades" is misrepresented as it is widely acknowledged that damage during thunderstorms often occurs to sensitive electronics that are connected to telecom wiring where grounding is often inadequate as lighting surges (direct or indirect) enter facilities on telecom lines. The National Electrical Code is not about telecom the utility but is rather about protecting users from the consequences of lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. There is no justification in specifying inadequate grounding electrodes that have no independent record of performance and that are obviously technically inferior to those required by 250-52(A)(4) through (A)(8).

Utilizing a 5 ft long ground rod by a particular segment of industry, where that industry may be responsible for that electrode, does not provide technical substantiation as to the worth of that electrode. The "statement "very little resistance change will result from using larger sizes of electrodes" from *The ABCs of Grounding and Bonding* is misapplied in this context. One authoritative reference, the *Soares Book on Grounding* states that the diameter of a ground rod does not materially reduce the resistance of a ground rod but rather that a ground rod's resistance is substantially reduced by extending the length of a ground rod into earth. By actual calculation this could be as much as a 40%+ reduction in resistance by doubling a 5 ft long ground rod's length to 10 ft. Therefore, the reference from *The ABCs of Grounding and Bonding*, when taken in context, agrees with Soares on the ineffectiveness of increasing the diameter of a ground rod, but the panel is negligent in not mentioning the effectiveness of increasing the length of a ground rod in the panel statement. Power utilities also realize the advantage of deeper, thus longer, electrodes when grounding distribution systems such as substations where sectional ground rods are commonly installed from 20 to 60 ft deep. In addition, it is unfathomable that the committee would indicate that requiring a minimum standard electrode would be too expensive when compared to the damage and expense a lightning strike could cause to a structure where inadequate grounding is installed and especially where any additional installation cost is negligible. It is also interesting to note that 820.100(B)(3)(2), as well as the inference in 810.21(F)(3), specifies that a rod or pipe electrode shall meet the requirements of 250.52(A)(5) while other NEC Chapter 8 Articles as well as 800.100(B)(3)(2) allows the inadequate ½ inch by 5 ft long rod or pipe while all other grounding parameters remain essentially the same. This seems to be inconsistent concerning the various requirements between similar articles. Therefore, it is difficult to understand the resistance of the Panel 16 members in not accepting Proposal 16-151 that would provide an acceptable minimum standard for grounding telecommunications systems that would help limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation..

There is no argument that bonding together the communications grounding electrode and power grounding electrode system is an important safety aspect. However that also is not the issue addressed by Proposal 16-151. The issue remains to be that ½ in. diameter by 5 ft long ground rods are not an adequate electrode for grounding telecommunication systems and that the electrodes utilized for systems installed as a part of the premise wiring system should meet the same minimum requirements as those in Article 250 as they serve the same purpose. The technical substantiation for this change was in Proposal 16-151 and is expanded in this Comment. Code-Making Panel 5 has the expertise on this subject and the users of the NEC as well as the public deserve a reliable minimum standard for grounding any and all telecommunications systems.

In addressing the last part of the panel statement, section 800.100(B)(3) addresses "In Buildings or Structures Without Intersystem Bonding Termination or Grounding Means", and 800.100(B)(2) addresses "In Buildings or Structures with Grounding Means." What possibly could the panel mean when it states "must be taken in context?" 800.100(B)(3) addresses buildings and structures without electrodes, thus there are no grounding electrode means at the building or structure to be identified. Paragraph 800.100(B)(3)(1) states "To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)", but these are not in existence according to the title of 800.100(B)(3). Therefore, the only choice left is 800.100(B)(3)(2) and that states the electrode shall be a plate electrode (A)(7), a local metal underground system or structure (A)(8), or "a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (½ in.) in diameter, driven, where practicable, into permanently damp earth." Not allowed is a ground ring (A)(4) and a listed electrode which is an excellent grounding electrode. A 12.7 mm pipe is approximately a 3/8-inch trade size which is half the required diameter of a pipe electrode of 3/4-inch required by 250.52(A)(5) for a pipe electrode which is considered to be the minimum size for durability that goes back to the 1925 NEC edition. As to a 5 ft rod or pipe being driven into permanently damp earth – where in the US could this be consistently accomplished? The problems in this section alone justify the acceptance of Proposal 16-151.

Panel Meeting Action: Reject

Panel Statement: The panel reiterates its position as stated in the panel statement of the submitter's original proposal. The submitter has neither provided technical justification nor cited a safety issue to justify the elimination of the 5-foot communications ground rod that has been used successfully and safely by the communications industry for decades. It is unreasonable and unnecessary to require installation of such power-oriented grounding means as proposed by the submitter solely for communications applications where power fault and lightning currents are limited by the relatively fine gauge of communications conductors and cable shields.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 14 Negative: 1

Ballot Not Returned: 1 Esemplare, R.

Explanation of Negative:

BOYER, J.: Proposal 16-151 should be reconsidered and accepted as proposed. It is technically sound, reasonable and will aid in reducing losses from lightning, line surges and unintentional contact with higher-voltage lines. Furthermore, it would help stabilize the voltage to earth during normal operation.

16-135 Log #1895 NEC-P16 **Final Action: Accept in Principle**
(800.106(A) and (B))

Submitter: Phil Simmons, Simmons Electrical Services

Comment on Proposal No: 16-91

Recommendation: Revise text to read as follows:

800.106 Primary Protector Grounding and Bonding at Mobile Homes.

(A) Grounding. Grounding shall comply with 800.106(A)(1) and (A)(2).

(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the primary protector ~~ground~~ shall be connected to a grounding electrode ~~conductor~~ in accordance with 800.100(B)(3).

(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the primary protector ~~ground~~ shall be connected to a grounding electrode ~~conductor~~ in accordance with 800.100(B)(3).

(B) Bonding. The primary protector grounding terminal or grounding electrode shall be connected to the metal frame or available grounding terminal of the mobile home with a copper ~~grounding~~ conductor not smaller than 12 AWG under either of the following conditions:

(1) Where there is no mobile home service equipment or disconnecting means as in 800.106(A)

(2) Where the mobile home is supplied by cord and plug

Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 800.

These comments address the changes suggested in Proposal 16-91 in each section within Article 800 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

800.106 Primary Protector Grounding and Bonding at Mobile Homes.

(A) Grounding. Grounding shall comply with 800.106(A)(1) and (A)(2).

(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the primary protector ~~ground~~ shall be connected to a grounding electrode conductor or grounding electrode in accordance with 800.100(B)(3).

(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the primary protector ~~ground~~ shall be connected to a

grounding electrode ~~conductor~~ in accordance with 800.100(B)(3).
(B) Bonding. The primary protector grounding terminal or grounding electrode shall be connected to the metal frame or available grounding terminal of the mobile home with a copper ~~grounding~~ conductor not smaller than 12 AWG under either of the following conditions:
(1) Where there is no mobile home service equipment or disconnecting means as in 800.106(A)
(2) Where the mobile home is supplied by cord and plug.
Panel Statement: The panel accepts the submitter's text and adds "electrode conductor or" to allow the option to connect to the grounding electrode or grounding electrode conductor. This retains the original intent of 800.106(A)(1).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
BRUNSSEN, J.: Revise 800.106(A)(1) to read as follows: "(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the primary protector shall be connected to a grounding electrode in accordance with 800.100(B)(3)." It is unlikely that a grounding electrode conductor will be available if there is no mobile home service equipment, a grounding electrode conductor is not mentioned in any of the sections referenced in 800.100(B)(3), and the revision is consistent with the proposed text of 800.106(A)(2).
OHDE, H.: See our affirmative comment for Comment 16-22.

16-136 Log #2429 NEC-P16 **Final Action: Accept in Principle**
(800.106(A) and (B))

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-91
Recommendation: Revise text to read as follows:
800.106 Primary Protector Grounding and Bonding at Mobile Homes.
(A) Grounding. Grounding shall comply with 800.106(A)(1) and (A)(2).
(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the primary protector ~~ground~~ shall be connected to a grounding electrode ~~conductor~~ in accordance with 800.100(B)(3).
(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the primary protector ~~ground~~ shall be connected to a grounding electrode ~~conductor~~ in accordance with 800.100(B)(3).
(B) Bonding. The primary protector grounding terminal or grounding electrode shall be connected to the metal frame or available grounding terminal of the mobile home with a copper ~~grounding~~ conductor not smaller than 12 AWG under either of the following conditions:
(1) Where there is no mobile home service equipment or disconnecting means as in 800.106(A)
(2) Where the mobile home is supplied by cord and plug
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.
From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-135.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-137 Log #30 NEC-P16 **Final Action: Accept**
(800.110(A)(2))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-159
Recommendation: Replace "optical fiber raceway" with "communications raceway" three times.
Substantiation: Jerry Dona's ballot statement was:
This proposal contains a cut-and-paste error. It is a companion proposal to 16-47. "Optical fiber raceway" should have been replaced with "communications raceway".
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-138 Log #1631 NEC-P16 **Final Action: Accept in Principle**
(800.113)

TCC Action: The Technical Correlating Committee directs the phrase "and plenums" be removed from the title, text and informational note in 800.113(B) because the accepted text in the title, text, and the Informational Note in 300.22(B), as accepted in Proposal 3-94 does not include the term "fabricated plenums."
Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-160
Recommendation: Revise text to read as follows:
800.113 Installation of Communications Wires, Cables and Raceways. Installation of communications wires, cables and raceways shall comply with 800.113 (A) through (L). Installation of raceways shall also comply with 800.110.
(A) Listing. Communications wires, cables and raceways installed in buildings shall be listed.
Exception: Communications cables that comply with 800.48 shall not be required to be listed.
(B) Fabricated Ducts and Plenums Used for Environmental Air. The following wires and cables shall be permitted in ducts and plenums used for environmental air as described in 300.22(B) if they are directly associated with the air distribution system.
(1) Up to 1.22 m (4 ft) of Type CMP
(2) Types CMP, CMR, CMG, CM, CMX and communications wires installed in raceways that are installed in compliance with 300.22(B)
Informational Note: For information on fire protection of wiring installed in fabricated ducts and plenums see Sections 4.3.4.1 (air ducts) and 4.3.11.3.3 (apparatus casings plenums) in NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*
(C) Other Spaces Used For Environmental Air (Plenums). The following wires, cables and raceways shall be permitted in other spaces used for environmental air as described in 300.22(C).
(1) Type CMP
(2) Plenum communications raceway
(3) Type CMP installed in plenum communications raceway
(4) Type CMP supported by metallic cable trays or cable tray systems
(5) Types CMP, CMR, CMG, CM, CMX and communications wires installed in raceways that are installed in compliance with 300.22(C)
Informational Note: For information on fire protection of wiring installed in other spaces used for environmental air see Sections 4.3.11.2 (ceiling cavity plenum), 4.3.11.4 (air-handling unit room plenum) and 4.3.11.5 (raised floor plenum) of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*
(D) Risers- Cables and Raceways in Vertical Runs. The following cables and raceways shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:
(1) Types CMP and CMR
(2) Plenum and riser communications raceways
(3) Types CMP and CMR installed in:
a) plenum communications raceway
b) riser communications raceway
c) riser cable routing assembly
Informational Note: See 800.26 for firestop requirements for floor penetrations.
(E) Risers-Cables and Raceways in Metal Raceways. The following cables and raceways shall be permitted in metal raceways in a riser having firestops at each floor.
(1) Types CMP, CMR, CMG, CM and CMX
(2) Plenum, riser and general-purpose communications raceways
(3) Types CMP, CMR, CMG, CM and CMX installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
Informational Note: See 800.26 for firestop requirements for floor penetrations.
(F) Risers-Cables and Raceways in Fireproof Shafts. The following cables and raceways shall be permitted to be installed in fireproof riser shafts having firestops at each floor.
(1) Types CMP, CMR, CMG, CM and CMX
(2) Plenum, riser and general-purpose communications raceways
(3) Types CMP, CMR, CMG and CM installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
Informational Note: See 800.26 for firestop requirements for floor penetrations.
(G) Risers- One- and Two-Family Dwellings. The following cables and raceways shall be permitted in one- and two-family dwellings:
(1) Types CMP, CMR, CMG and CM

(2) Type CMX less than 6 mm (0.25 in.) in diameter,
(3) Plenum, riser and general-purpose communications raceways
(4) Types CMP, CMR, CMG and CM installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly

(H) Cable Trays. The following wires, cables and raceways shall be permitted to be installed in cable trays.
(1) Types CMP, CMR, CMG and CM
(2) Plenum, riser and general-purpose communications raceways
(3) Communications wires and Types CMP, CMR, CMG and CM installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway

(I) Distributing Frames and Cross-Connect Arrays. The following wires, cables and raceways shall be permitted to be installed in distributing frames and cross-connect arrays.
(1) Types CMP, CMR, CMG, CM and communications wires
(2) Plenum, riser and general-purpose communications raceways
(3) Communications wires and Types CMP, CMR, CMG and CM installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly

(J) Other Building Locations. The following wires, cables and raceways shall be permitted to be installed in building locations other than the locations covered in 800.113(B) through (I).
(1) Types CMP, CMR, CMG and CM
(2) A maximum of 3 m (10 ft) of exposed Type CMX in nonconcealed spaces
(3) Plenum, riser and general-purpose communications raceways
(4) Communications wires and Types CMP, CMR, CMG and CM installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
(5) Types CMP, CMR, CMG and CM installed in:
a) riser cable routing assembly
b) general-purpose cable routing assembly
(6) Communication wires and Types CMP, CMR, CMG, CM and CMX and installed in a raceway of a type included in Chapter 3
(7) Type CMUC undercarpet communications wires and cables installed under carpet

(K) Multifamily Dwellings. The following cables, raceways and wring assemblies shall be permitted to be installed in multifamily dwellings in locations other than the locations covered in 800.113(B) through (G).
(1) Types CMP, CMR, CMG, CM
(2) Type CMX less than 6 mm (0.25 in.) in diameter in nonconcealed spaces
(3) Plenum, riser and general-purpose communications raceways
(4) Communications wires and Types CMP, CMR, CMG and CM installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
(5) Types CMP, CMR, CMG and CM installed in:
a) riser cable routing assembly
b) general-purpose cable routing assembly
(6) Communication wires and Types CMP, CMR, CMG, CM and CMX and installed in a raceway of a type included in Chapter 3
(7) Type CMUC undercarpet communications wires and cables installed under carpet

(L) One- and Two-Family Dwellings. The following cables and raceways shall be permitted to be installed in one- and two-family dwellings in locations other than the locations covered in 800.113(B) through (F).
(1) Types CMP, CMR, CMG, CM
(2) Type CMX less than 6 mm (0.25 in.) in diameter
(3) Plenum, riser and general-purpose communications raceways
(4) Communications wires and Types CMP, CMR, CMG and CM installed in;
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
(5) Types CMP, CMR, CMG and CM installed in:
a) riser cable routing assembly
b) general-purpose cable routing assembly
(6) Communication wires and Types CMP, CMR, CMG, CM and CMX and installed in a raceway of a type included in Chapter 3
(7) Type CMUC undercarpet communications wires and cables installed under carpet
(8) Hybrid power and communications cable listed in accordance with 800.179(I)

Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

The task group supports the panel action on the proposal to incorporate installation of cables in cable routing assemblies into the section. However the task group recommends that the listing, applications and installation of the cable routing assemblies be consolidated into Article 770 and not be duplicated in each of panel sixteen's articles. Accordingly, the recommended text for this section includes installation of wires and cables in cable routing assemblies and omits the installation of the cable routing assemblies which belong in 770.113.

Section 800.110 permits communications wires to be installed in communications raceways but 800.154 has no specific application for communications wires in communications raceways. Communications wires are used primarily in cross-connect arrays. They should be permitted to be installed in communications raceways and routing assemblies that are part of a cross-connect array.

The panel action on the revision of 800.113 included several applications of cable routing assemblies, but a few applications were missed.

The recommended text for the informational notes dealing with installations in air handling spaces have been modified to better reflect the contents of the mandatory text.

Most of the text in this comment was submitted by Randy Ivans and Gerald Dorna as an affirmative ballot comments on this proposal. See the ROP.

Panel Meeting Action: Accept in Principle

Revise 800.113 to read as follows:

800.113 Installation of Communications Wires, Cables and Raceways. Installation of communications wires, cables and raceways shall comply with 800.113 (A) through (L). Installation of raceways shall also comply with 800.110.

(A) Listing. Communications wires, cables and raceways installed in buildings shall be listed.

Exception: Communications cables that comply with 800.48 shall not be required to be listed.

(B) Fabricated Ducts and Plenums Used for Environmental Air. The following wires and cables shall be permitted in ducts and plenums used for environmental air as described in 300.22(B) if they are directly associated with the air distribution system.
(1) Up to 1.22 m (4 ft) of Type CMP cable
(2) Types CMP, CMR, CMG, CM, CMX cables and communications wires installed in raceways that are installed in compliance with 300.22(B)

Informational Note: For information on fire protection of wiring installed in fabricated ducts and plenums see sections 4.3.4.1 ~~(air ducts)~~ and 4.3.11.3.3 ~~(apparatus casings plenums)~~ in NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(C) Other Spaces Used For Environmental Air (Plenums). The following wires, cables and raceways shall be permitted in other spaces used for environmental air as described in 300.22(C).
(1) Type CMP cable
(2) Plenum communications raceway
(3) Type CMP cable installed in plenum communications raceway
(4) Type CMP cables and plenum communications raceways supported by open metallic cable trays or cable tray systems
(5) Types CMP, CMR, CMG, CM, CMX cables and communications wires installed in raceways that are installed in compliance with 300.22(C)
(6) Types CMP, CMR, CMG, CM, CMX cables and plenum communications raceways, riser communications raceways and general-purpose communications raceways supported by solid bottom metal cable trays with solid metal covers in other spaces used for environmental air (plenums) as described in 300.22(C)
Informational Note: For information on fire protection of wiring installed in other spaces used for environmental air see sections 4.3.11.2 ~~(ceiling cavity plenum)~~, 4.3.11.4 ~~(air-handling unit room plenum)~~ and 4.3.11.5 ~~(raised floor plenum)~~ of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(D) Risers- Cables and Raceways in Vertical Runs. The following cables and raceways shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:
(1) Types CMP and CMR cables
(2) Plenum and riser communications raceways
(3) Types CMP and CMR cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) riser cable routing assembly

Informational Note: See 800.26 for firestop requirements for floor penetrations.

(E) Risers-Cables and Raceways in Metal Raceways. The following cables and raceways shall be permitted in metal raceways in a riser having firestops at each floor.
(1) Types CMP, CMR, CMG, CM and CMX cables
(2) Plenum, riser and general-purpose communications raceways
(3) Types CMP, CMR, CMG, CM and CMX cables installed in:

a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway

Informational Note: See 800.26 for firestop requirements for floor penetrations.

(F) Risers-Cables and Raceways in Fireproof Shafts.. The following cables and raceways shall be permitted to be installed in fireproof riser shafts having firestops at each floor.

(1) Types CMP, CMR, CMG, CM and CMX cables
(2) Plenum, riser and general-purpose communications raceways
(3) Types CMP, CMR, CMG and CM cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly

Informational Note: See 800.26 for firestop requirements for floor penetrations.

(G) Risers- One- and Two-Family Dwellings. The following cables and raceways shall be permitted in one- and two-family dwellings:

(1) Types CMP, CMR, CMG and CM cables
(2) Type CMX cable less than 6 mm (0.25 in.) in diameter
(3) Plenum, riser and general-purpose communications raceways
(4) Types CMP, CMR, CMG and CM cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly

(H) Cable Trays. The following wires, cables and raceways shall be permitted to be supported by ~~installed in~~ cable trays.

(1) Types CMP, CMR, CMG and CM cables
(2) Plenum, riser and general-purpose communications raceways
(3) Communications wires and Types CMP, CMR, CMG and CM cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway

(I) Distributing Frames and Cross-Connect Arrays. The following wires, cables and raceways shall be permitted to be installed in distributing frames and cross-connect arrays.

(1) Types CMP, CMR, CMG, CM cables and communications wires
(2) Plenum, riser and general-purpose communications raceways
(3) Communications wires and Types CMP, CMR, CMG and CM cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly

(J) Other Building Locations. The following wires, cables and raceways shall be permitted to be installed in building locations other than the locations covered in 800.113(B) through (I).

(1) Types CMP, CMR, CMG and CM cables
(2) A maximum of 3 m (10 ft) of exposed Type CMX in nonconcealed spaces
(3) Plenum, riser and general-purpose communications raceways
(4) Communications wires and Types CMP, CMR, CMG and CM cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
(5) Types CMP, CMR, CMG and CM cables installed in:
a) riser cable routing assembly
b) general-purpose cable routing assembly
(6) Communication wires and Types CMP, CMR, CMG, CM and CMX cables ~~and~~ installed in a raceway of a type recognized ~~included~~ in Chapter 3
(7) Type CMUC undercarpet communications wires and cables installed under carpet

(K) Multifamily Dwellings. The following cables, raceways and wring assemblies shall be permitted to be installed in multifamily dwellings in locations other than the locations covered in 800.113(B) through (G).

(1) Types CMP, CMR, CMG, CM cables
(2) Type CMX cable less than 6 mm (0.25 in.) in diameter in nonconcealed spaces
(3) Plenum, riser and general-purpose communications raceways
(4) Communications wires and Types CMP, CMR, CMG and CM cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
(5) Types CMP, CMR, CMG and CM cables installed in:
a) riser cable routing assembly
b) general-purpose cable routing assembly
(6) Communication wires and Types CMP, CMR, CMG, CM and CMX cables ~~and~~ installed in a raceway of a type recognized ~~included~~ in Chapter 3
(7) Type CMUC undercarpet communications wires and cables installed under carpet

(L) One- and Two-Family Dwellings. The following cables and raceways shall be permitted to be installed in one- and two-family dwellings in locations other than the locations covered in 800.113(B) through (F).

(1) Types CMP, CMR, CMG, CM cables
(2) Type CMX cable less than 6 mm (0.25 in.) in diameter
(3) Plenum, riser and general-purpose communications raceways
(4) Communications wires and Types CMP, CMR, CMG and CM cables installed in;
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
(5) Types CMP, CMR, CMG and CM cables installed in:
a) riser cable routing assembly
b) general-purpose cable routing assembly
(6) Communication wires and Types CMP, CMR, CMG, CM and CMX cables ~~and~~ installed in a raceway of a type recognized ~~included~~ in Chapter 3
(7) Type CMUC undercarpet communications wires and cables installed under carpet
(8) Hybrid power and communications cable listed in accordance with 800.179(I)

Panel Statement: The panel added text to recognize solid bottom cable trays with a solid covers.

The panel added text to permit plenum raceways to be supported by open cable trays.

The panel added the word "cables" after each cable type. See panel action on Comment 16-140.

The panel changed "included" to "recognized" in reference to Chapter 3.

The panel changed "installed in" cable trays to "supported by" cable trays.

The panel accepts in principle the recommendations to revise the informational notes. The panel text provides information on air handling spaces using NEC terminology in lieu of NFPA 90A terminology as was used in the ROP text. The panel chooses not to include NFPA 90A "titles" in parenthesis following each section reference.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-139 Log #1925 NEC-P16 **Final Action: Hold**
(800.113)

TCC Action: The Technical Correlating Committee understands that only Comment 16-139 is being held.
Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-160
Recommendation: Revise the text as follows:

800.113(B)(2) Types CMP, CMR, CMG, CM, CMX and listed communications wires installed in metal raceways ~~that are installed~~ in compliance with 300.22(B).

800.113(C)(5) Types CMP, CMR, CMG, CM, CMX, and listed communications wires installed in metal raceways ~~that are installed~~ in compliance with 300.22(C).

800.113(E) Risers- Cables in Metal Raceways or ~~Fireproof~~ Fire-Resistance-Rated Shafts. Types CMP, CMR, CMG, CM and CMX shall be permitted in metal raceway or in a ~~fireproof~~ fire-resistance-rated shaft with firestops at each floor.

800.113(F)(4) Types CMP, CMR, CMG and CM installed in plenum, riser or general-purpose communications raceway or in a raceway permitted in Chapter 3.

800.113(G) Cable Trays. The following cables and raceways shall be permitted to be ~~installed~~ supported in cable trays~~:~~ and shall comply with 300.22 when installed in ducts, plenums, and other environmental air spaces.

Substantiation: In (B)(2), the word "metal" should be added to make this requirement very simple and very clear without having to refer to the entire text of 300.22, just as the Panel clarified in (C)(4) that only *metallic* cable trays are allowed. The informational note in this section refers to NFPA 90A which requires the use of metal raceways in these spaces.

In (C)(5) "metal" was added to clarify that these cables must be installed in metal raceways in accordance with the requirements in 300.22(C) and NFPA 90A. 800.113(C)(2) and (3) list plenum communications raceways which are the nonmetallic type of raceways that are allowed for use with CMP cables only.

In (E) "Fireproof" was changed to "fire-resistance-rated", which is the appropriate terminology.

In (F)(4) text was added to include Chapter 3 raceways which can also be used in one and two family dwellings.

In (G) the word "installed" was changed to "supported" to properly reflect the use of cable tray as a support method. Text was added to clarify special requirements for plenum applications. Most of the other sections of 800.113 are *locations* (spaces uses for environmental air, risers, other building locations, etc.) not *products*. The use of cable tray and the type of cables allowed in cable trays are dependent upon where the tray is installed. This gets lost in the current (G), since it appears as if you could use Types CMP, CMR, CMG and CM cable in cable trays wherever the cable tray is installed. 300.22 requires

solid bottom metal cable tray and solid metal covers.
Panel Meeting Action: Hold
Panel Statement: Changing "fireproof" to "fire-resistance rated" is a concept that has not had public review by being published in the ROP.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-140 Log #1347 NEC-P16 **Final Action: Accept in Principle (800.113(B), FPN and 800.113(C), FPN)**

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-160
Recommendation: (B) Fabricated Ducts and Plenums Used for Environmental Air. The following wires and cables shall be permitted in ducts and plenums, as described in 300.22(B), if they are directly associated with the air distribution system:
(1) Up to 1.22 m (4 ft) of Type CMP cables
(2) Types CMP, CMR, CMG, CM, and CMX cables and listed communications wires and cables installed in raceways that are installed in compliance with 300.22(B)
FPN: See 4.3.4 and 4.3.11.3.3 of NFPA 90A-2009, *Standard for the Installation of Air- Conditioning and Ventilation Systems*, for information on wires and cables installed in fabricated ducts and plenums used for environmental air ~~wire and cables in air ducts and apparatus casings plenums. See 3.3.22 for the definition of an apparatus casing plenum~~.
(C) Other Spaces Used For Environmental Air (Plenums). The following wires, cables and raceways shall be permitted in other spaces used for environmental air as described in 300.22(C):
(1) Type CMP cables
(2) Plenum communications raceways installed in compliance with 800.110
(3) Type CMP cables installed in plenum communications raceways
(4) Type CMP cables supported by metallic cable trays or cable tray systems
(5) Types CMP, CMR, CMG, CM, and CMX cables and listed communications wires and cables installed in raceways that are installed in compliance with 300.22(C).
FPN: See 4.3.11.2, 4.3.11.4, and 4.3.11.5 of NFPA 90A-2009, *Standard for the Installation of Air- Conditioning and Ventilation Systems*, for information on wires, cables and raceways installed in other spaces used for environmental air (plenums) ~~wire, cables, and raceways in ceiling cavity, raised floor, and air-handling unit room plenums. See 3.3.22 for plenum definitions~~ .
Substantiation: This comment is intended to bring consistency to this section. The FPN nomenclature or terminology needs to correspond to the terminology in the charging paragraph.
The term "air duct" is not used in this section or elsewhere in the article. The definitions from NFPA 90A are not necessary since this FPN sends the NEC user directly to the relevant sections for the requirements.
It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept in Principle
Panel Statement: The panel accepts in principle the recommendations to revise the informational notes. As recommended by the submitter, the panel text provides information on air handling spaces using NEC terminology in lieu of NFPA 90A terminology as was used in the ROP text.
The panel accepts in principle the recommendations to revise the informational notes. See panel action and statement on Comment 16-138.
The panel accepts in principle adding the word "cables" after each cable type. See panel action and statement on Comment 16-138.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-141 Log #797 NEC-P16 **Final Action: Reject (800.133)**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-164
Recommendation: Accept the proposal.
Substantiation: Communications circuits may consist of wires, not cables, which are defined as an assembly of two or more conductors. 800.133(A)(1) refers to cables of any of the following, whereas the "following" may not be composed of "cables". Single conductors of Class 2 and 3 circuits should be classified, but not required to be listed as a communication cable. The first sentence of (h) only requires classification as communication circuits, not listing.
Panel Meeting Action: Reject
Panel Statement: The provision for the reclassification of Class 2 and Class 3 circuits as communications circuits is in Article 800 and Article 725. Both articles are correlated. If CMP-16 accepted a change without a corresponding change in Article 725, correlation would be lost. The submitter has not mentioned any correlating proposal for Article 725.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-142 Log #307 NEC-P16 **Final Action: Accept in Principle in Part (800.133(A)(1)(a))**

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-166
Recommendation: The Technical Correlating Committee directs that the action on this proposal be rewritten to comply with the NEC Style Manual with respect to the use of mandatory language.
The Technical Correlating Committee directs that the Chairs of Code-Making Panels 3 and 16 form a Task Group to correlate the actions taken on this proposal and Proposal 3-196.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Principle in Part
The panel agrees that the Chairs of Code-Making Panels 3 and 16 formed a Task Group to correlate the actions taken on this proposal and Proposal 3-196.
Panel Statement: The task group does not see any issue with mandatory language in this proposal and guesses that the TCC directive was simply a "cut and paste" error from its directive on a related proposal. The panel refers the TCC to the statement on Comment 16-143.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-143 Log #1632 NEC-P16 **Final Action: Accept in Principle (800.133(A)(1)(a))**

TCC Action: In order to correlate with the action taken on Comment 3-96, the Technical Correlating Committee changes the action on Comment 16-143 from "Accept" to "Accept in Principle" and revises 800.133(A)(1) to read as follows:
"(a) Optical Fiber and Communications Cables. Communications cables shall be permitted in the same raceway, cable tray, enclosure or cable routing assembly with cables of any of the following:
(1) Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770
(2) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820
(3) Low-power network-powered broadband communications circuits in compliance with Parts I and IV of Article 830.
(b) Other Circuits. Communications cables shall be permitted in the same raceway, cable tray, or enclosure with cables of any of the following:
(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and III of Article 725
(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760."
Existing (b) will become (c).
Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-166
Recommendation: Continue to accept Proposal 16-166 in principle in part and make the following editorial revisions:
Delete "or" between "cable tray" and "enclosure".
Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.
The TCC also directed that the proposal be rewritten to remove mandatory language. The task group does not see any issue with mandatory language in this proposal and guesses that the TCC directive was simply a "cut and paste" error from its directive on a related proposal.
The task group supports the panel action on the proposal to incorporate cable routing assemblies into the section. However in its review of this and related proposals, the task group found a minor error. This comment is editorial.
Panel Meeting Action: Accept
Panel Statement: The panel notes that the text in the draft is correct.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
DORNA, G.: The Panel 3 & 16 Reconciliation Task Group submitted Comments 3-96, 16-41, 16-143, 16-236 and 16-296, all dealing with the commingling of cables in raceways, cable trays, enclosures and cable routing assemblies. In the ROP, CMP 16 had taken actions (accept, accept in principle, accept in principle in part) to treat cable routing assemblies in the same manner as raceways, cable trays, and enclosures, while CMP 3 had rejected the coordinating proposals. The Reconciliation Task Group's comments recommended that CMP 16 continue its direction and that CMP 3 recognize cable routing assemblies and provide for their use. CMP 16 accepted the

Reconciliation Task Group's comments and CMP 3 rejected them.

The CMP 3 rejection statement on Comment 3-96 included an alert to the TCC:

"In addition it is brought to the attention of the technical correlating committee that CMP 16 has accepted changes that will allow the use of cable routing assemblies for the installation of Class 2 & 3 circuits and power-limited fire alarm circuits."

The text of 800.133(A)(1)(a) as modified by Proposal 16-166 and Comment 16-143 is shown below. The underlining was added for emphasis.

(a) *Other Circuits.* Communications cables shall be permitted in the same raceway, cable tray, enclosure, or cable routing assembly with cables of any of the following:

(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and III of Article 725

(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760

(3) Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770

(4) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820

(5) Low-power network-powered broadband communications circuits in compliance with Parts I and IV of Article 83

The text of 800.133(A)(1)(a) clearly shows that communications cables are permitted to be installed in cable routing assemblies along with other cables that are installed in accordance with their own articles. Class 2 and Class 3 cables must be installed compliant with Article 725. Likewise power-limited fire alarm cables must be installed compliant with Article 760.

The CMP 3 statement that "CMP 16 has accepted changes that will allow the use of cable routing assemblies for the installation of Class 2 & 3 circuits and power-limited fire alarm circuits" is not correct.

The Panel 16 actions on Proposal 16-166 and Comment 16-143 permits communications cables to be installed in the same routing assembly with Class 2, Class 3 and power-limited fire alarm cables only if the Class 2, Class 3 and power-limited fire alarm cables are installed in compliance with Articles 725 and 760. Obviously, CMP 16 has taken no actions that change the cable installation requirements in Articles 725 and 760.

See also, my affirmative comments on Comments 16-41 and 16-236.

16-144 Log #2682 NEC-P16 **Final Action: Reject**
(800.133(A)(2) Exception No. 3 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 16-167
Recommendation: Accept the proposal.
Substantiation: The first portion of the panel statement regarding the absence of a specific application cited is difficult to understand. The substantiation cited an actual NEC section [334.116(C)] that recognizes such a construction. However, Chapter 8 will trump that allowance unless correlating language is in place. This needs correlation, the wording of Exception No. 2 does not require listing and seems to describe something CMP 3 described in its statement on a companion proposal for 725.136(I)(3) (Proposal 3-195).

Because of the Chapter 8 location, this issue still needs attention, only partially due to formal recognition of this construction in some form in 334.116(C). In addition, CMP 16 (and 3) will have on its ROC agenda, courtesy of CMP 9 and the TCC sending it there, Proposal 9-8 which covers a form of tray cable with this type of separation. This submitter has rigorously defended the system separation rules in print for decades, but the issues don't go away, and technology may have advanced to the point where some form of these cable constructions can be recognized.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its position on Proposal 16-167.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-145 Log #796 NEC-P16 **Final Action: Reject**
(800.133(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-168
Recommendation: Accept the proposal with the following revisions:

Communications wires and cables shall not be attached to the exterior of any raceway, cable, or conductor as a means of support.

Exception No. 1: Overhead aerial conductors shall be permitted to be attached to an approved raceway mast.

Exception No. 2: Conductors shall be permitted to be supported by a messenger wire.
Substantiation: The purpose of raceways is covered in the definition of "raceway" in Article 100. Provisions should allow support by raceway masts and messenger wires.
Panel Meeting Action: Reject
Panel Statement: The proposed editorial changes provide no additional clarity.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-146 Log #1215 NEC-P16 **Final Action: Reject**
(800.135 (New))

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 16-171
Recommendation: This proposal should have been Accepted.
Substantiation: Panel Member Mr. Ivans is correct in his Negative statement. Communication cable and connectors carry an electrical current and should not become easily accessible. Outlet Boxes and brackets have been listed by NRTL's, such as UL, to insure that incidental contact with other electrical light and power conductors does not occur.
Panel Meeting Action: Reject
Panel Statement: The text, as suggested in Proposal 16-171, is too broad. Not all communications devices or equipment need to be mounted in boxes, on a bracket or in assemblies designed for the purpose (e.g., telephone set, FAX machine).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 1
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:

IVANS, R.: Loose and exposed cable or connectors can pose a risk of electric shock. Ringing voltages can exceed 100V and should not become easily accessible due to weak mounting or terminating methods. Loose cabling and connectors can come into contact with electric light and power conductors.

There are boxes and brackets listed for this purpose using the requirements in UL Subject 2269, "Outline of Investigation for Optical Fiber/ Communications/ Signaling/Coaxial Cable Outlet Boxes." Companies have certifications with UL under the category "Optical Fiber/Communications/Signaling/Coaxial Cable Outlet Boxes", QAZR.

16-147 Log #328 NEC-P16 **Final Action: Accept in Principle**
(800.154)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-172
Recommendation: Revise text to read as follows:
800.154 Applications of Listed Communications Wires, Cables and Raceways. Permitted and non-permitted applications of listed communications wires, cables and raceways shall be as indicated in Table 800.154(A). The permitted applications are subject to the installation rules of 800.110 and 800.113. The substitutions for communications cables listed in Table 800.154(B) and illustrated in Figure 800.154 shall be permitted.

Table 800.154(B) Cable Substitutions
See Table 800.154(A) on Page 608

Cable type	Permitted Substitutions
CMR	**CMP**
CMG, CM	**CMP, CMR**
CMX	**CMP, CMR, CMG, CM**

(Renumber Figure 800.154(E) to Figure 800.154 and insert it here.)
Substantiation: The word "In" was omitted from head of the second column of Table 800.154(A). It should read "In fabricated ducts and plenums as described in 300.22(B)"

Section 800.110 permits communications wires to be installed in communications raceway.

Most of the text in this comment was submitted by Gerald Dorna as an affirmative ballot comment on this proposal. See the ROP.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-148.
Number Eligible to Vote: 16

Table 800.154(A) Applications of Listed Communications Wires, Cables and Raceways

Wire, Cable, and Raceway Types	Applications: In Air-Handling Spaces		In Risers				Within Buildings in Other Than Air-Handling Spaces and Risers										
	Fabricated Ducts and plenums as described in 300.22(B)	**In other spaces used for environmental air (plenums) as described in 300.22(C)**	**In vertical runs**	**In metal raceways**	**In fireproof shafts**	**In one- and two-family dwellings**	**General**	**In one- and two-family dwellings**	**In multi-family dwellings**	**In nonconcealed spaces**	**In cable trays**	**Under carpet**	**In distributing frames and cross-connect arrays**	**In any raceway in Chapter 3**	**In plenum communications raceways**	**In riser communications raceways and riser cable routing assemblies**	**In general-purpose communications raceways and general-purpose cable routing assemblies**
CMP	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
CMR	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
CMG, CM	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
CMX	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	N	N	N
CMUC	N	N	N	N	N	N	N	Y	Y	Y	N	Y	N	Y	N	N	N
Hybrid power and communications cables	N	N	N	N	N	Y	N	Y	N	Y	Y	N	N	N	N	N	N
Communications wires	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y
Plenum communications raceways	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y			
Riser communications raceways	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y			
General-purpose communications raceways	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y			

Note: An 'N' in the table indicates that the wire, cable, raceway or cable routing assembly type shall not be permitted to be installed in the application. A 'Y' indicates that the wire, cable, raceway or cable routing assembly type shall be permitted to be installed in the application, subject to the limitations described in 800.110 and 800.113.

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-148 Log #1623 NEC-P16 **Final Action: Accept in Principle (800.154)**

TCC Action: The Technical Correlating Committee directs that the phrase "and plenums" be removed from the application columns in Table 800.154(A) and Informational Note No. 2.

See the Technical Correlating Committee Note on Comment 16-37.

Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-172
Recommendation: Revise text to read as follows:

800.154 Applications of Listed Communications Wires, Cables and Raceways. Permitted and non-permitted applications of listed communications wires, cables and raceways shall be as indicated in Table 800.154(A). The permitted applications are subject to the installation rules of 800.110 and 800.113. The substitutions for communications cables listed in Table 800.154(B) and illustrated in Figure 800.154 shall be permitted.

See Table 800.154(A) on Page 610

Renumber Figure 800.154(E) to become Figure 800.154
Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

The task group supports the panel action on the proposal to incorporate installation of cables in cable routing assemblies into the section. However the task group recommends that the listing, applications and installation of the cable routing assemblies be consolidated into Article 770 and not be duplicated in each of panel sixteen's articles. Accordingly, the recommended text for this section includes applications of wires and cables in cable routing assemblies and omits the installation of the cable routing assemblies which belong in 770.154.

Table 800.154(A) has been reformatted in 'landscape' and is recommended by the Task Group to be presented this way in the Code to enhance readability and use.

Section 800.110 permits communications wires to be installed in communications raceway.

Most of the text in this comment was submitted by Randy Ivans and Gerald Dorna as an affirmative ballot comments on this proposal. See the ROP.
Panel Meeting Action: Accept in Principle

See TG revised Table 800.154(A) on Page 611

Panel Statement: "Y" was changed to "Y*" to emphasize to the user that installation rules apply.

Add "In..." to the second column in Table 800.154(A) as a prefix to each phrase.

"Chapter 3 raceway" was changed to "In any raceway recognized in Chapter 3 " for consistency with the installation rules.

See panel action on Comment 16-140.

The panel added eight rows to clarify the issues raised in Comment 16-139 including adding rows dealing with installations in raceways and cable trays. An editorial change was made to clarify that air handling spaces refers to 300.22(B) & (C) spaces.

The box "In Air-Handling Spaces" was divided into the component sections "In Fabricated Ducts and Plenums as Described in 300.22(B)" and "In Other Spaces Used for Environmental Air as Described in 300.22(C)" in order to reduce repetition in the next column.
Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-149 Log #2168 NEC-P16 **Final Action: Reject (800.154)**

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-172
Recommendation: It is understood Proposal 16-172 is a companion proposal to 16-160.

Revise the first sentence to read: Permitted and non-permitted applications of listed communications wires, cables and raceways shall be as ~~indicated in Table 800.154(A)~~ in accordance with 800.110 and 800.113.
Substantiation: A comment has been submitted to delete Table 800.154(A). 800.154 will need to be revised for correlation if the Table is deleted.

The following is our reason for deleting the Table.

Table 800.154(A) is very confusing and will lead to misapplication. A number of notes are needed if this table moves forward. Many users will simply take the table as fact without reading limiting requirements applicable per 800.10 and 800.113 A simple "yes" or "no" does not always fit and will lead to misinterpretation.

Several cycles ago both CMP 8 and CMP 7 rewrote their articles. At that time both attempted to develop tables such as 800.154A. There was such a hue and cry against this and so many notes needed to explain what is actually permitted both Panels dropped the tables. Most tables in the NEC are there to clarify special conditions, not normal use. Text, as opposed to tables, is much easier to interpret and enforce correctly.

Just in case the Panel rejects this comment and continues with the Table, we have submitted a separate comment for 16-172/16-160 containing notes to the table. However, REMOVING THE TABLE IS MUCH MORE USER FRIENDLY AS PAST CODE DEVELOPMENT HAS SHOWN. Thorough reading of 800-110 and 800-113 by users will lead to easier and better enforcement and avoid installers having to remove and redo an installation due to noncompliance.
Panel Meeting Action: Reject
Panel Statement: The recommended action was intended to correlate with the acceptance of Comment 16-151. The panel rejected Comment 16-151.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-150 Log #2169 NEC-P16 **Final Action: Accept in Principle in Part (Table 800.154(A))**

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-172
Recommendation: If the Table is not deleted as proposed in a separate comment, revise Table 800.154(A) as follows:

Add Notes to clarify and change some Y(es) and N(o) permitted uses.

For reference purposes the columns of the draft Table have been numbered in numerical sequence from left to right. The cable and/or raceway types are for identification as shown in the far left product column. It is the intent that a parenthetical note number be placed with the identified product Y or N, with the corresponding note(s) at the bottom of the Table.

Column one – **CMP Cable** – Indicate Note (1) Text: Note (1). CMP Cable in free air in a 300.22(B) location must be associated with the air distribution system and is limited to 1.22mm (4 ft); the length limitation does not apply where the cable is installed in a raceway complying with 300.22(B).

Columns one and two two – **CMP,CMR, CMG, CM and CMX** -- Indicate Note (2). Change N to Y for CMR, CMG, CM and CMX and apply Note (2).

Text: Note 2. In 300.22(B) and (C) locations these cables are permitted in raceways that comply with 300.22(B) and (C).

Column 6 – **CMX** – Indicate Note (3). Text: Note 3. Limited to 3 m (10 ft) exposed in non-concealed spaces.

Column 6 - **CMUC** – Indicate Note (4). Text: Note 4. Under carpet only.

Also change N to Y to agree with 800.113 (I)(6).

Column seven, eight, and 9 – **CMUC** -- Indicate Note (4), Text: Note 4. Under carpet only.

Column seven, eight and 9 – **CMX** – Indicate Note (5). Text: Note 5. Limited to less than 6mm (0.25 in) in diameter unless installed in a raceway of a type included in Chapter 3.

Column ten -- **CMR, CMG, CM, and Hybrid power and communications cables** -- Indicate Note (6) Text: Note 6. Where these cables are supported by cable tray in 300.22(C) locations, cable trays are required to be solid metal bottom with solid metal covers.

Column ten – **Riser and general purpose cable routing assemblies** --indicate Note (7). Text: Note 7. Riser and general purpose cable routing assemblies are not permitted to be supported by cable trays,

Column thirteen – **CMUC** – Change Y to N because only use permitted is under carpet.

Column thirteen – **CMR, CMG, CM, CMX** –Indicate Note (8). Text: Note 8. Subject to requirements of 300.22.

Table 800.154(A), Applications of Listed Communications Wires, Cables and Raceways

Applications		Wire, Cable and Raceway Type									
		CMP	CMR	CMG, CM	CMX	CMUC	Hybrid power and communications cables	Communications wires	Plenum communications raceways	Riser communications raceways	General-purpose communications raceways
In Air-Handling Spaces	Fabricated ducts and plenums as described in 300.22(B)	Y	N	N	N	N	N	N	N	N	N
	Other spaces used for environmental air (plenums) as described in 300.22(C)	Y	N	N	N	N	N	N	Y	N	N
In Risers	Vertical runs	Y	Y	N	N	N	N	N	Y	Y	N
	Metal raceways	Y	Y	Y	Y	N	N	N	Y	Y	Y
	Fireproof shafts	Y	Y	Y	Y	N	N	N	Y	Y	Y
	One- and two-family dwellings	Y	Y	Y	Y	N	N	N	Y	Y	Y
Within Buildings in Other Than Air-Handling Spaces and Risers	General	Y	Y	Y	Y	N	N	N	Y	Y	Y
	One- and two-family dwellings	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
	Multifamily dwellings	Y	Y	Y	Y	Y	N	N	Y	Y	Y
	Nonconcealed spaces	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
	Cable trays	Y	Y	Y	N	N	N	N	Y	Y	Y
	Under carpet	N	N	N	N	Y	N	N	N	N	N
	Distributing frames and cross-connect arrays	Y	Y	Y	N	N	N	Y	Y	Y	Y
	Chapter 3 raceway	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
	Plenum communications raceways	Y	Y	Y	N	N	N	Y			
	Riser communications raceways and riser cable routing assemblies	Y	Y	Y	N	N	N	Y			
	General-purpose communications raceways and general-purpose cable routing assemblies	Y	Y	Y	N	N	N	Y			

Note: An ‘N’ in the table indicates that the cable type shall not be permitted to be installed in the application. A ‘Y’ indicates that the cable shall be permitted to be installed in the application, subject to the limitations described in 800.110 and 800.113.

Table 800.154(A

Applications of Listed Communications Wires, Cables and Raceways in Buildings

Applications		Wire, Cable and Raceway Type									
		CMP	CMR	CMG CM	CMX	CMUC	Hybrid power and communications cables	Communications wires	Plenum communi-cations raceways	Riser communica-tions raceways	General-purpose communications raceways
In Fabricated Ducts and Plenums as Described in 300.22(B)	In fabricated ducts and plenums	Y*	N	N	N	N	N	N	N	N	N
	In metal raceway that complies with 300.22(B)	Y*	Y*	Y*	Y*	N	N	Y*	Y*	Y*	Y*
In Other Spaces Used for Environmental Air as Described in 300.22(C)	In other spaces used for environmental air	Y*	N	N	N	N	N	N	Y*	N	N
	In metal raceway that complies with 300.22(C)	Y*	Y*	Y*	Y*	N	N	Y*	Y*	Y*	Y*
	In plenum communica-tions raceways	Y*	N	N	N	N	N	N	N	N	N
	Supported by open metal cable trays	Y*	N	N	N	N	N	N	N	N	N
	Supported by solid bot-tom metal cable trays with solid metal covers	Y*	Y*	Y*	Y*	N	N	N	Y*	Y*	Y*
In Risers	In vertical runs	Y*	Y*	N	N	N	N	N	Y*	Y*	N
	In metal raceways	Y*	Y*	Y*	Y*	N	N	N	Y*	Y*	Y*
	In fireproof shafts	Y*	Y*	Y*	Y*	N	N	N	Y*	Y*	Y*
	In plenum communica-tions raceways	Y*	Y*	N	N	N	N	N			N
	In riser communications raceways	Y*	Y*	N	N	N	N	N			N
	In riser cable routing assemblies	Y*	Y*	N	N	N	N	N	N	N	N
	In one- and two-family dwellings	Y*	Y*	Y*	Y*	N	Y*	N	Y*	Y*	Y*
Within Buildings in Other Than Air-Handling Spaces and Risers	General	Y*	Y*	Y*	Y*	N	N	N	Y*	Y*	Y*
	In one- and two-family dwellings	Y*	Y*	Y*	Y*	Y*	Y*	N	Y*	Y*	Y*
	In multifamily dwellings	Y*	Y*	Y*	Y*	Y*	N	N	Y*	Y*	Y*
	In nonconcealed spaces	Y*	Y*	Y*	Y*	Y*	N	N	Y*	Y*	Y*
	Supported by cable trays	Y*	Y*	Y*	N	N	N	N	Y*	Y*	Y*
	Under carpet	N	N	N	N	Y*	N	N	N	N	N
	In distributing frames and cross-connect arrays	Y*	Y*	Y*	N	N	N	Y*	Y*	Y*	Y*
	In any raceway recog-nized in Chapter 3	Y*	Y*	Y*	Y*	N	N	Y*	Y*	Y*	Y*
	In plenum communica-tions raceways	Y*	Y*	Y*	N	N	N	Y*			
	In riser communications raceways and riser cable routing assemblies	Y*	Y*	Y*	N	N	N	Y*			
	In general-purpose com-munications raceways and general-purpose cable routing assemblies	Y*	Y*	Y*	N	N	N	Y*			

Note: An 'N' in the table indicates that the cable type shall not be permitted to be installed in the application. A 'Y*' indicates that the cable shall be permitted to be installed in the application, subject to the limitations described in 800.110 and 800.113.

Informational Note 1: Part V of Article 800 covers installation methods within buildings. This table covers the applications of listed communications wires, cables and raceways in buildings. The definition of point of entrance is in 800.2. Communications entrance cables that have not emerged from the rigid metal conduit or intermediate metal conduit are not considered to be in the building.

Informational Note No. 2: For information on the restrictions to the installation of communications cables in fabricated ducts and plenums see 800.113(B).

Column fourteen – **CMR, CMG and CM.** Indicate Note (9) Text: Note 9. Although permitted in plenum communications raceways in locations other than plenums and environmental air spaces, this combination of raceway and cable is not permitted in 30.22 locations. Cables must be CMP.

Column Fifteen -- **CMG AND CM**.-- Indicate Note (10). Text: Note 10. Although permitted in riser communications raceways in other locations, this combination of raceway and cable is not permitted in riser applications. The cable must be riser cable.

Column Sixteen – **CMP and CMR –** Indicate Note (11). Text: Note 11. CMP and CMR in General Purpose Communications Raceway does not constitute a plenum or riser complying installation.

Substantiation: Notes were developed from the following references:

Note (1). Per **800.113(B)**.

Note (2) Per **800.113(B)**(2) and **800.113(C)**(5).

Note (3) Per **800.113(I)**(2)

Note (4) Per **800.113(I)**(6), **800.113(J)**(6), and **800.113(K)**(6)

Note (5) Per **800.113**(F)(2), (J)(2) and (5), AND (K)(2) and (5)

Note (6) Per **800.113(B) and (C) that refer to 300.22(B) and (C) where cable tray is not noted in (B), and solid metal bottom tray with metal cover is required in (C).**

Note (7) **Cable Routing Assemblies are a support system as are cable trays, which is the title of this column. One support system should not support another.**

The Panel may prefer to separate the plenum, riser and general purpose raceways from cable routing assemblies for easier interpretation as they are not used exactly the same.

In Column 13 the requested change for CMUC from Y to N is appropriate because the title of this column is "In any raceway in Chapter 3" and the use of CMUC is limited to under carpet only.

Notes 9 and 10 are intended to clarify that when plenum or riser raceways are used that does not translate to a plenum or riser installation unless CMP or Riser cable (as applicable) are used.

Note 11 is intended to clarify that the use of plenum or riser cable in a General Purpose Communications Raceway still is suitable for only a general purpose application.

Several comments have been submitted to 800.113 that clarify metal and other Chapter 3 raceways are permitted. That fact is missing in some sections of 800.113 although the Table shows Yes. Developing these notes to the Table emphasized the misinterpretations and difficulty of applying the Table to the text. Note 8 is a good example of crossover with Columns one and two and could easily be misinterpreted to use any Chapter 3 raceway anywhere with any cable. We urge the Panel to delete this Table, but offer these notes for consideration in the event you do not.

Panel Meeting Action: Accept in Principle in Part

The panel accepts in principle recommendation 1. See Informational Note No 2 in Table 800.154(A).

The panel accepts in principle recommendation 2. See The row "In metal raceway that complies with 300.22(B)".

The panel accepts in principle recommendation 3. The information in recommended Note (3) is in 800.113(J).

The panel accepts in principle recommendation 4. The information in recommended Note (4) is in 800.113(J).

The panel accepts in principle recommendation 5. The information in the second recommended Note (4) is in 800.113(L).

The panel accepts in principle recommendation 6. The information in recommended Note (5) is in 800.113(J).

The panel does not accept recommendation 7. See panel action on proposal 16-175 which permits plenum cable to be installed in metallic cable trays in plenums.

The panel does not accept recommendation 8. The installation of cable routing assemblies is in 770.113.

The panel accepts in principle recommendation 9. The information on the use of CMUC is in 800.113(L).

The panel does not accept recommendation 9. See 800.113(C) which only permits Type CMP.

The panel accepts in principle recommendation 10. See The row "In metal raceway that complies with 300.22(B)" and the row "In metal raceway that complies with 300.22(C)".

The panel accepts in principle recommendation 11. See the row "In plenum optical fiber and communications raceways" and the row "In riser optical fiber and communications raceways."

Panel Statement: See panel action on Comments 16-138 and 16-148.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-151 Log #2170 NEC-P16 **Final Action: Reject**
(Table 800.154(A))

Submitter: William A. Wolfe, Steel Tube Institute of North America

Comment on Proposal No: 16-172

Recommendation: Delete Table 800.154(A)

Substantiation: This is a companion comment for revision of 800.154.

See also comment to add notes to Table 800.154(A) if this comment is not accepted.

Panel Meeting Action: Reject

Panel Statement: The submitter has provided no substantiation for the recommended action.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-152 Log #2171 NEC-P16 **Final Action: Hold**
(800.154(A))

Submitter: William A. Wolfe, Steel Tube Institute of North America

Comment on Proposal No: 16-172

Recommendation: It is understood 16-172 is a companion proposal to 16-160.

For the purpose of this comment the columns are referenced numerically from left to right and as shown in the draft.

Revise column headings as follows:

1. Add "Specifically" before "Fabricated"; delete "and plenums"

4. Change "fireproof" to "fire-resistance- rated."

Substantiation: 1. To correlate with the title of 300.22(B) and avoid confusion.

4. The term "fireproof " is being replaced with the correct description "fire-resistance-rated" throughout ASTM fire related standards and other codes. It is a known fact that that "fireproof" is not a legally defensible term. A comment has been submitted to change the term in 800.113(E).

Panel Meeting Action: Hold

Panel Statement: Changing "fireproof" to "fire-resistance rated" is a concept that has not had public review by being published in the ROP.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-153 Log #1362 NEC-P16 **Final Action: Accept**
(800.154(H) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council

Comment on Proposal No: 16-183

Recommendation: Continue rejecting this proposal.

Substantiation: The proposal introduces terms that are associated with fire testing/fire performance and are not defined anywhere. Therefore, not only does no application exist (as CMP 16 correctly pointed out) but no organization has developed criteria for such fire performance.

Communications cables in the NEC can be listed as complying with one of the following 6 categories: CMP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), CMR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), CMG (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of CSA FT4), CM (i.e. alternate cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581), CMX (i.e. limited use cables listed as suitable for use in dwellings or in raceways and resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581) and CMUC (i.e. cables listed as suitable for use under carpets and resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581).

Nowhere does a definition exist for "very-low-smoke producing cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable.

Nowhere does a definition exist for "fire hazard cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation to continue to reject but does not necessarily agree with the submitter's substantiation.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-154 Log #2073 NEC-P16 **Final Action: Reject**
(800.154(H) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-183
Recommendation: Add new 800.154(H).

(H) Communications Cables With Suffix Markings. Communications cables with single or multiple suffix markings shall be permitted where required to meet special applications.

(1) Communications Circuit Integrity (CI) Cables or Electrical Circuit Protective System. Circuit integrity (CI) cables or a listed electrical circuit protective system shall be permitted for use in communications systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions.

(2) Communications Cables for Wet Locations. Communications cables installed in wet locations shall be Types CMP-WET, CMR-WET, CMG-WET, OR CM-WET.

(3) Communications Cables Exposed to Direct Sunlight. Communications cables installed exposed to direct sunlight shall be Types CMP-SR, CMR-SR, CMG-SR, or CM-SR.

(4) Communications Cables in Corrosive Locations. Communications cables installed in where exposed to oil shall be Types CMP-PR, CMR-PR, CMG-PR, or CM-PR. Communications cables installed in where exposed to oil and gas shall be Types CMP-GR, CMR-GR, CMG-GR, or CM-GR

(5) Communications Very-Low-Smoke Producing Cables. Communications very-low-smoke producing cables installed to provide low flame spread and very-low-smoke emissions shall be Types CMP-50, CMR-50, CMG-50, or CM-50.

(6) Communications Fire Hazard Cables. Communications fire hazard cables installed to provide low flame spread, very-low-smoke, and known potential heat release shall be Types CMP-FHC, CMR-FHC, CMG-FHC, or CM-FHC.

Substantiation: The comment provides the application information missing from the proposal, as noted by Panel 16.
Panel Meeting Action: Reject
Panel Statement: Requiring that communications cables installed in wet locations be listed for wet locations conflicts with 800.48 which permits 50 feet of unlisted cable to enter the building. It also conflicts with the panel action on Proposal 16-129 which clarified that the requirements of 310.8(C) (which requires cables in wet locations to be listed for wet locations), does not apply to communications cables. Likewise, requiring that communications cables that are exposed to direct sunlight be listed for exposure to sunlight also conflicts with 800.48. The requirements of 800.48 recognize that outside plant cables, which are designed for exposure to sunlight and water, need to be brought into buildings in order to connect with listing building cables.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-155 Log #2846 NEC-P16 **Final Action: Reject**
(800.170, FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 16-186
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that "the FPNs are more user-friendly in current locations" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: This FPN information is valuable for the user of the Code and the user should not have to go back to an annex to find it.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-156 Log #22 NEC-P16 **Final Action: Accept**
(Table 800.179)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-172
Recommendation: Delete the "Reference" column in Table 800.179.
Substantiation: The panel action on proposal 16-172 changed the references to 800.154. Rather than correcting the references, simply delete the "Reference" column because it is not needed. See Tables 725.179 and 760.179(I) which have no "Reference" column.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-157 Log #2074 NEC-P16 **Final Action: Reject**
(800.179)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-187
Recommendation: Accept Proposal 16-187.
Substantiation: It is important to have requirements for cable temperature rating.
Panel Meeting Action: Reject
Panel Statement: The panel has not accepted any of the proposals or comments for new cable types, therefore, markings are not required.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-158 Log #640 NEC-P16 **Final Action: Accept**
(800.179(A), FPN)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-188
Recommendation: Continue to reject this proposal.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel action to reject this proposal and recommends that the panel continue to reject it.

A fine print note giving information on fire testing of plenum cable has been in the NEC since the 1984 edition. It has undergone only minor editorial changes since 1984. It provides extremely useful to cable manufacturers. The proposed change would remove essential information.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-159 Log #999 NEC-P16 **Final Action: Reject**
(800.179(A), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-188
Recommendation: The Proposal should be Accepted in Principle, revised and the following words "and Annex A Explanatory Material" added after "NFPA 262-2007" so the revised text reads as follows:
~~FPN~~ Informational Note: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is ~~that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with~~ described in NFPA 262-2007, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, and Annex A Explanatory Material.
Substantiation: The FPN refers to a test method and defines the maximum values, which are not specified in the body of NFPA 262. Inclusion of the maximum values in the FPN are requirements and this violates 3.1.3 of the NEC Style Manual.

NFPA 262 defines the Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces but it does not specify any pass/fail criteria.

While the values specified for maximum peak optical density, maximum average optical density, and maximum allowable flame travel distance in the FPN are not included in the body of NFPA 262, they are contained in Annex A Explanatory Material. Addition of the words "and Annex A Explanatory Material" will reference the maximum values that are in the FPN and the proposed revised FPN will comply with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of determining what a low-smoke producing and fire-resistant cable is.
Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-160 Log #1348 NEC-P16 **Final Action: Reject**
(800.179(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-188
Recommendation: 800.179 Communications Wires and Cables.

Communications wires and cables shall be listed in accordance with 800.179(A) through (I) and marked in accordance with Table 800.179. Conductors in communications cables, other than in a coaxial cable, shall be copper.

Communications wires and cables shall have a voltage rating of not less than 300 volts. The insulation for the individual conductors, other than the outer conductor of a coaxial cable, shall be rated for 300 volts minimum. The cable voltage rating shall not be marked on the cable or on the undercarpet communications wire. Communications wires and cables shall have a temperature rating of not less than 60°C.

Exception: Voltage markings shall be permitted where the cable has multiple listings and voltage marking is required for one or more of the listings.

FPN No. 1: Voltage markings on cables may be misinterpreted to suggest that the cables may be suitable for Class 1, electric light, and power applications.

FPN No. 2: See 800.170 for listing requirement for equipment. (A) Types OFNP and OFCP.

(A) Type CMP. Type CMP communications plenum cables shall be listed as being suitable for use in ducts, plenums, and other spaces used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.

Substantiation: Retain the FPN as in the current NEC, but only if the FPNs from CMP 3 are not changed to the same language. This comment is being written just in case CMP 3 is willing to change to existing NEC language.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Reject
Panel Statement: The panel upholds its position to not change the FPN.

The panel agrees with the submitter's statement that "the FPN is worded correctly".

See panel action and statement on Comment 16-61.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-161 Log #1349 NEC-P16 **Final Action: Reject**
(800.179(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-188
Recommendation: 800.179 Communications Wires and Cables.

Communications wires and cables shall be listed in accordance with 800.179(A) through (I) and marked in accordance with Table 800.179. Conductors in communications cables, other than in a coaxial cable, shall be copper.

Communications wires and cables shall have a voltage rating of not less than 300 volts. The insulation for the individual conductors, other than the outer conductor of a coaxial cable, shall be rated for 300 volts minimum. The cable voltage rating shall not be marked on the cable or on the undercarpet communications wire. Communications wires and cables shall have a temperature rating of not less than 60°C.

Exception: Voltage markings shall be permitted where the cable has multiple listings and voltage marking is required for one or more of the listings.

FPN No. 1: Voltage markings on cables may be misinterpreted to suggest that the cables may be suitable for Class 1, electric light, and power applications.

FPN No. 2: See 800.170 for listing requirement for equipment. (A) Types OFNP and OFCP.

(A) Type CMP. Type CMP communications plenum cables shall be listed as being suitable for use in ducts, plenums, and other spaces used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN: One method of defining low smoke producing and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.

~~FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.~~

Substantiation: This comment is intended to bring consistency to the NEC. In Articles 770, 800, 820 and 830, the FPN is worded correctly but different from what CMP 3 recommended. The original proposal I made to CMP 3 and CMP 16 was already made in the 2005 and 2008 NEC cycles, but was caught up in the "plenum cable moratorium" in the opinion of CMP 3 but not of CMP 16. The present wording also follows the requirements of the preceding section, which requires that the cable be listed as having both "adequate fire-resistant and low smoke-producing characteristics". The wording of CMP 3 (although adequate also) does not explain what is needed to define a cable that is a "low smoke-producing and fire-resistant cable" by omitting the words "a cable that is". However, if CMP 16 makes this change consistency is achieved in the NEC.

With regard to the comment by Mr. Ayers to the proposals in CMP 3, I agree with him, but the (incorrect) use of the term "fire-resistant cable" is consistent in not just the FPNs in all 6 relevant articles (725, 760, 770, 800, 820 and 830) but is also consistent with the use in the charging paragraph.

If CMP 3 and CMP 16 would both like to eliminate the term "fire-resistant cable", consistently in all locations, and replace it by a term such as "low flame spread cable", that would be an excellent idea, but it does require consistency (and probably a task group of both panels). In the meantime the use of the term "fire-resistant cable" is necessary to correlate with the charging paragraph.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Reject
Panel Statement: The panel upholds its position to not change the FPN.

The panel agrees with the submitter's statement that "the FPN is worded correctly".

See panel action and statement on Comment 16-61.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-162 Log #2847 NEC-P16 **Final Action: Reject**
(800.179(A), FPN)

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 16-189
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement that "the FPNs are more user-friendly in current locations" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.

The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.

Panel Meeting Action: Reject
Panel Statement: This FPN information is valuable for the user of the Code and the user should not have to go back to an annex to find it.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-163 Log #1000 NEC-P16 **Final Action: Reject**
(800.179(B), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-191
Recommendation: The Proposal should be Accepted in Principle and 800.179(B), FPN revised as follows:

~~FPN~~ Informational Note: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the cables pass the requirements of~~ ANSI/UL 1666-2002, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts.*

Substantiation: The original proposal incorrectly identified 820.179(B), FPN in the Recommendation.

The existing phrase "…is that the cables pass the requirements…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate

standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject

Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining the fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-164 Log #1001 NEC-P16 **Final Action: Reject**
(800.179(C), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-193

Recommendation: The Proposal should be Accepted in Principle and the text revised as shown:

~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.

Substantiation: Acceptance of the revised wording shown above will still provide the user with a reference to a "method of defining resistant to the spread of fire" and also comply with the NEC Style Manual that FPNs not contain requirements. The pass/fail criteria is already defined in the standard.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject

Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining resistant to the spread of fire.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-165 Log #1002 NEC-P16 **Final Action: Reject**
(800.179(D), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-197

Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:

~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.

Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.

Substantiation: The existing FPN specifically defines "that the cables not spread fire to the top of the tray in UL 1685" and "for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the Vertical Flame Test – Cables in Cable Trays in CSA C22.2…", those are very specific requirements.

Acceptance of the revised wording will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPNs not contain requirements. The pass/fail criteria are already defined in those two standards.

The text in the second paragraph correctly uses the term "described" and the proposed revision simply relocates the term and uses it in the first paragraph as well.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject

Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on two methods of defining resistant to the spread of fire.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-166 Log #1003 NEC-P16 **Final Action: Reject**
(800.179(G), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-200

Recommendation: The Proposal should be Accepted in Principle and reworded as follows:

~~FPN~~ Informational Note: One method of defining circuit integrity is ~~by establishing a minimum 2-hour fire resistance rating for the cable when tested~~ described in ~~accordance with~~ UL 2196-2002, Standard for Tests of Fire Resistive Cables.

Substantiation: Acceptance of the revised wording will still provide the user with a reference to a method of defining "circuit integrity" and also comply with the NEC Style Manual that FPN's not contain requirements. The pass/fail criteria is already defined in the standard. The deleted text specifically defines the one method of defining circuit integrity and includes the minimum rating for the cable and the specific test; that could very easily be interpreted as a requirement in the FPN.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject

Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining circuit integrity.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-167 Log #1004 NEC-P16 **Final Action: Reject**
(800.179(H), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-201

Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:

~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.

Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.

Substantiation: The existing FPN specifically defines "that the cables not spread fire to the top of the tray in UL 1685" and "for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the Vertical Flame Test – Cables in Cable Trays in CSA C22.2…", those are very specific requirements.

Acceptance of the revised wording will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPNs not contain requirements. The pass/fail criteria are already defined in those two standards.

The text in the second paragraph correctly uses the term "described" and the proposed revision simply relocates the term and uses it in the first paragraph as well.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject

Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on two methods of defining resistant to the spread of fire.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-168 Log #1005 NEC-P16 **Final Action: Reject**
(800.179(I), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-202

Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:

~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.

Another method of defining resistant to the spread of fire is ~~for the damage~~

~~(char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
Substantiation: The existing FPN specifically defines "that the cables not spread fire to the top of the tray in UL 1685" and "for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the Vertical Flame Test – Cables in Cable Trays in CSA C22.2…", those are very specific requirements.

Acceptance of the revised wording will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPNs not contain requirements. The pass/fail criteria are already defined in those two standards.

The text in the second paragraph correctly uses the term "described" and the proposed revision simply relocates the term and uses it in the first paragraph as well.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.
Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on two methods of defining resistant to the spread of fire.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-169 Log #1363 NEC-P16 **Final Action: Accept**
(800.179(J) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-204
Recommendation: Continue rejecting this proposal.
Substantiation: The proposal introduces a definition of a term that is associated with fire testing/fire performance and is not defined anywhere. Therefore, not only does no application exist (as CMP 16 correctly pointed out) but no organization has developed criteria for such fire performance.

Communications cables in the NEC can be listed as complying with one of the following 6 categories: CMP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), CMR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), CMG (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of CSA FT4), CM (i.e. alternate cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581), CMX (i.e. limited use cables listed as suitable for use in dwellings or in raceways and resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581) and CMUC (i.e. cables listed as suitable for use under carpets and resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581).

Nowhere does a definition exist for "fire hazard cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable. The proposed fire properties recommended for such a listing do not correspond to any listing developed by a nationally recognized listing organization, even when optional listings are taken into account. UL has developed UL Subject 2424, "Outline of Investigation for Cable Marked "Limited Combustible", which contains a set of listing criteria for which no application exists, but this document requires that cables also be tested in accordance with UL 723 after oven aging.

Cables listed to UL 2424 are already allowed by NFPA 90A to be used anywhere that plenum cables are required.

Both NFPA 90A and the mechanical codes (the IMC, International Mechanical Code, and the UMC, Uniform Mechanical Code) have requirements of 25/50 (flame spread index/smoke developed index, in accordance with ASTM E 84) for materials in plenums other than wires and cables (and some other materials). NFPA 13 (sprinkler standard) also made it clear that the use of plenum cables in plenums does not even introduce a fire hazard sufficient to require installation of sprinklers.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation to continue to reject but does not necessarily agree with the submitter's substantiation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-170 Log #1365 NEC-P16 **Final Action: Accept**
(800.179(J) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-210
Recommendation: Continue rejecting this proposal.
Substantiation: The proposal introduces a definition of a term that is associated with fire testing/fire performance and is not defined anywhere. Therefore, not only does no application exist (as CMP 16 correctly pointed out) but no organization has developed criteria for such fire performance.

Communications cables in the NEC can be listed as complying with one of the following 6 categories: CMP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), CMR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), CMG (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of CSA FT4), CM (i.e. alternate cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581), CMX (i.e. limited use cables listed as suitable for use in dwellings or in raceways and resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581) and CMUC (i.e. cables listed as suitable for use under carpets and resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581).

Nowhere does a definition exist for "fire hazard cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable. The proposed fire properties recommended for such a listing do not correspond to any listing developed by a nationally recognized listing organization, even when optional listings are taken into account. UL has developed UL Subject 2424, "Outline of Investigation for Cable Marked "Limited Combustible", which contains a set of listing criteria for which no application exists, but this document requires that cables also be tested in accordance with UL 723 after oven aging.

Cables listed to UL 2424 are already allowed by NFPA 90A to be used anywhere that plenum cables are required.

Both NFPA 90A and the mechanical codes (the IMC, International Mechanical Code, and the UMC, Uniform Mechanical Code) have requirements of 25/50 (flame spread index/smoke developed index, in accordance with ASTM E 84) for materials in plenums other than wires and cables (and some other materials). NFPA 13 (sprinkler standard) also made it clear that the use of plenum cables in plenums does not even introduce a fire hazard sufficient to require installation of sprinklers.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation to continue to reject but does not necessarily agree with the submitter's substantiation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-171 Log #2075 NEC-P16 **Final Action: Reject**
(800.179(J))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-204
Recommendation: Accept Proposal 16-204
Substantiation: There are cables listed that meet UL 2424. Cables with the characteristics tested by UL 2424 are identified in NFPA 90A.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its original position on Proposal 16-204.

The submitter has not provided any applications or installation requirements as requested by the panel in the ROP.

Adding listing requirements without application or installation requirements is not in keeping with the 2003 NEC Style Manual Section 1.3, Regulatory Adoption, which states "Because the National Electrical Code is intended to be suitable for adoption as a regulatory document, it is important that it contain clearly stated mandatory requirements in the Code text."
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-172 Log #2076 NEC-P16 **Final Action: Reject**
(800.179(K) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-205
Recommendation: Add new 800.179(K)

(K) Cables in Wet Locations. Cables specified in 800.154(A), (B), and (C) shall be listed for installation in wet locations, or shall have a moisture-impervious metal sheath, and shall be marked with a suffix as required in 800.179(K)(a) or (b).

(a) Cables installed in dry location shall not be required to have an additional suffix marking.

(b) Cables suitable for installation in wet locations shall be identified with the suffix "-WET". Conductors and cables listed for damp locations shall be suitable for installation in dry or damp locations.

FPN: One method of defining suitability for installation in wet locations is by testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*
Substantiation: Adding a "-WET" suffix will assure better installations for

cables exposed to wet locations.
Panel Meeting Action: Reject
Panel Statement: Section 800.179 contains listing requirements only. The recommended text is a mixture of listing requirements and installation requirements. The recommended text is inappropriate for a listing section.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-173 Log #2077 NEC-P16 **Final Action: Reject**
(800.179(L) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-206
Recommendation: Accept proposal 16-206
Substantiation: It is important to identify cables with a marking for sunlight resistance.
Panel Meeting Action: Reject
Panel Statement: Section 800.179 contains listing requirements only. The recommended text is a mixture of listing requirements and installation requirements. The recommended text is inappropriate for a listing section.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-174 Log #2078 NEC-P16 **Final Action: Reject**
(800.179(M) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-207
Recommendation: Accept proposal 16-207.
Substantiation: It is important for cables to have temperature marking requirements in the NEC.
Panel Meeting Action: Reject
Panel Statement: The requirement that communications cables have a minimum temperature rating of 60°C is already in 800.179. UL 444 has provisions for a low temperature rating; it is not necessary to add it to 800.179.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-175 Log #2079 NEC-P16 **Final Action: Reject**
(800.179(N) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-208
Recommendation: Add new 800.179(N)
(N) Communications Cables Exposed to Oil or Gas. Communications cables installed where exposed to gas or oil shall be listed for those locations. Cables specified in 800.154(A), (B), and (C), and used for installation in corrosive locations shall have the additional classification using the following suffixes: "-PR" for oil resistant, and "-GR" for gasoline and oil resistant.
FPN: One method of defining corrosion resistance is testing to the requirements of UL 1581, *Reference Standard for Electrical Wires, Cables, and Flexible Cords.*
Substantiation: Presently, there is no marking that identifies cables as being suitable for installation where exposed to oil or gas. It is important to have the correct cable for locations that have the potential to degrade cable and conductor insulation and cause system malfunction.
Panel Meeting Action: Reject
Panel Statement: Section 800.179 contains listing requirements only. The recommended text is a mixture of listing requirements and installation requirements. The recommended text is inappropriate for a listing section.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-176 Log #1364 NEC-P16 **Final Action: Accept**
(800.179(O) (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-209
Recommendation: Continue rejecting this proposal.
Substantiation: The proposal introduces a definition of a term that is associated with fire testing/fire performance and is not defined anywhere. Therefore, not only does no application exist (as CMP 3 correctly pointed out) but no organization has developed criteria for such fire performance.
Communications cables in the NEC can be listed as complying with one of the following 6 categories: CMP (i.e. cables listed as plenum cables and that comply with the requirements of NFPA 262), CMR (i.e. cables listed as riser cables and that comply with the requirements of UL 1666), CMG (i.e. cables listed as general purpose, or tray, cables and that comply with the requirements of CSA FT4), CM (i.e. alternate cables listed as general purpose, or tray, cables and that comply with the requirements of UL 1685 or of CSA FT4 or of the vertical cable tray test in UL 1581), CMX (i.e. limited use cables listed as suitable for use in dwellings or in raceways and resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581) and CMUC (i.e. cables listed as suitable for use under carpets and resistant to flame spread and that comply with the requirements of the vertical wire test VW-1 in UL 1581).
Nowhere does a definition exist for "very-low-smoke producing cables"; no test exists for that type of cables and no listing category exists for that type of cable. Requiring a marking (even if it is optional) for such a type of cable makes no sense because it would be a marking in advance of any such category of cable. The proposed fire properties recommended for such a listing do not correspond to any listing developed by a nationally recognized listing organization, even when optional listings are taken into account. UL has developed UL Subject 2424, "Outline of Investigation for Cable Marked "Limited Combustible", which contains a set of listing criteria for which no application exists, but this document requires that cables also be tested in accordance with NFPA 259.
Cables listed to UL 2424 are already allowed by NFPA 90A to be used anywhere that plenum cables are required.
Both NFPA 90A and the mechanical codes (the IMC, International Mechanical Code, and the UMC, Uniform Mechanical Code) have requirements of 25/50 (flame spread index/smoke developed index, in accordance with ASTM E 84) for materials in plenums other than wires and cables (and some other materials). NFPA 13 (sprinkler standard) also made it clear that the use of plenum cables in plenums does not even introduce a fire hazard sufficient to require installation of sprinklers.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation to continue to reject but does not necessarily agree with the submitter's substantiation.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-177 Log #2080 NEC-P16 **Final Action: Reject**
(800.179(O) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-209
Recommendation: Accept Proposal 16-209
Substantiation: There are cables available that would pass the UL 723 test, but it would be foolish for a manufacturer to submit a product for testing, as there is no marking available to differentiate a very low smoke cable for smoky cable.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided sufficient additional technical information for the panel to reverse its position.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-178 Log #2081 NEC-P16 **Final Action: Reject**
(800.179(P) (New))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.
Comment on Proposal No: 16-210
Recommendation: Accept Proposal 16-210.
Substantiation: There are cables available that would pass the UL 723 test, but it would be foolish for a manufacturer to submit a product for testing, as there is no marking available to differentiate a very low smoke cable for smoky cable.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its original position on Proposal 16-210.
The submitter has not provided any applications or installation requirements as requested by the panel in the ROP.
Adding listing requirements without application or installation requirements is not in keeping with the 2003 NEC Style Manual Section 1.3, Regulatory Adoption, which states "Because the National Electrical Code is intended to be suitable for adoption as a regulatory document, it is important that it contain clearly stated mandatory requirements in the Code text."
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-179 Log #1006 NEC-P16 **Final Action: Reject**
(800.182)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-211
Recommendation: The Proposal was correctly Accepted in Principle, however, the following revisions should be made to the Section:

Revise 800.182(A) FPN as follows:

~~FPN~~ Informational Note: One method of defining that an optical fiber raceway is a low smoke producing raceway and a fire-resistant raceway is ~~that the raceway exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with~~ described in the plenum test in UL 2024, Standard for Optical Fiber Cable Raceway.

Revise 800.182(B) FPN as follows:

~~FPN~~ Informational Note: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the raceways pass the requirements of~~ the Test for Flame Propagation (Riser) in UL 2024, Standard for Optical Fiber Cable Raceway.

Revise 800.182(C) FPN as follows:

~~FPN~~ Informational Note: One method of defining resistance to the spread of fire is ~~that the raceways pass the requirements of~~ described in the "Vertical-Tray Flame Test (General Use) in UL 2024, Standard for Optical Fiber Cable Raceway.

Substantiation: The existing phrases in 800.182(A) FPN that specify the maximum values when tested in accordance with UL 2024 specifies a requirement which violates 3.1.3 of the NEC Style Manual.

The existing phrase in both 800.182(B) FPN and 800.182(C) FPN "…that the raceways pass the requirements of…" specifies a requirement which violates 3.1.3 of the NEC Style Manual.

The revised text will still provide the user with references that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject
Panel Statement: The informational note in 800.182(A) does not contain requirements and is not written in mandatory language; it provides information on one method of defining an optical fiber raceway that is low smoke producing and fire resistant.

The informational note in 800.182(B) does not contain requirements and is not written in mandatory language; it provides information on one method of defining the fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

The informational note in 800.182(C)does not contain requirements and is not written in mandatory language; it provides information on defining resistance to the spread of fire.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-180 Log #1633 NEC-P16 **Final Action: Accept in Principle**
(800.182)

Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-211
Recommendation: Accept Proposal 16-211 in principle in part by rejecting the recommended text in Proposal 16-211 and instead accepting the task group's comment on Proposal 16-108 which refers to Article 770 for applications of cable routing assemblies.
Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

Panel 16 accepted listing requirements for cable routing assemblies in multiple articles. The task group recommends that panel 16 simplify the multiple sections dealing with cable routing assemblies by placing the listing requirements in one article only. Since the primary application of cable routing assemblies is currently with optical fiber cables, the task group chose Article 770. This proposal is not needed if the panel accepts the task group comment on Proposal 16-108.

Panel Meeting Action: Accept in Principle
Panel Statement: The panel accepts the principle of placing the listing requirements of cable routing assemblies in 770.182, and not repeating them in Chapter 8. See panel action on Comment 16-99. The panel accepts the recommendation to reject the recommended text of Proposal 16-211.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

ARTICLE 810 — RADIO AND TELEVISION EQUIPMENT

16-181 Log #543 NEC-P16 **Final Action: Reject**
(810)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-212
Recommendation: Continue to reject the proposal.
Substantiation: The panel statement has correctly identified several criteria that make the "grounding electrode conductor" unique and different from a communications "grounding conductor". They include: connection of the grounded conductor (neutral) and the equipment grounding conductor from within the power service equipment to the grounding electrode/ grounding electrode system at the premises, specific requirements for material, installation, sizing and accessibility, and service as the interconnection point for other equipment/systems required to be grounded. Communications grounding conductors do not have the required attributes to serve these important functions. Identifying them as such will lead to confusion, misapplication of grounding rules and inadequate grounding.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the submitter.

The panel has reviewed the proposed CMP 5 grounding terminology changes and has accepted the changes with editorial revisions in an effort to ensure consistent terminology throughout the Code.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
PIRKLE, W.: See comment on 16-85.

16-182 Log #612 NEC-P16 **Final Action: Accept in Principle**
(810)

Submitter: Travis Lindsey, Travis Lindsey Consulting Services
Comment on Proposal No: 16-212
Recommendation: Replace the term "~~grounding conductor~~", with the term "grounding electrode conductor", throughout this article.
Substantiation: The term "grounding electrode conductor", is a specific term and thus it is easier for most people in the industry to understand the purpose. The generic term "grounding conductor" is so general that most people can misunderstand the application. It cannot be held to be in the best interest of safety for a general misunderstanding of terms to be an allowable mode in the NEC process.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-190.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-183 Log #1269 NEC-P16 **Final Action: Accept in Principle**
(810)

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 16-212
Recommendation: I highly encourage CMP-16 to accept this proposal in principle and accept the coordinated set of comments that provide the completed revisions throughout Article 810.
Substantiation: This comment responds to action by CMP-5 to delete the term "grounding conductor" and revise the term "grounding electrode conductor." Two definitions that apply to a conductive path in the grounding scheme that functions as a grounding electrode conductor are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 810. The coordinated comments actually even correct misuse of grounding terms in a few locations that existed for a few cycles.

CMP-5 has responsibilities for defined grounding and bonding terms (Code wide). This comment respects the independence of CMP-16 regarding Chapter 8 based on 90.3: this work is not an effort to remove that independence. These proposed revisions are technically correct and result in grounding and bonding terms being used consistently with how they are defined. The term "grounding conductor" is too broad and has been part of a planned migration for removal since the 2005 edition. This planned revision is part of a larger plan implemented by the NEC-2008 TCC assigned grounding and bonding task group work. The grounding and bonding concepts are simple. If grounding happens, a connection is made to an electrode by use of a grounding electrode conductor. Bonding connected conductive parts to establish continuity and

conductivity between them. The proposed revisions do not change anything technically in the article: they only make the use of grounding terms consistent with how they are defined, improving the current text. The only change proposed is in use of terms. All other rules such as sizing, installation and so forth remain as specified in this article, as before.

Not accepting the proposed revisions shows a deliberate action to allow continued inconsistency and subjectivity to remain in the NEC. CMP-5 actions have deleted the term "grounding conductor" from Article 100 and revised the term "grounding electrode conductor" to work consistently with the limited energy articles in Chapter 8. The term "grounding conductor" has been removed or replaced in Article 250 and other articles of the NEC. Not accepting the proposed revisions in the coordinated comments will result in the continued use of an orphaned term that is not specific and can lead to subjectivity. The proposed changes are technically correct and there have been no technical reasons brought forward to reject what is being proposed. I highly encourage CMP-16 to give strong consideration to the coordinated comments submitted that resolve these inconsistencies and improve clarity and usability within the limited energy articles with regards to grounding and bonding rules. The best approach in Code development work is to look at the long range objectives and what would be best for the NEC. It needs to be practical, understandable, and enforceable. These proposed revisions are in the spirit of accomplishing all three of these objectives. It's not about who is right or wrong, it is about being successful and ending up with the best Code as a result.

Panel Meeting Action: Accept in Principle
Panel Statement: The panel disagrees with the submitter. The panel has reviewed the proposed grounding terminology changes and has accepted the changes with editorial revisions in an effort to ensure consistent terminology throughout the Code.

See panel action and statement on Comment 16-190.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-184 Log #1997 NEC-P16 **Final Action: Accept in Principle (810)**

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 16-212
Recommendation: Replace the term "grounding conductor" with "grounding electrode conductor" throughout this Article.
Substantiation: I agree with the submitter that the term "grounding conductor" and "grounding electrode conductor" are all but identical. The term "grounding electrode conductor" will not be mistaken in the field for the grounded conductor and refers to any point on the grounding electrode system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-190.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-185 Log #2096 NEC-P16 **Final Action: Accept in Principle (810)**

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 16-212
Recommendation: Revise the proposal as follows: Replace the term "grounding conductor" with "bonding conductor" or "grounding electrode conductor" throughout the article as appropriate.
Substantiation: The present term "grounding conductor" is proposed to be deleted by CMP5. The present term is not correct in most applications. I was part of a CMP-5 and CMP-16 Task Group that could not come to a consensus. The members of CMP-5 went through all the sections in Articles 770, 800, 810, 830 and the proposed new Article 840. The proposed changes are being presented by Phil Simmons and I urge the code panel to either agree with the submitter or make additional changes as needed to remove the term "grounding conductor from these articles.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-190.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-186 Log #2221 NEC-P16 **Final Action: Accept in Principle (810)**

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-212
Recommendation: Accept Proposal 16-212 as intended to delete the term "grounding conductor" and replace it with the term "grounding electrode conductor" throughout Article 810.
Substantiation: Proposal 5-13 deleted the definition of "Grounding Conductor" in Article 100 during the 2011 ROP stage as well as the revision of the term "Grounding Electrode Conductor". The revision of the term "grounding electrode conductor" in Article 100 included wording necessary for the Chapter 8 Articles, therefore, the term "grounding conductor" is no longer needed or required. The term "grounding electrode conductor" is more correct than the term "grounding conductor". Proposal 5-18 which was accepted in principle and revised by CMP-1 reads as follows:
Grounding Electrode Conductor (GEC). A conductor used to connect the system grounded conductor, equipment, communications system protectors, antenna discharge units, communications cables or network interface units to a grounding electrode or to a point on the grounding system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-190.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-187 Log #2269 NEC-P16 **Final Action: Accept in Principle (810)**

Submitter: Terry C. Coleman, National Joint Apprentice & Training Committee / Rep. IBEW
Comment on Proposal No: 16-212
Recommendation: Accept Proposal 16-212 as intended to delete the term "grounding conductor" and replace it with the term "grounding electrode conductor" throughout this Article 810.
Substantiation: Proposal 5-13 deleted the definition of "Grounding Conductor" in Article 100 during the 2011 ROP stage as well as the revision of the term" Grounding Electrode Conductor. The revision of the term "grounding electrode conductor" in Article 100 included wording necessary for the Chapter 8 Articles, therefore, the term "grounding conductor" is no longer needed or required. The term "grounding electrode conductor" is more correct than the term "grounding conductor". Proposal 5-18 which was accepted in principle and revised by CMP-1 reads as follows:

Grounding Electrode Condcutor (GEC). A conductor used to connect the system grounded conductor, equipment, communications system protectors, antenna discharge units, communications cables or network interface units to a grounding electrode or to a point on the grounding system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-190.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-188 Log #308 NEC-P16 **Final Action: Accept (810.13)**

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-214
Recommendation: The Technical Correlating Committee directs that the panel clarify that the panel action intends to delete "of less than 250 volts between conductors".

In addition, the Technical Correlating Committee directs the Chair of Code-Making Panel 4 to establish a Task Group to correlate the action on this proposal with the actions taken by Code-Making Panel 4.

This shall be considered as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on Proposal 16-214.

The panel did not intend to delete "of less than 250 volts between conductors". Note that the text is correct in the draft.
Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-189 Log #2780 NEC-P16 **Final Action: Accept**
(810.13)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Accept"
to correlate with similar accepted comments acted on by other panels.
Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 16-214
Recommendation: Proposal should be rejected.
Substantiation: CMP 4 rewrote the definitions and subsequent requirements for the installation of the service conductors that the submitter is referencing in his proposal. The submitter presented rationale in his substantiation based on the presumption that CMP 4 would accept his proposals to CMP 4, we did not. The submitter is incorrect that under existing NEC requirements all "service drop" and "service entrance" conductors are utility owned, they are not. Utilizing the word "service" in 408.3 will be sufficient whether the recommended changes in Article 430 pass or not.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its position on Proposal 16-214.

Section 810.13 applies regardless of ownership of the electric light or service entrance conductors.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-190 Log #1897 NEC-P16 **Final Action: Accept in Principle**
(810.21)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-212
Recommendation: Revise text to read as follows:
810.21 Bonding Conductors and Grounding Electrode Conductors — Receiving Stations.
Bonding conductors and grounding electrode conductors shall comply with 810.21(A) through (K).
(A) Material. The bonding conductor and grounding electrode conductor shall be of copper, aluminum, copper-clad steel, bronze, or similar corrosion-resistant material. Aluminum or copper-clad aluminum bonding conductors and grounding electrode conductors shall not be used where in direct contact with masonry or the earth or where subject to corrosive conditions. Where used outside, aluminum or copper-clad aluminum conductors shall not be installed within 450 mm (18 in.) of the earth.
(B) Insulation. Insulation on bonding conductors and grounding electrode conductors shall not be required.
(C) Supports. The bonding conductors and grounding electrode conductors shall be securely fastened in place and shall be permitted to be directly attached to the surface wired over without the use of insulating supports.
Exception: Where proper support cannot be provided, the size of the bonding conductors and grounding electrode conductors shall be increased proportionately.
(D) Mechanical Protection. The bonding conductors and grounding electrode conductor shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is run in a metal raceway, both ends of the raceway shall be bonded to the contained ~~grounding~~ conductor or to the same terminal or electrode to which the ~~grounding~~ conductor is connected.
(E) Run in Straight Line. The grounding electrode conductor for an antenna mast or antenna discharge unit shall be run in as straight a line as practicable from the mast or discharge unit to the grounding electrode.
(F) Electrode. The grounding electrode conductor shall be connected as required in (F)(1) through (F)(3).
(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.
Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.
(2) In Existing Buildings or Structures Without an Intersystem Bonding Termination ~~Grounding Means~~.
If the existing building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on the following:
(1) The building or structure grounding electrode system as covered in 250.50
(2) The grounded interior metal water piping systems, within 1.52 m (5 ft) from its point of entrance to the building, as covered in 250.52
(3) The power service accessible means external to the building, as covered in 250.94
(4) The nonflexible metallic power service raceway
(5) The service equipment enclosure, or
(6) The grounding electrode conductor or the grounding electrode conductor metal enclosures

A bonding device intended to provide a termination point for the bonding ~~grounding~~ conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is non-removable.
(3) In Existing Buildings or Structures Without an Intersystem Bonding Termination or Grounding Means. If the existing building or structure served has no intersystem bonding termination or grounding means as described in 810.21(F)(2).
(1) To any one of the individual electrodes described in 250.52; or
(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 810.21(F)(2) or (F)(3)(1), to an effectively grounded metal structure. **[ROP 16-221]**

(G) Inside or Outside Building. The bonding conductor or grounding electrode conductor shall be permitted to be run either inside or outside the building.
(H) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 10 AWG copper, 8 AWG aluminum, or 17 AWG copper-clad steel or bronze.
(I) Common Ground. A single bonding conductor or grounding electrode conductor shall be permitted for both protective and operating purposes.
(J) Bonding of Electrodes. A bonding jumper not smaller than 6 AWG copper or equivalent shall be connected between the radio and television equipment grounding electrode and the power grounding electrode system at the building or structure served where separate electrodes are used.
(K) Electrode Connection. Connections to grounding electrodes shall comply with 250.70.
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 810.

These comments address the changes suggested in Proposal 16-212 in each section within Article 810 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Other editorial changes are included to improve the syntax but intend to maintain the existing meaning without introducing a new concept. This includes adding "existing" to 800.100(B)(2) and (3). The provisions in these sections should properly apply to only existing installations to correlate with the rules in 250.94.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
810.21 Bonding Conductors and Grounding Electrode Conductors — Receiving Stations.
Bonding conductors or ~~and~~ grounding electrode conductors shall comply with 810.21(A) through (K).
(A) Material. The bonding conductor or ~~and~~ grounding electrode conductor shall be of copper, aluminum, copper-clad steel, bronze, or similar corrosion-resistant material. Aluminum or copper-clad aluminum bonding conductors or ~~and~~ grounding electrode conductors shall not be used where in direct contact with masonry or the earth or where subject to corrosive conditions. Where used outside, aluminum or copper-clad aluminum conductors shall not be installed within 450 mm (18 in.) of the earth.
(B) Insulation. Insulation on bonding conductors or ~~and~~ grounding electrode conductors shall not be required.
(C) Supports. The bonding conductors and grounding electrode conductors shall be securely fastened in place and shall be permitted to be directly attached to the surface wired over without the use of insulating supports.
Exception: Where proper support cannot be provided, the size of the bonding conductors and grounding electrode conductors shall be increased proportionately.
(D) Mechanical Protection. The bonding conductors and grounding electrode

conductor shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is run in a metal raceway, both ends of the raceway shall be bonded to the contained ~~grounding~~ conductor or to the same terminal or electrode to which the ~~grounding~~ conductor is connected.

(E) Run in Straight Line. The bonding conductor or grounding electrode conductor for an antenna mast or antenna discharge unit shall be run in as straight a line as practicable ~~from the mast or discharge unit to the grounding electrode~~.

(F) Electrode. The bonding conductor or grounding electrode conductor shall be connected as required in (F)(1) through (F)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In ~~Existing~~ Buildings or Structures Wit~~hout an Intersystem Bonding Termination~~ Grounding Means.

If the ~~existing~~ building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping systems, within 1.52 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to the building, as covered in 250.94

(4) The nonflexible metallic power service raceway

(5) The service equipment enclosure, or

(6) The grounding electrode conductor or the grounding electrode conductor metal enclosures of the power service

A bonding device intended to provide a termination point for the bonding ~~grounding~~ conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is non-removable.

(3) In ~~Existing~~ Buildings or Structures Without an Intersystem Bonding Termination or Grounding Means. If the ~~existing~~ building or structure served has no intersystem bonding termination or grounding means as described in 810.21(F)(2).

(1) To any one of the individual electrodes described in 250.52; or

(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 810.21(F)(2) or (F)(3)(1), to an effectively grounded metal structure. **~~[ROP 16-221]~~**

(G) Inside or Outside Building. The bonding conductor or grounding electrode conductor shall be permitted to be run either inside or outside the building.

(H) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 10 AWG copper, 8 AWG aluminum, or 17 AWG copper-clad steel or bronze.

(I) Common Ground. A single bonding conductor or grounding electrode conductor shall be permitted for both protective and operating purposes.

(J) Bonding of Electrodes. A bonding jumper not smaller than 6 AWG copper or equivalent shall be connected between the radio and television equipment grounding electrode and the power grounding electrode system at the building or structure served where separate electrodes are used.

(K) Electrode Connection. Connections to grounding electrodes shall comply with 250.70.

Panel Statement: The panel agrees with the submitter's intent and edits the text for editorial clarification.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

Comment on Affirmative:

BRUNSSEN, J.: Revise the first sentence of 810.21 as follows: "Bonding conductors and grounding electrode conductors shall comply with 810.21(A) through (K)." Both bonding and grounding electrode conductors need to comply with (A) through (K); revised text correlates with similar text of 810.58. There is inconsistent use of the plural 'conductors' as well as the conjunctions 'and' and 'or' throughout 810.21(A) through (K). Revise 810.21(B) as follows: "Insulation on the bonding conductor or grounding electrode conductor shall not be required." Revise 810.21(C) as follows: "The bonding conductor or grounding electrode conductor shall be …". Revise the exception following 810.21(C) as follows: "…The size of the bonding conductor or grounding electrode conductor shall be …". Revise 810.21(D) as follows: "The bonding conductor or grounding electrode conductor shall be …". Revise 810.21(F)(3) by adding commas to delineate between buildings having an intersystem bonding termination and those having the grounding means of 810.21(F)(2). Final text is contained in the Panel Action for Comment 16-193.

OHDE, H.: See our affirmative comment for Comment 16-22.

16-191 Log #2430 NEC-P16 **Final Action: Accept in Principle (810.21)**

Submitter: Keith Lofland, IAEI

Comment on Proposal No: 16-212

Recommendation: Revise text to read as follows:

810.21 Bonding Conductors and Grounding Electrode Conductors — Receiving Stations.

Bonding conductors and grounding electrode conductors shall comply with 810.21(A) through (K).

(A) Material. The bonding conductor and grounding electrode conductor shall be of copper, aluminum, copper-clad steel, bronze, or similar corrosion-resistant material. Aluminum or copper-clad aluminum bonding conductors and grounding electrode conductors shall not be used where in direct contact with masonry or the earth or where subject to corrosive conditions. Where used outside, aluminum or copper-clad aluminum conductors shall not be installed within 450 mm (18 in.) of the earth.

(B) Insulation. Insulation on bonding conductors and grounding electrode conductors shall not be required.

(C) Supports. The bonding conductors and grounding electrode conductors shall be securely fastened in place and shall be permitted to be directly attached to the surface wired over without the use of insulating supports.

Exception: Where proper support cannot be provided, the size of the bonding conductors and grounding electrode conductors shall be increased proportionately.

(D) Mechanical Protection. The bonding conductors and grounding electrode conductor shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is run in a metal raceway, both ends of the raceway shall be bonded to the contained ~~grounding~~ conductor or to the same terminal or electrode to which the ~~grounding~~ conductor is connected.

(E) Run in Straight Line. The grounding electrode conductor for an antenna mast or antenna discharge unit shall be run in as straight a line as practicable from the mast or discharge unit to the grounding electrode.

(F) Electrode. The grounding electrode conductor shall be connected as required in (F)(1) through (F)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In Existing Buildings or Structures Without an Intersystem Bonding Termination ~~Grounding Means~~.

If the existing building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping systems, within 1.52 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to the building, as covered in 250.94

(4) The nonflexible metallic power service raceway

(5) The service equipment enclosure, or

(6) The grounding electrode conductor or the grounding electrode conductor metal enclosures

A bonding device intended to provide a termination point for the bonding ~~grounding~~ conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is non-removable.

(3) In Existing Buildings or Structures Without an Intersystem Bonding Termination or Grounding Means. If the existing building or structure served has no intersystem bonding termination or grounding means as described in 810.21(F)(2).

(1) To any one of the individual electrodes described in 250.52; or

(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 810.21(F)(2) or (F)(3)(1), to an effectively grounded metal structure. **[ROP 16-221]**

(G) Inside or Outside Building. The bonding conductor or grounding electrode conductor shall be permitted to be run either inside or outside the building.

(H) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 10 AWG copper, 8 AWG aluminum, or 17 AWG copper-clad steel or bronze.

(I) Common Ground. A single bonding conductor or grounding electrode conductor shall be permitted for both protective and operating purposes.

(J) Bonding of Electrodes. A bonding jumper not smaller than 6 AWG copper or equivalent shall be connected between the radio and television equipment grounding electrode and the power grounding electrode system at the building or structure served where separate electrodes are used.

(K) Electrode Connection. Connections to grounding electrodes shall comply with 250.70.
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-190.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-192 Log #1253 NEC-P16 **Final Action: Accept in Principle (810.21(F)(3))**

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 16-220
Recommendation: Accept Proposal 16-220.
Substantiation: In addressing the panel statement, section 810.21(F)(3) addresses "In Buildings or Structures Without Intersystem Bonding Termination or Grounding Means", and 810.21(B)(2) addresses "In Buildings or Structures with Grounding Means." What possibly could the panel mean when it states "must be taken in context?" 810.21(B)(3) addresses buildings and structures without electrodes, thus there are no grounding electrode means at the building or structure to be utilized and grounding electrode(s) have to be installed. Paragraph 810.21(B)(3)(1) states "To any one of the individual electrodes described in 250.52, but these are not in existence according to the title of 810.21(B)(3). Therefore, the only choice left is 810.21(B)(3)(2) and that states the electrode shall be an effectively grounded metal structure, which again, is not in existence as again, the title of 810.21(B)(3) states "…Without …Grounding Means." Also, the word "effectively" was dropped by Code-Making Panel 5 as being subjective and inadequate in determining if a metal structure is grounded. So, why does it remain in 810.21(B)(3)(2)? The grounding electrodes that could feasibly be installed are those in 250.52(A)(4) through (A)(8), those suggested in Proposal 16-220. The issues pointed out in this comment justify the acceptance of Proposal 16-36.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-193.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-193 Log #2327 NEC-P16 **Final Action: Accept in Principle (810.21(F)(3))**

Submitter: Mike Holt, Mike Holt Enterprises
Comment on Proposal No: 16-219
Recommendation: This proposal should have been accepted as submitted.
Substantiation: The term "effectively grounded" is no longer used in the NEC. The reason it is no longer used is that it is too vague and subjective—what is the difference between "grounded" and "effectively grounded"? CMP-16 should follow the lead of CMP-5 in this endeavor.

Item (2) Can be removed due to the fact that it is already covered in (existing) item 1.

By removing (2), the Code can also eliminate the list format by including the text of (1) in the main text of the rule.
Panel Meeting Action: Accept in Principle

Revise 810.21(F)(3) as follows: If the building or structure served has no intersystem bonding termination, or grounding means as described in 810.21(F)(2), the grounding electrode conductor shall be connected to an electrode as described in 250.52.

Delete (1) and (2) as the submitter suggests.
Panel Statement: The panel agrees that "effectively" does not contribute clarity in this case. Addition of 810.21(F)(2) references the previous paragraph that identifies grounding means at the building or structure. Addition of the submitter's proposed text clarifies that if a grounding means does not exist, one should be installed in accordance with 250.52.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-194 Log #1898 NEC-P16 **Final Action: Accept (810.58)**

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-212
Recommendation: Revise text to read as follows:
810.58 Bonding Conductors and Grounding Electrode Conductors — Amateur and Citizen Band Transmitting and Receiving Stations. Bonding conductors and grounding electrode conductors shall comply with 810.58(A) through (C).
(A) Other Sections. All bonding conductors and grounding electrode conductors for amateur and citizen band transmitting and receiving stations shall comply with 810.21(A) through (K). **[ROP 16-222]**

(B) Size of Protective Bonding Conductor or Grounding Electrode Conductor. The protective bonding conductor or grounding electrode conductor for transmitting stations shall be as large as the lead-in but not smaller than 10 AWG copper, bronze, or copper-clad steel.
(C) Size of Operating Bonding Conductor or Grounding Electrode Conductor. The operating bonding conductor or grounding electrode conductor for transmitting stations shall not be less than 14 AWG copper or its equivalent.
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 810.

These comments address the changes suggested in Proposal 16-212 in each section within Article 810 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-195 Log #2431 NEC-P16 **Final Action: Accept (810.58)**

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-212
Recommendation: Revise text to read as follows:
810.58 Bonding Conductors and Grounding Electrode Conductors — Amateur and Citizen Band Transmitting and Receiving Stations. Bonding conductors and grounding electrode conductors shall comply with 810.58(A) through (C).
(A) Other Sections. All bonding conductors and grounding electrode conductors for amateur and citizen band transmitting and receiving stations shall comply with 810.21(A) through (K). **[ROP 16-222]**

(B) Size of Protective Bonding Conductor or Grounding Electrode Conductor. The protective bonding conductor or grounding electrode conductor for transmitting stations shall be as large as the lead-in but not smaller than 10 AWG copper, bronze, or copper-clad steel.
(C) Size of Operating Bonding Conductor or Grounding Electrode Conductor. The operating bonding conductor or grounding electrode conductor for transmitting stations shall not be less than 14 AWG copper or its equivalent.
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.

Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-196 Log #309 NEC-P16 **Final Action: Accept**
(810.70 Exception No. 1)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-223
Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal and the existing section 640.3(K).
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Exception No 1 to read as follows:
Exception No. 1: As provided in Article 640.
Panel Statement: The panel accepts the direction of the TCC to reconsider the action on Proposal 16-223.
The panel revises the panel action on Proposal 16-223 to "Reject". Article 640 covers not only antenna wiring, but other wiring associated with radio and television equipment.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-197 Log #1899 NEC-P16 **Final Action: Accept in Principle in Part**
(810.71)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-212
Recommendation: Revise text to read as follows:
810.71 General. Transmitters shall comply with 810.71(A) through (C).
(A) Enclosing. The transmitter shall be enclosed in a metal frame or grille or separated from the operating space by a barrier or other equivalent means.~~,~~ All metallic parts of the equipment shall be ~~which are effectively~~ connected to a bonding ~~grounding~~ conductor.
(B) Grounding of Controls. All external metal handles and controls accessible to the operating personnel shall be effectively connected to an equipment grounding conductor if the transmitter is powered by the premises wiring system or grounded with a conductor in accordance with 810.21.
(C) Interlocks on Doors. All access doors shall be provided with interlocks that disconnect all voltages of over 350 volts between conductors when any access door is opened.
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 810.
These comments address the changes suggested in proposal 16-212 in each section within Article 810 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.
Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept in Principle in Part
Revise 810.71 to read as follows:
810.71 General. Transmitters shall comply with 810.71(A) through (C).
(A) Enclosing. The transmitter shall be enclosed in a metal frame or grille or separated from the operating space by a barrier or other equivalent means, all metallic parts of which are effectively connected to a bonding or grounding electrode conductor.
Panel Statement: The panel accepts parts (B) and (C).
The panel does not accept "equipment shall be" in Part (A) as provided by the submitter as this is unrelated to the original proposal and unsubstantiated. "Bonding or grounding electrode conductor" was changed for consistency with other Comments.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
BRUNSSEN, J.: For consistency with similar revisions throughout 770, 800, 810, 820, 830 and 840, revise the latter portion of 810.71(A) as follows: "…are effectively connected to a bonding conductor or grounding electrode conductor." The word 'conductor' is added after 'bonding' for consistency.
OHDE, H.: See our affirmative comment for Comment 16-22.

16-198 Log #2432 NEC-P16 **Final Action: Accept in Principle**
(810.71)

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-212
Recommendation: Revise text to read as follows:
810.71 General. Transmitters shall comply with 810.71(A) through (C).
(A) Enclosing. The transmitter shall be enclosed in a metal frame or grille or separated from the operating space by a barrier or other equivalent means.~~,~~ All metallic parts of the equipment shall be ~~which are effectively~~ connected to a bonding ~~grounding~~ conductor.
(B) Grounding of Controls. All external metal handles and controls accessible to the operating personnel shall be effectively connected to an equipment grounding conductor if the transmitter is powered by the premises wiring system or grounded with a conductor in accordance with 810.21.
(C) Interlocks on Doors. All access doors shall be provided with interlocks that disconnect all voltages of over 350 volts between conductors when any access door is opened.
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.
From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept in Principle
Panel Statement: See action and statement on Comment 16-197.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

ARTICLE 820 — COMMUNITY ANTENNA TELEVISION AND RADIO DISTRIBUTION SYSTEMS

16-199 Log #548 NEC-P16 **Final Action: Reject**
(820)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-225
Recommendation: Continue to reject this proposal.
Substantiation: See my explanation on Comment to Proposal 16-91.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the submitter.
The panel has reviewed the proposed CMP 5 grounding terminology changes and has accepted the changes with editorial revisions in an effort to ensure consistent terminology throughout the Code.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
PIRKLE, W.: See comment on 16-85.

16-200 Log #613 NEC-P16 **Final Action: Accept in Principle**
(820)

Submitter: Travis Lindsey, Travis Lindsey Consulting Services
Comment on Proposal No: 16-225
Recommendation: Replace the term "~~grounding conductor~~", with the term "grounding electrode conductor", throughout this article.
Substantiation: The term "grounding electrode conductor", is a specific term and thus it is easier for most people in the industry to understand the purpose. The generic term "grounding conductor" is so general that most people can misunderstand the application. It cannot be held to be in the best interest of safety for a general misunderstanding of terms to be an allowable mode in the NEC process.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-224.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-201 Log #1270 NEC-P16 **Final Action: Accept in Principle (820)**

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 16-225
Recommendation: I highly encourage CMP-16 to accept this proposal in principle and accept the coordinated set of comments that provide the completed revisions throughout Article 820.
Substantiation: This comment responds to action by CMP-5 to delete the term "grounding conductor" and revise the term "grounding electrode conductor." Two definitions that apply to a conductive path in the grounding scheme that functions as a grounding electrode conductor are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 820. The coordinated comments actually even correct misuse of grounding terms in a few locations that existed for a few cycles.

CMP-5 has responsibilities for defined grounding and bonding terms (Code wide). This comment respects the independence of CMP-16 regarding Chapter 8 based on 90.3: this work is not an effort to remove that independence. These proposed revisions are technically correct and result in grounding and bonding terms being used consistently with how they are defined. The term "grounding conductor" is too broad and has been part of a planned migration for removal since the 2005 edition. This planned revision is part of a larger plan implemented by the NEC-2008 TCC assigned grounding and bonding task group work. The grounding and bonding concepts are simple. If grounding happens, a connection is made to an electrode by use of a grounding electrode conductor. Bonding connected conductive parts to establish continuity and conductivity between them. The proposed revisions do not change anything technically in the article: they only make the use of grounding terms consistent with how they are defined, improving the current text. The only change proposed is in use of terms. All other rules such as sizing, installation and so forth remain as specified in this article, as before.

Not accepting the proposed revisions shows a deliberate action to allow continued inconsistency and subjectivity to remain in the NEC. CMP-5 actions have deleted the term "grounding conductor" from Article 100 and revised the term "grounding electrode conductor" to work consistently with the limited energy articles in Chapter 8. The term "grounding conductor" has been removed or replaced in Article 250 and other articles of the NEC. Not accepting the proposed revisions in the coordinated comments will result in the continued use of an orphaned term that is not specific and can lead to subjectivity. The proposed changes are technically correct and there have been no technical reasons brought forward to reject what is being proposed. I highly encourage CMP-16 to give strong consideration to the coordinated comments submitted that resolve these inconsistencies and improve clarity and usability within the limited energy articles with regards to grounding and bonding rules. The best approach in Code development work is to look at the long range objectives and what would be best for the NEC. It needs to be practical, understandable, and enforceable. These proposed revisions are in the spirit of accomplishing all three of these objectives. It's not about who is right or wrong, it is about being successful and ending up with the best Code as a result.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel disagrees with the submitter. The panel has reviewed the proposed grounding terminology changes and has accepted the changes with editorial revisions in an effort to ensure consistent terminology throughout the Code.

See panel action and statement on Comment 16-224.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-202 Log #1998 NEC-P16 **Final Action: Accept in Principle (820)**

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 16-225
Recommendation: Replace the term "grounding conductor" with "grounding electrode conductor" throughout this Article.
Substantiation: I agree with the submitter that the term "grounding conductor" and "grounding electrode conductor" are all but identical. The term "grounding electrode conductor" will not be mistaken in the field for the grounded conductor and refers to any point on the grounding electrode system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-224.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-203 Log #2097 NEC-P16 **Final Action: Accept in Principle (820)**

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 16-225
Recommendation: Revise the proposal as follows: Replace the term "grounding conductor" with "bonding conductor" or "grounding electrode conductor" throughout the article as appropriate.
Substantiation: The present term "grounding conductor" is proposed to be deleted by CMP5. The present term is not correct in most applications. I was part of a CMP-5 and CMP-16 Task Group that could not come to a consensus. The members of CMP-5 went through all the sections in Articles 770, 800, 810, 830 and the proposed new Article 840. The proposed changes are being presented by Phil Simmons and I urge the code panel to either agree with the submitter or make additional changes as needed to remove the term "grounding conductor from these articles.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-224.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-204 Log #2222 NEC-P16 **Final Action: Accept in Principle (820)**

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-225
Recommendation: Accept Proposal 16-225 as intended to delete the term "grounding conductor" and replace it with the term "grounding electrode conductor" throughout Article 820.
Substantiation: Proposal 5-13 deleted the definition of "Grounding Conductor" in Article 100 during the 2011 ROP stage as well as the revision of the term "Grounding Electrode Conductor". The revision of the term "grounding electrode conductor" in Article 100 included wording necessary for the Chapter 8 Articles, therefore, the term "grounding conductor" is no longer needed or required. The term "grounding electrode conductor" is more correct than the term "grounding conductor". Proposal 5-18 which was accepted in principle and revised by CMP-1 reads as follows:

Grounding Electrode Conductor (GEC). A conductor used to connect the system grounded conductor, equipment, communications system protectors, antenna discharge units, communications cables or network interface units to a grounding electrode or to a point on the grounding system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-224.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-205 Log #2270 NEC-P16 **Final Action: Accept in Principle (820)**

Submitter: Terry C. Coleman, National Joint Apprentice & Training Committee / Rep. IBEW
Comment on Proposal No: 16-225
Recommendation: Accept Proposal 16-225 as intended to delete the term "grounding conductor" and replace it with the term "grounding electrode conductor" throughout this Article 820.
Substantiation: Proposal 5-13 deleted the definition of "Grounding Conductor" in Article 100 during the 2011 ROP stage as well as the revision of the term" Grounding Electrode Conductor. The revision of the term "grounding electrode conductor" in Article 100 included wording necessary for the Chapter 8 Articles, therefore, the term "grounding conductor" is no longer needed or required. The term "grounding electrode conductor" is more correct than the term "grounding conductor". Proposal 5-18 which was accepted in principle and revised by CMP-1 reads as follows:

Grounding Electrode Condcutor (GEC). A conductor used to connect the system grounded conductor, equipment, communications system protectors, antenna discharge units, communications cables or network interface units to a grounding electrode or to a point on the grounding system.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-224.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-206 Log #544 NEC-P16 **Final Action: Accept in Principle**
(820.2)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-232
Recommendation: Revise the definition as follows: "**820.2. Cable Routing Assembly.** A structural system consisting of a single or multiple units and associated fittings used to support and protect optical fiber, communications and data cables."
Substantiation: As indicated in my affirmative ballot comment, the definition is incomplete. The Panel also needs to accommodate the TCC Action. The proposed revisions contained in this comment will complete the definition and satisfy the TCC's concerns. The 'requirement' that the assembly be listed can be included in the appropriate sections of the various Articles, e.g. 820.113(A).
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 16-208.
The text meets the submitter's intent.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-207 Log #1351 NEC-P16 **Final Action: Accept**
(820.2)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-230
Recommendation: *ARTICLE 820 Community Antenna Television and Radio Distribution Systems*
~~*FPN: Rules that are followed by a reference in brackets contain text that has been extracted from NFPA 90A–2002, Standard for the Installation of Air-Conditioning and Ventilating Systems. Only editorial changes were made to the extracted text to make it consistent with this Code.*~~
Substantiation: This text needs to be deleted as the extract text (definition of air duct) has been deleted by the proposal.
It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-208 Log #1634 NEC-P16 **Final Action: Accept**
(820.2)

Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-232
Recommendation: Accept Proposal 16-232 in principle in part by taking the following actions:
Reject including the definition of cable routing assembly in Article 820. Instead add a new 820.3(I) as follows:
(I) Cable Routing Assemblies. The definition in 770.2, the applications in 770.154 and installation rules in 770.113 shall apply to Article 820.
Add a new 830.3(G) as follows:
(G) Cable Routing Assemblies. The definition in 770.2, the applications in 770.154 and installation rules in 770.113 shall apply to Article 830.
Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.
Panel 16 accepted a definition of a cable routing assembly in multiple articles. It also established installation rules and listing requirements in multiple articles. The task group recommends that panel 16 simplify the multiple sections dealing with cable routing assemblies by placing the definition and installation rules in one article only with appropriate references to that article from the other articles. Since the primary application of cable routing assemblies is currently with optical fiber cables, the task group chose Article 770 to contain the primary requirements dealing with cable routing assemblies.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-209 Log #310 NEC-P16 **Final Action: Accept**
(820.2.Optical Fiber/Communications Cable Routing Assembly)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-232
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal by complying with 2.2.2 of the NEC Style Manual to not contain mandatory text, such as "listed."
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review the panel action on Proposal 16-232.
See panel action and statement on Comment 16-208.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-210 Log #2433 NEC-P16 **Final Action: Accept in Principle**
(820.2.Point of Entrance)

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-225
Recommendation: Revise text to read as follows:
Point of Entrance. The point within a building at which the wire or cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC) connected by a grounding <u>electrode</u> conductor to an electrode in accordance with 820.100(B).
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.
From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept in Principle
Panel Statement: See action and statement on Comment 16-211.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-211 Log #1900 NEC-P16 **Final Action: Accept in Principle**
(820.2 Point of Entrance)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-225
Recommendation: Revise text to read as follows:
Point of Entrance. The point within a building at which the wire or cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC) connected by a grounding <u>electrode</u> conductor to an electrode in accordance with 820.100(B).
Substantiation: This comment responds to the action of CMP-5 to delete the term "grounding conductor" and revise the term "grounding electrode conductor." Two definitions that apply to a conductive path in the grounding scheme that functions as a grounding electrode conductor are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 800.
Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
Point of Entrance. The point within a building at which the coaxial cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC)

connected by a bonding conductor or grounding electrode conductor ~~to an electrode~~ in accordance with 820.100(B).
Panel Statement: The panel agrees with the submitter and edits the text as 820.100(B) includes both bonding conductors and grounding electrode conductors.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-212 Log #311 NEC-P16 **Final Action: Accept in Principle**
(820.3(A) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-236
Recommendation: The Technical Correlating Committee directs that the panel delete the subsection since 90.3 already provides the information and compliance with 4.1 of the NEC Style Manual is necessary.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel accepts the direction of the TCC to take action on Proposal 16-236.
The panel meets the intent of the TCC to delete the reference to 90.3.
See panel action and statement on Comment 16-213.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-213 Log #545 NEC-P16 **Final Action: Reject**
(820.3(A) (New))

TCC Action: In accordance with 4.1 of the NEC Style Manual, the Technical Correlating Committee directs that this comment and Proposal 16-236 be reported as "Reject" since there is no need to duplicate part of 90.3.
Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-236
Recommendation: Revise the panel action to 'Accept in Part'. Accept the part as follows that states: "Re-letter the existing (A) to (B), (B) to (C), etc. and establish a new (A). **(A) Chapters 1 through 7.** The requirements of Chapters 1 through 7 shall not apply to Article ~~800~~ 820 except where the requirements are specifically referenced in Article ~~800~~ 820."
Delete the part that states: "See 90.3."
Substantiation: Removes the reference to 90.3 as flagged by the Technical Correlating Committee. Corrects a typographical error by changing "800" to "820". Note that the preprint is correct with respect to the typographical error.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-214 Log #1352 NEC-P16 **Final Action: Accept**
(820.24, FPN 2)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-240
Recommendation: FPN # 2; See NFPA 90A-2009, *Standard for Installation of Air-Conditioning and Ventilation Systems*, for discrete combustible components installed in accordance with 300.22(B) and (C).
Note to staff and TCC: See also FPNs to the following sections, which have no associated proposals: 424.66 and 640.3(B).
Substantiation: Please reference the updated edition of NFPA 90A: 2009.
It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-215 Log #546 NEC-P16 **Final Action: Accept**
(820.25)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-241
Recommendation: Continue to reject this proposal.
Substantiation: The submitter has provided no substantiation for the new requirement that is essentially unenforceable.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-216 Log #641 NEC-P16 **Final Action: Accept**
(820.25)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-241
Recommendation: Continue to reject this proposal.
Substantiation: Panel 1 rejected similar Proposals 1-139 and 1-146 with the statement "The submitter has not substantiated that a problem exists, or that the problem would be alleviated by removing abandoned cables and equipment neatly. Rather, the panel concludes, that in some cases, abandoned cables and equipment are best left abandoned. The proposed text is unnecessary as the section more appropriately applies to "Requirements for Electrical Installations" and "Mechanical Execution of Work.""
Panel 3 rejected similar Proposals 3-173 and 3-253 with the statement. "The submitter has not provided technical substantiation for the proposed change, and compliance with this requirement would be unenforceable. This is already covered under 90.4 and 110.2.
Panel 12 rejected similar Proposals 12-114, 12-146 with the statement. "The requirement is unenforceable. Disposition of removed materials is not a code responsibility. The remaining installation is required to be in accordance with 110.3, which is enforceable."
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-217 Log #1399 NEC-P16 **Final Action: Reject**
(820.26)

Submitter: Russell LeBlanc, The Peterson School
Comment on Proposal No: 16-242
Recommendation: The proposal should be accepted in principal but modified as follows:
If a conduit or raceway of metric designator 53 (trade size 2 inch) or larger, penetrates a fire-resistance-rated wall, partition, floor, or ceiling, and that same conduit or raceway also enters an enclosure of the ventilated type, that conduit or raceway shall be sealed or plugged with an approved fire stopping material at the point of entrance to the enclosure to prevent fire, smoke, or other products of combustion from passing through the raceway or conduit into other areas of the building or structure.
Substantiation: I have modified the wording for clarity and so the application is more focused, and less of a "sweeping" change.
In my original proposal I provided a first hand eyewitness account of what happened.
This was NOT a second hand or third hand story. I saw it happen with my own eyes! I am not a novice. I have been in the trade for over 25 years. I have also been teaching electrician classes for over 10 years. I am OSHA certified. I am an instructor approved by the Mass. Dept. of Education, and The Board of Examiners of Electricians. I have authored several other code changes. I am a member of NFPA. No, I am not a Fire chief or fire science engineer, or some other Fire Dept. Official. But I know what I saw, and it just did NOT seem right to me. I am very concerned. The smoke simply should NOT have been able to spread through the building via the raceways. What more technical substantiation is needed than that?
Lets break it down to simple science and logic.
If I build a fire in a fireplace, the smoke will go up the chimney flue, if the flue damper is OPEN.
If I build a fire in a fireplace, the smoke will NOT go up the chimney flue, if the flue damper is CLOSED!
Try it!
Apply logic here.
If I am wrong then maybe we don't need to seal the raceway ends. But this "chimney effect" of the unsealed pipes has already happened once. I have seen it. If it happens again, the occupants may not be as lucky as the first time I saw this phenomenon happen.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The recommended text is vague, unenforceable and lacks specificity. Insufficient data has been provided to justify such a change. Selection of conduit size requiring fire stopping is arbitrary. This may be more of a building Code issue rather than an electrical Code issue.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 1
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:
IVANS, R.: The submitter identifies a concern associated with conduit providing a bypass of firebreaks between floors that should not be ignored.

Although there may be issues associated with the general nature of the original proposal or the seemingly arbitrary selection of 2" conduit, the solutions are not technically insurmountable. I am aware of installations where such sealing of conduit was required by local building codes and effectively implemented This item should have been put on hold for further study rather than rejected.

16-218 Log #2781 NEC-P16 **Final Action: Accept**
(820.44(B) Exception)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 16-243
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-219 Log #2782 NEC-P16 **Final Action: Accept**
(820.47(B) Exception No. 1)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Accept" to correlate with similar accepted comments acted on by other panels.
Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 16-247
Recommendation: Proposal should be rejected.
Substantiation: CMP 4 rewrote the definitions and subsequent requirements for the installation of the service conductors that the submitter is referencing in his proposal. The submitter presented rationale in his substantiation based on the presumption that CMP 4 would accept his proposals to CMP 4, we did not. The submitter is incorrect that under existing NEC requirements all "service drop" and "service entrance" conductors are utility owned, they are not. Utilizing the word "service" in 408.3 will be sufficient whether the recommended changes in Article 430 pass or not.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its position on Proposal 16-247.
The addition of the word "entrance" adds clarity.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-220 Log #1901 NEC-P16 **Final Action: Accept**
(820.93)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-225
Recommendation: Revise text to read as follows:
820.93 Grounding of the Outer Conductive Shield of Coaxial Cables. Coaxial cables entering buildings or attached to buildings shall comply with 820.93(A) or (B). Where the outer conductive shield of a coaxial cable is grounded, no other protective devices shall be required. For purposes of this section, grounding located at mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, or at a mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, shall be considered to meet the requirements of this section.

Informational Note: Selecting a grounding location to achieve the shortest practicable bonding conductor or grounding electrode conductor helps limit potential differences between CATV and other metallic systems.

Sections 820.93(A), (B), (C), and (D) are not affected by this Comment.
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 820.

These comments address the changes suggested in proposal 16-225 in each section within Article 820 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Other editorial changes are included to improve the syntax but intend to maintain the existing meaning without introducing a new concept.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-221 Log #2434 NEC-P16 **Final Action: Accept**
(820.93)

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-225
Recommendation: Revise text to read as follows:
820.93 Grounding of the Outer Conductive Shield of Coaxial Cables. Coaxial cables entering buildings or attached to buildings shall comply with 820.93(A) or (B). Where the outer conductive shield of a coaxial cable is grounded, no other protective devices shall be required. For purposes of this section, grounding located at mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, or at a mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, shall be considered to meet the requirements of this section.

Informational Note: Selecting a grounding location to achieve the shortest practicable bonding conductor or grounding electrode conductor helps limit potential differences between CATV and other metallic systems.

Sections 820.93(A), (B), (C), and (D) are not affected by this Comment.
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-222 Log #547 NEC-P16 **Final Action: Accept**
(820.100 (New))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-250
Recommendation: Continue to reject this proposal.
Substantiation: The proposed revision is unnecessary. The Panel Statement has correctly indicated that all Article 250 grounding requirements that are applicable to CATV are presently fully covered in Article 820, IV, *Grounding Methods*, with reference to specific sections of Article 250 as appropriate. Further, the NEC Style Manual prohibits reference to complete articles.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-223 Log #468 NEC-P16 **Final Action: Hold**
(820.100(A) and (B))

TCC Action: The Technical Correlating Committee directs that Comment 16-223 be reported as "Hold" as it introduces new material that has not received public review.
Submitter: Steven C. Johnson, Johnson Telecom, LLC / Rep. National Cable & Telecommunications Assn.
Comment on Proposal No: 16-261
Recommendation: Change Panel action from Reject to Accept in Principle with the wording changes below:
820.100(A)(4)
Exception: In one- and two-family dwellings where it is not practicable to achieve an overall maximum grounding conductor length of 6.0 m (20 ft), a separate ~~grounding electrode~~ communications ground rod meeting the minimum dimensional criteria of 820.100(B)(3)(2) shall be driven, and the grounding conductor shall be connected to the communications ground rod

in accordance with 820.100(C). The communications ground rod shall be connected~~. as specified in 250.52(A)(5); (A)(6), or (A)(7) shall be used, the grounding conductor shall be connected to the separate grounding electrode in accordance with 250.70, and the separate grounding electrode shall be connected~~ to the power grounding electrode system in accordance with 820.100(D).

820.100(B)(3)(2) If the building or structure served has no intersystem bonding termination or grounding means, as described in 820.100(B)(2) or (B)(3)(1), to any one of the individual electrodes described in 250.52~~(A)(5)~~, (A)(7), and (A)(8)~~.~~ , or to a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (1/2 in.) in diameter, driven, where practicable, into permanently damp earth and separated from lightning conductors as covered in 820.44(F)(3) and at least 1.8 m (6 ft) from electrodes of other systems. Steam or hot water pipes or lightning-rod conductors shall not be employed as electrodes for grounding.

Substantiation: Panel 16 concluded in the ROP that a 5 ft ground rod was sufficient for Article 800 applications. Articles 770, 800, and 830 all specify a 5 ft ground rod while Article 820 specifies an 8 ft ground rod (by reference to 250.52). From the Panel Statement on Proposal 16-151: "The tutorial, The ABCs of Grounding and Bonding, states: "Very little resistance change will result from using larger sizes of electrodes." The most important safety aspect is the bonding together of the power and telecom systems." Added text (above) is taken from Article 800 and 830 with minor changes. Changing 820 to allow 5 ft ground rods will create more consistent requirements and parallelism among Articles 770, 800, 820, and 830.

Panel Meeting Action: Reject

Panel Statement: The panel does not accept the text provided by the submitter. The submitter's recommendation is beyond the scope of Proposal 16-261. The submitter is introducing new material.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 14 Negative: 1

Ballot Not Returned: 1 Esemplare, R.

Explanation of Negative:

JOHNSON, S.: Acceptance of this comment would bring Article 820 ground rod requirements consistent with Articles 770, 800, and 830.

16-224 Log #1902 NEC-P16 **Final Action: Accept in Principle**
(820.100(A) and (B))

Submitter: Phil Simmons, Simmons Electrical Services

Comment on Proposal No: 16-225

Recommendation: Revise text to read as follows:

820.100 Cable Bonding or Grounding. The shield of the coaxial cable shall be grounded or bonded as specified in 820.100(A) through (D).

Exception: For communication systems using coaxial cable confined within the premises and isolated from outside cable plant, the shield shall be permitted to be grounded by a connection to an equipment grounding conductor as described in 250.118. Connecting to an equipment grounding conductor through a grounded receptacle using a dedicated grounding conductor and permanently connected listed device shall be permitted. Use of a cord and plug for the connection to an equipment grounding conductor shall not be permitted.

(A) Bonding Conductor or Grounding Electrode Conductor.

(1) Insulation. The bonding conductor or grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.

(2) Material. The bonding conductor or grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.

(3) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 14 AWG. It shall have a current-carrying capacity not less than the outer sheath of the coaxial cable. The bonding conductor or grounding electrode conductor shall not be required to exceed 6 AWG.

(4) Length. The primary protector grounding electrode conductor shall be as short as practicable. In one- and two-family dwellings, the primary protector bonding conductor or grounding electrode conductor shall be as short as practicable, not to exceed 6.0 m (20 ft) in length.

Informational Note: Similar grounding electrode conductor length limitations applied at apartment buildings and commercial buildings help to reduce voltages that may be developed between the building's power and communications systems during lightning events.

Exception: In one- and two-family dwellings where it is not practicable to achieve an overall maximum bonding conductor or grounding electrode conductor length of 6.0 m (20 ft), a separate grounding electrode as specified in 250.52(A)(5), (A)(6), or (A)(7) shall be used, the grounding electrode conductor shall be connected to the separate grounding electrode in accordance with 250.70, and the separate grounding electrode shall be connected to the power grounding electrode system in accordance with 820.100(D).

(5) Run in Straight Line. The bonding conductor and grounding electrode conductor shall be run to the grounding electrode in as straight a line as practicable.

(6) Physical Protection. ~~The~~ Bonding conductors and grounding electrode conductors shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is installed ~~run~~ in a metal raceway, both ends of the raceway shall be bonded to the ~~grounding~~ contained conductor or to the same terminal or electrode to which the bonding conductor or grounding electrode conductor is connected.

(B) Electrode. The bonding conductor or grounding electrode conductor shall be connected in accordance with 820.100(B)(1), (B)(2), or (B)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In Existing Buildings or Structures without an Intersystem Bonding Termination ~~Grounding Means~~.

If the existing building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on one of the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to enclosures as covered in 250.94 Exception

(4) The nonflexible metallic power service raceway

(5) The service equipment enclosure

(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure

(7) The grounding electrode conductor or the grounding electrode of a building or structure disconnecting means that is connected to an electrode as covered in 250.32

A bonding device intended to provide a termination point for the grounding electrode conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is nonremovable.

For purposes of this section, the mobile home service equipment or the mobile home disconnecting means, as described in 820.93, shall be considered accessible.

(3) In Existing Buildings or Structures Without an Intersystem Bonding Termination or Grounding Electrode(s) ~~Means~~. If the existing building or structure served has no intersystem bonding termination or grounding electrode(s) ~~means, as described in 820.100(B)(2),~~ the grounding electrode conductor shall be connected to either of the following:

(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)

(2) If the building or structure served has no intersystem bonding termination or grounding means, as described in 820.100(B)(2) or (B)(3)(1), to any one of the individual grounding electrodes described in 250.52(A)(5), (A)(7) and (A)(8).

Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 820.

These comments address the changes suggested in Proposal 16-225 in each section within Article 820 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Other editorial changes are included to improve the syntax but intend to maintain the existing meaning without introducing a new concept. This includes adding "existing" to 820.100(B)(2) and (3). The provisions in these sections should properly apply to only existing installations to correlate with the rules in 250.94.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

820.100 Cable Bonding and ~~or~~ Grounding. The shield of the coaxial cable shall be bonded or grounded ~~or bonded~~ as specified in 820.100(A) through (D).

Exception: For communication systems using coaxial cable confined within the premises and isolated from outside cable plant, the shield shall be permitted to be grounded by a connection to an equipment grounding conductor as described in 250.118. Connecting to an equipment grounding

conductor through a grounded receptacle using a dedicated grounding conductor and permanently connected listed device shall be permitted. Use of a cord and plug for the connection to an equipment grounding conductor shall not be permitted.

(A) Bonding Conductor or Grounding Electrode Conductor.

(1) Insulation. The bonding conductor or grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.

(2) Material. The bonding conductor or grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.

(3) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 14 AWG. It shall have a current-carrying capacity not less than the outer sheath of the coaxial cable. The bonding conductor or grounding electrode conductor shall not be required to exceed 6 AWG.

(4) Length. The ~~primary protector~~ grounding electrode conductor shall be as short as practicable. In one- and two-family dwellings, the ~~primary protector~~ bonding conductor or grounding electrode conductor shall be as short as practicable, not to exceed 6.0 m (20 ft) in length.

Informational Note: Similar bonding conductor or grounding electrode conductor length limitations applied at apartment buildings and commercial buildings help to reduce voltages that may be developed between the building's power and communications systems during lightning events.

Exception: In one- and two-family dwellings where it is not practicable to achieve an overall maximum bonding conductor or grounding electrode conductor length of 6.0 m (20 ft), a separate grounding electrode as specified in 250.52(A)(5), (A)(6), or (A)(7) shall be used, the grounding electrode conductor shall be connected to the separate grounding electrode in accordance with 250.70, and the separate grounding electrode shall be connected to the power grounding electrode system in accordance with 820.100(D).

(5) Run in Straight Line. The bonding conductor or and grounding electrode conductor shall be run ~~to the grounding electrode~~ in as straight a line as practicable.

(6) Physical Protection. ~~The~~ Bonding conductors and grounding electrode conductors shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is installed ~~run~~ in a metal raceway, both ends of the raceway shall be bonded to the ~~grounding~~ contained conductor or to the same terminal or electrode to which the bonding conductor or grounding electrode conductor is connected.

(B) Electrode. The bonding conductor or grounding electrode conductor shall be connected in accordance with 820.100(B)(1), (B)(2), or (B)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In ~~Existing~~ Buildings or Structures with~~out an Intersystem Bonding Termination~~ Grounding Means.

If the ~~existing~~ building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on one of the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to enclosures as covered in 250.94 Exception

(4) The nonflexible metallic power service raceway

(5) The service equipment enclosure

(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure of the power service, or

(7) The grounding electrode conductor or the grounding electrode of a building or structure disconnecting means that is connected to an electrode as covered in 250.32

A bonding device intended to provide a termination point for the grounding electrode conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is nonremovable.

For purposes of this section, the mobile home service equipment or the mobile home disconnecting means, as described in 820.93, shall be considered accessible.

(3) In ~~Existing~~ Buildings or Structures Without an Intersystem Bonding Termination or Grounding Means. If the ~~existing~~ building or structure served has no intersystem bonding termination or grounding means, as described in 820.100(B)(2), the grounding electrode conductor shall be connected to either of the following:

(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)

(2) If the building or structure served has no intersystem bonding termination or grounding means, as described in 820.100(B)(2) or (B)(3)(1), to any one of the individual grounding electrodes described in 250.52(A)(5), (A)(7) and (A)(8).

Panel Statement: The panel agrees with the submitter's intent and edits the text for editorial clarification.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

BRUNSSEN, J.: 820.100(A)(6), first sentence, should state: "The bonding conductor or grounding electrode conductor shall be …", for consistency with 820.100(A) (1) though (5). 820.100(B)(3) should read as follows: "If the building or structure served has no intersystem bonding termination, or grounding means as described in 820.100(B)(2), …". The comma needs to be placed after "termination" and not after "means" to distinguish between buildings with an intersystem bonding termination as described in (B)(1) and buildings with grounding means as described in (B)(2).

OHDE, H.: See our affirmative comment for Comment 16-22.

16-225 Log #2435 NEC-P16 **Final Action: Accept in Principle**
(820.100(A) and (B))

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-225
Recommendation: Revise text to read as follows:

820.100 Cable Bonding or Grounding. The shield of the coaxial cable shall be grounded or bonded as specified in 820.100(A) through (D).

Exception: For communication systems using coaxial cable confined within the premises and isolated from outside cable plant, the shield shall be permitted to be grounded by a connection to an equipment grounding conductor as described in 250.118. Connecting to an equipment grounding conductor through a grounded receptacle using a dedicated grounding conductor and permanently connected listed device shall be permitted. Use of a cord and plug for the connection to an equipment grounding conductor shall not be permitted.

(A) Bonding Conductor or Grounding Electrode Conductor.

(1) Insulation. The bonding conductor or grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.

(2) Material. The bonding conductor or grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.

(3) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 14 AWG. It shall have a current-carrying capacity not less than the outer sheath of the coaxial cable. The bonding conductor or grounding electrode conductor shall not be required to exceed 6 AWG.

(4) Length. The primary protector grounding electrode conductor shall be as short as practicable. In one- and two-family dwellings, the primary protector bonding conductor or grounding electrode conductor shall be as short as practicable, not to exceed 6.0 m (20 ft) in length.

Informational Note: Similar grounding electrode conductor length limitations applied at apartment buildings and commercial buildings help to reduce voltages that may be developed between the building's power and communications systems during lightning events.

Exception: In one- and two-family dwellings where it is not practicable to achieve an overall maximum bonding conductor or grounding electrode conductor length of 6.0 m (20 ft), a separate grounding electrode as specified in 250.52(A)(5), (A)(6), or (A)(7) shall be used, the grounding electrode conductor shall be connected to the separate grounding electrode in accordance with 250.70, and the separate grounding electrode shall be connected to the power grounding electrode system in accordance with 820.100(D).

(5) Run in Straight Line. The bonding conductor and grounding electrode conductor shall be run to the grounding electrode in as straight a line as practicable.

(6) Physical Protection. ~~The~~ Bonding conductors and grounding electrode conductors shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is installed ~~run~~ in a metal raceway, both ends of the raceway shall be bonded to the ~~grounding~~ contained conductor or to the same terminal or electrode to which the bonding conductor or grounding electrode conductor is connected.

(B) Electrode. The bonding conductor or grounding electrode conductor shall be connected in accordance with 820.100(B)(1), (B)(2), or (B)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In Existing Buildings or Structures without an Intersystem Bonding Termination ~~Grounding Means~~.

If the existing building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on one of the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to enclosures as covered in 250.94 Exception

(4) The nonflexible metallic power service raceway
(5) The service equipment enclosure
(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure
(7) The grounding electrode conductor or the grounding electrode of a building or structure disconnecting means that is connected to an electrode as covered in 250.32

A bonding device intended to provide a termination point for the grounding electrode conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is nonremovable.

For purposes of this section, the mobile home service equipment or the mobile home disconnecting means, as described in 820.93, shall be considered accessible.

(3) In Existing Buildings or Structures Without an Intersystem Bonding Termination or Grounding Electrode(s) ~~Means~~. If the existing building or structure served has no intersystem bonding termination or grounding electrode(s) ~~means, as described in 820.100(B)(2),~~ the grounding electrode conductor shall be connected to either of the following:

(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)
(2) If the building or structure served has no intersystem bonding termination or grounding means, as described in 820.100(B)(2) or (B)(3)(1), to any one of the individual grounding electrodes described in 250.52(A)(5), (A)(7) and (A)(8).

Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-224.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-226 Log #312 NEC-P16 **Final Action: Accept**
(820.100(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-253
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify Proposal 16-253.

See action and statement on Comment 16-227.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-227 Log #313 NEC-P16 **Final Action: Accept**
(820.100(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-254
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this Proposal.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal.

The panel realizes the importance of listing in a communications environment.

The panel intends to require the use of listed insulated, covered or bare conductors in the communications industry.

The panel has obtained verification that listing exists for insulated, covered or bare wire. Listing covers testing and verification of insulation and conductor properties.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-228 Log #314 NEC-P16 **Final Action: Accept**
(820.100(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-256
Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal as the existing numbering complies with the NEC Style Manual and is consistent with other lists in the code.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to to review the proposal to comply with the NEC Style Manual.

See action on Comment 16-26.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-229 Log #1254 NEC-P16 **Final Action: Reject**
(820.100(B)(3))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 16-261
Recommendation: Accept Proposal 16-261.
Substantiation: In addressing the panel statement, section 820.100(B)(3) addresses "In Buildings or Structures Without Intersystem Bonding Termination or Grounding Means", and 820.100(B)(2) addresses "In Buildings or Structures with Grounding Means." What possibly could the panel mean when it states "must be taken in context?" 820.100(B)(3) addresses buildings and structures without electrodes, thus there are no grounding electrode means at the building or structure to be identified. Paragraph 820.100(B)(3)(1) states "To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)", but these are not in existence according to the title of 820.100(B)(3). Therefore, the only choices left according to 820.100(B)(3)(2) are a pipe or rod electrode per, 250.52((A)(5); a plate electrode, 250.52(A)(7); or a local metal underground system or structure, 250.52((A)(8). This requirement prohibits the use of a ground ring, (A)(4), and a listed grounding electrode, (A)(6), an excellent electrode. It is also interesting to note that 820.100(B)(3)(2), as well as the inference in 810.21(F)(3), specifies that a rod or pipe electrode shall meet the requirements of 250.52(A)(5) while other NEC Chapter 8 Articles as well as 770.100(B)(3)(2) allows the inadequate ½ inch by 5 ft long rod or pipe while all other grounding parameters remain essentially the same. This seems to be inconsistent, while being the proper reference, concerning the various requirements between similar articles and especially the panel statements issued by Panel 16 for 2010 ROP proposals 16-36, 16-143, 16-151, 16-323, and 16-327.

The issues pointed out here justify the acceptance of Proposal 16-261.

Panel Meeting Action: Reject
Panel Statement: The panel reiterates its position as stated in the panel statement for the submitter's original proposal. Grounding electrode choices currently are provided in 820.100(B)(3)(1) and (2). If there's nothing available, the installer has the option of selecting and installing one from 820.100(B)(3)(1) and (2).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 1
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:
BOYER, J.: Proposal 16-261 should be reconsidered and accepted as proposed. It is technically sound, reasonable and will aid in reducing losses from lightning, line surges and unintentional contact with higher-voltage lines. Furthermore, they it would help stabilize the voltage to earth during normal operation.

16-230 Log #1903 NEC-P16 **Final Action: Accept in Principle**
(820.106(A) and (B))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-225
Recommendation: Revise text to read as follows:
820.106 Grounding and Bonding at Mobile Homes.

(A) Grounding. Grounding shall comply with 820.106(A)(1) and (A)(2).

(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the coaxial cable shield ground or surge arrestor ground, shall be connected to a grounding electrode ~~conductor~~ in accordance with 820.100(B)(3).

(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the coaxial cable shield ground or surge arrestor

ground, shall be connected to a grounding electrode ~~conductor~~ in accordance with 820.100(B)(3).
(B) Bonding. The coaxial cable shield grounding terminal, surge arrestor grounding terminal, or grounding electrode shall be connected to the metal frame or available grounding terminal of the mobile home with a copper bonding ~~grounding~~ conductor not smaller than 12 AWG under any of the following conditions:
(1) Where there is no mobile home service equipment or disconnecting means as in 820.106(A)
(2) Where the mobile home is supplied by cord and plug
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 820.
These comments address the changes suggested in Proposal 16-225 in each section within Article 820 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.
Other editorial changes are included to improve the syntax but intend to maintain the existing meaning without introducing a new concept.
Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
820.106 Grounding and Bonding at Mobile Homes.
(A) Grounding. Grounding shall comply with 820.106(A)(1) and (A)(2).
(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the coaxial cable shield ground or surge arrestor ground, shall be connected to a grounding electrode conductor or grounding electrode ~~conductor~~ in accordance with 820.100(B)(3).
(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the coaxial cable shield ground or surge arrestor ground, shall be connected to a grounding electrode ~~conductor~~ in accordance with 820.100(B)(3).
(B) Bonding. The coaxial cable shield grounding terminal, surge arrestor grounding terminal, or grounding electrode shall be connected to the metal frame or available grounding terminal of the mobile home with a copper ~~bonding grounding~~ conductor not smaller than 12 AWG under any of the following conditions:
(1) Where there is no mobile home service equipment or disconnecting means as in 820.106(A)
(2) Where the mobile home is supplied by cord and plug.
Panel Statement: The panel accepts the submitter's text and adds "electrode conductor or" to allow the option to connect to the grounding electrode or grounding electrode conductor. This retains the original intent of 820.106(A)(1).
The panel accepts the submitter's text and deletes "bonding" in (B) as it is clearly implied by the title of the subsection.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
BRUNSSEN, J.: Revise 820.106(A)(1) to read as follows: "(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the coaxial cable shield ground or surge arrestor ground shall be connected to a grounding electrode in accordance with 820.100(B)(3)." It is unlikely that a grounding electrode conductor will be available if there is no mobile home service equipment, a grounding electrode conductor is not mentioned in any of the sections referenced in 820.100(B)(3), and the revision is consistent with the proposed text of 820.106(A)(2). The second comma is unnecessary.
OHDE, H.: See our affirmative comment for Comment 16-22.

16-231 Log #2436 NEC-P16 **Final Action: Accept in Principle**
(820.106(A) and (B))

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-225
Recommendation: Revise text to read as follows:
820.106 Grounding and Bonding at Mobile Homes.
(A) Grounding. Grounding shall comply with 820.106(A)(1) and (A)(2).
(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the coaxial cable shield ground or surge arrestor ground, shall be connected to a grounding electrode ~~conductor~~ in accordance with 820.100(B)(3).
(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the coaxial cable shield ground or surge arrestor ground, shall be connected to a grounding electrode ~~conductor~~ in accordance with 820.100(B)(3).
(B) Bonding. The coaxial cable shield grounding terminal, surge arrestor grounding terminal, or grounding electrode shall be connected to the metal frame or available grounding terminal of the mobile home with a copper bonding ~~grounding~~ conductor not smaller than 12 AWG under any of the following conditions:
(1) Where there is no mobile home service equipment or disconnecting means as in 820.106(A)
(2) Where the mobile home is supplied by cord and plug
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.
From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-230.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-232 Log #881 NEC-P16 **Final Action: Reject**
(820.110 Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-266
Recommendation: Accept the proposal with the following revisions:
Raceway fill restrictions shall not apply.
Substantiation: If conduit fill restrictions do not apply, all raceways should be included.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its position on Proposal 16-266.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-233 Log #1635 NEC-P16 **Final Action: Accept in Principle**
(820.113)

TCC Action: The Technical Correlating Committee directs the phrase "and plenums" be removed from the title, text and informational note in 820.113(B) because the accepted text in the title, text, and the Informational Note in 300.22(B), as accepted in Proposal 3-94, does not include the term "fabricated plenums."
Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-267
Recommendation: Revise 820.113 to read as follows:
820.113 Installation of Coaxial Cables. Installation of coaxial cables shall comply with 820.113(A) through (K). Installation of raceways shall comply with 820.110.
(A) Listing. Coaxial cables installed in buildings shall be listed.
Exception: Coaxial cables that comply with 820.48 shall not be required to be listed.
(B) Fabricated Ducts and Plenums Used for Environmental Air. The following cables shall be permitted in ducts and plenums as described in 300.22(B) if they are directly associated with the air distribution system:
(1) Up to 1.22 m (4 ft) of Type CATVP

(2) Types CATVP, CATVR, CATV and CATVX installed in raceways that are installed in compliance with 300.22(B)

Informational Note: For information on fire protection of wiring installed in fabricated ducts and plenums see Sections 4.3.4.1 (air ducts) and 4.3.11.3.3 (apparatus casings plenums) in NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(C) Other Spaces Used For Environmental Air (Plenums). The following cables shall be permitted in other spaces used for environmental air as described in 300.22(C).

(1) Type CATVP

(2) Type CATVP installed in plenum communications raceway

(3) Type CATVP supported by metallic cable trays or cable tray systems

(4) Types CATVP, CATVR, CATV and CATVX installed in raceways that are installed in compliance with 300.22(C)

Informational Note: For information on fire protection of wiring installed in other spaces used for environmental air see Sections 4.3.11.2 (ceiling cavity plenum), 4.3.11.4 (air-handling unit room plenum) and 4.3.11.5 (raised floor plenum) of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(D) Risers- Cables in Vertical Runs. The following cables shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:

(1) Types CATVP and CATVR

(2) Types CATVP and CATVR installed in

(a) plenum communications raceway

(b) riser communications raceway

(c) riser cable routing assembly

Informational Note: See 820.26 for firestop requirements for floor penetrations.

(E) Risers-Cables in Metal Raceways. The following cables shall be permitted in metal raceways in a riser having firestops at each floor:

(1) Types CATVP, CATVR, CATV and CATVX

(2) Types CATVP, CATVR, CATV and CATVX installed in:

a) plenum communications raceway

b) riser communications raceway

c) general-purpose communications raceway

Informational Note: See 820.26 for firestop requirements for floor penetrations.

(F) Risers-Cables in Fireproof Shafts. The following cables shall be permitted to be installed in fireproof riser shafts with firestops at each floor:

(1) Types CATVP, CATVR, CATV and CATVX

(2) Types CATVP, CATVR and CATV installed in:

a) plenum communications raceway

b) riser communications raceway

c) general-purpose communications raceway

d) riser cable routing assembly

e) general-purpose cable routing assembly

Informational Note: See 820.26 for firestop requirements for floor penetrations

(G) Risers- One- and Two-Family Dwellings. The following cables shall be permitted one- and two-family dwellings:

(1) Types CATVP, CATVR and CATV

(2) Type CATVX less than 10 mm (0.375 in.) in diameter

(3) Types CATVP, CATVR and CATV installed in:

a) plenum communications raceway

b) riser communications raceway

c) general-purpose communications raceway

d) riser cable routing assembly

e) general-purpose cable routing assembly

Informational Note: See 820.26 for firestop requirements for floor penetrations

(H) Cable Trays. The following cables shall be permitted to be installed in cable trays.

(1) Types CATVP, CATVR, and CATV

(2) Types CATVP, CATVR and CATV installed in:

a) plenum communications raceway

b) riser communications raceway

c) general-purpose communications raceway

(I) Distributing Frames and Cross-Connect Arrays. The following cables shall be permitted to be installed in distributing frames and cross-connect arrays.

(1) Types CATVP, CATVR and CATV

(2) Types CATVP, CATVR and CATV installed in:

a) plenum communications raceway

b) riser communications raceway

c) general-purpose communications raceway

d) riser cable routing assembly

e) general-purpose cable routing assembly

(J) Other Building Locations. The following cables and cable routing assemblies shall be permitted to be installed in building locations other than the locations covered in 820.113(B) through (I).

1) Types CATVP, CATVR and CATV

2) A maximum of 3m (10 ft) of exposed Type CATVX in nonconcealed spaces

3) Types CATVP, CATVR and CATV installed in:

a) plenum communications raceway

b) riser communications raceway

c) general-purpose communications raceway

_d) riser cable routing assembly

_e) general-purpose cable routing assembly

4) Types CATVP, CATVR, CATV and Type CATVX installed in a raceway of a type included in Chapter 3

(J) One- and Two-Family and Multifamily Dwellings. The following cables and cable routing assemblies shall be permitted to be installed in one- and two-family and multifamily dwellings in locations other than the locations covered in 820.113(B) through (I).

(1) Types CATVP, CATVR and CATV

(2) Type CATVX less than 10 mm (0.375 in.) in diameter

(3) Types CATVP, CATVR and CATV installed in:

a) plenum communications raceway

b) riser communications raceway

c) general-purpose communications raceway

d) riser cable routing assembly

e) general-purpose cable routing assembly

(4) Types CATVP, CATVR, CATV and Type CATVX installed in a raceway of a type included in Chapter 3

Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

The task group supports the panel action on the proposal to incorporate installation of cables in cable routing assemblies into the section. However the task group recommends that the listing, applications and installation of the cable routing assemblies be consolidated into Article 770 and not be duplicated in each of panel sixteen's articles. Accordingly the recommended text for this section includes installation of wires and cables in cable routing assemblies and omits the installation of the cable routing assemblies which belong in 770.113.

The recommended text for the informational notes dealing with installations in air handling spaces have been modified to better reflect the contents of the mandatory text.

The panel action on the revision of 820.113 didn't add any specific applications of coaxial cable in cable routing assemblies. The recommended text corrects this oversight.

Most of the text in this comment was submitted by Randy Ivans and Gerald Dorna as an affirmative ballot comments on this proposal. See the ROP.

Panel Meeting Action: Accept in Principle

Revise 820.113 to read as follows:

820.113 Installation of Coaxial Cables. Installation of coaxial cables shall comply with 820.113 (A) through (K). Installation of raceways shall comply with 820.110.

(A) Listing. Coaxial cables installed in buildings shall be listed.

Exception: Coaxial cables that comply with 820.48 shall not be required to be listed.

(B) Fabricated Ducts and Plenums Used for Environmental Air. The following cables shall be permitted in ducts and plenums as described in 300.22(B) if they are directly associated with the air distribution system:

(1) Up to 1.22 m (4 ft) of Type CATVP cable

(2) Types CATVP, CATVR, CATV and CATVX cables installed in raceways that are installed in compliance with 300.22(B)

Informational Note: For information on fire protection of wiring installed in fabricated ducts and plenums see sections 4.3.4.1 ~~(air ducts)~~ and 4.3.11.3.3 ~~(apparatus casings plenums)~~ in NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(C) Other Spaces Used For Environmental Air (Plenums). The following cables shall be permitted in other spaces used for environmental air as described in 300.22(C).

(1) Type CATVP cable

(2) Type CATVP cable installed in plenum communications raceway

(3) Type CATVP cable supported by open metallic cable trays or cable tray systems

(4) Types CATVP, CATVR, CATV and CATVX cables installed in raceways that are installed in compliance with 300.22(C)

(5)Types CATVP, CATVR, CATV and CATVX cables supported by solid bottom metal cable trays with solid metal covers in other spaces used for environmental air (plenums) as described in 300.22(C)

Informational Note: For information on fire protection of wiring installed in other spaces used for environmental air see sections 4.3.11.2 ~~(ceiling cavity plenum)~~, 4.3.11.4 ~~(air-handling unit room plenum)~~ and 4.3.11.5 ~~(raised floor plenum)~~ of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(D) Risers- Cables in Vertical Runs. The following cables shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:

(1) Types CATVP and CATVR cables

(2) Types CATVP and CATVR cables installed in

(a) plenum communications raceway

(b) riser communications raceway

(c) riser cable routing assembly

Informational Note: See 820.26 for firestop requirements for floor penetrations.

(E) Risers-Cables in Metal Raceways. The following cables shall be

permitted in metal raceways in a riser having firestops at each floor:
(1) Types CATVP, CATVR, CATV and CATVX cables
(2) Types CATVP, CATVR, CATV and CATVX cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
Informational Note: See 820.26 for firestop requirements for floor penetrations.
(F) Risers-Cables in Fireproof Shafts. The following cables shall be permitted to be installed in fireproof riser shafts with firestops at each floor:
(1) Types CATVP, CATVR, CATV and CATVX cables
(2) Types CATVP, CATVR and CATV cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
Informational Note: See 820.26 for firestop requirements for floor penetrations
(G) Risers- One- and Two-Family Dwellings. The following cables shall be permitted one- and two-family dwellings:
(1) Types CATVP, CATVR and CATV cables
(2) Type CATVX cable less than 10 mm (0.375 in.) in diameter
(3) Types CATVP, CATVR and CATV cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
Informational Note: See 820.26 for firestop requirements for floor penetrations
(H) Cable Trays. The following cables shall be permitted to be supported by ~~installed in~~ cable trays.
(1) Types CATVP, CATVR, and CATV cables
(2) Types CATVP, CATVR and CATV cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
(I) Distributing Frames and Cross-Connect Arrays. The following cables shall be permitted to be installed in distributing frames and cross-connect arrays.
(1) Types CATVP, CATVR and CATV cables
(2) Types CATVP, CATVR and CATV cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
(J) Other Building Locations. The following cables and cable routing assemblies shall be permitted to be installed in building locations other than the locations covered in 820.113(B) through (I).
1) Types CATVP, CATVR and CATV cables
2) A maximum of 3m (10 ft) of exposed Type CATVX cable in nonconcealed spaces
3) Types CATVP, CATVR and CATV cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
4) Types CATVP, CATVR, CATV and Type CATVX cables installed in a raceway of a type recognized ~~included~~ in Chapter 3
(K~~J~~) One- and Two-Family and Multifamily Dwellings. The following cables and cable routing assemblies shall be permitted to be installed in one- and two-family and multifamily dwellings in locations other than the locations covered in 820.113(B) through (I).
(1) Types CATVP, CATVR and CATV cables
(2) Type CATVX cable less than 10 mm (0.375 in.) in diameter
(3) Types CATVP, CATVR and CATV cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
Types CATVP, CATVR, CATV and Type CATVX cables installed in a raceway of a type recognized ~~included~~ in Chapter 3
Panel Statement: The panel added text to recognize solid bottom cable trays with a solid covers.
The panel added text to permit plenum raceways to be supported by open cable trays.
The panel added the word "cables" after each cable type. See panel action on comment 16-235.
The panel changed "included" to "recognized" in reference to Chapter 3.
The panel changed "installed in" cable trays to "supported by" cable trays.
The panel accepts in principle the recommendations to revise the informational notes. The panel text provides information on air handling spaces using NEC terminology in lieu of NFPA 90A terminology as was used in the ROP text. The panel chooses not to include NFPA 90A "titles" in parenthesis following each section reference.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-234 Log #1924 NEC-P16 **Final Action: Hold**
(820.113)

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-267
Recommendation: Revise the text as follows:
820.113(B)(2) Types CATVP, CATVR, CATV, and CATVX installed in metal raceways ~~that are installed~~ in compliance with 300.22(B).
820.113(C)(4) Types CATVP, CATVR, CATV, and CATVX installed in metal raceways ~~that are installed~~ in compliance with 300.22(C).
820.113(E) Risers- Cables in Metal Raceways or ~~Fireproof~~ Fire-Resistance-Rated Shafts. The following cables shall be permitted in metal raceway or in a ~~fireproof~~ fire-resistance-rated shaft with firestops at each floor.
Delete 820.113(E)(2).
820.113(F)(2) Types CATVP, CATAVR, and CATV installed in plenum, riser or general-purpose communications raceway or in a raceway permitted in Chapter 3~~.~~
820.113(G) Cable Trays. The following cables and raceways shall be permitted to be ~~installed~~ supported in cable trays ~~:~~ and shall comply with 300.22 when installed in ducts, plenums, and other environmental air spaces.
(1) Types CATVP and CATVR~~, and CATV~~ in accordance with 820.113(C) and 820.113(D).
Substantiation: In (B)(2), the word "metal" should be added to make this requirement very simple and very clear without having to refer to the entire text of 300.22, just as the Panel clarified in (C)(3) that only *metallic* cable trays are allowed. The informational note in this section refers to NFPA 90A which requires the use of metal raceways in these spaces.
In (C)(4) "metal" was added to clarify that the cables listed must be installed in metal raceways in accordance with the requirements in 300.22(C) and NFPA 90A.
In (E) "Fireproof" was changed to "fire-resistance-rated", which is the appropriate terminology.
Text in 800.113(E)(2) was deleted. This text incorrectly allows the use of CATVP, CATVR, and CATV cables "installed in plenum, riser, or general-purpose communications raceway" in a section that deals with cables in metal raceways or fireproof shafts. The current text in 2008 NEC only allows CATV and CATVX cables to be installed in metal raceway or fireproof shafts in riser applications.
In (F)(2) text was added to include Chapter 3 raceways which can also be used in one and two family risers.
In (G) the word "installed" was changed to "supported" to properly reflect the use of cable tray as a support method. Text was changed in (1) to clarify special requirements for plenum applications. Most of the other sections of 820.113 are *locations* (spaces uses for environmental air, risers, other building locations, etc.) not *products*. The use of cable tray and the type of cables allowed in cable trays are dependent upon where the tray is installed. This gets lost in the current (G), since it appears as if you could use Types CATVP, CATVR, and CATV cables in cable trays wherever the cable tray is installed. 300.22 requires solid bottom metal cable tray and solid metal covers.
Panel Meeting Action: Hold
Panel Statement: Changing "fireproof" to "fire-resistance rated" is a concept that has not had public review by being published in the ROP.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-235 Log #1353 NEC-P16 **Final Action: Accept in Principle in Part**
(820.113(B), FPN and 820.113(C), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-267
Recommendation: (B) Fabricated Ducts and Plenums Used for Environmental Air. The following wires and cables shall be permitted in ducts and plenums, as described in 300.22(B), if they are directly associated with the air distribution system:
(1) Up to 1.22 m (4 ft) of Type CATVP cables
(2) Types CATVP, CATVR, CATV, and CATVX cables and listed wires and cables installed in raceways that are installed in compliance with 300.22(B)
FPN: See 4.3.4 and 4.3.11.3.3 of NFPA 90A-2009, *Standard for the Installation of Air- Conditioning and Ventilation Systems*, for information on wires and cables installed in fabricated ducts and plenums used for environmental air ~~wire and cables in air ducts and apparatus casings plenums. See 3.3.22 for the definition of an apparatus casing plenum~~.
(C) Other Spaces Used For Environmental Air (Plenums). The following wires and cables shall be permitted in other spaces used for environmental air as described in 300.22(C):
(1) Type CATVP cables
(2) Type CATVP cables installed in plenum communications raceways

(3) Type CATVP cables supported by metallic cable trays or cable tray systems

(4) Types CATVP, CATVR, CATV and CATVX cables and listed wires and cables installed in raceways that are installed in compliance with 300.22(C).

FPN: See 4.3.11.2, 4.3.11.4, and 4.3.11.5 of NFPA 90A-2009, *Standard for the Installation of Air- Conditioning and Ventilation Systems*, for information on wires and cables installed in other spaces used for environmental air (plenums) ~~wire, cables, and raceways in ceiling cavity, raised floor, and air-handling unit room plenums. See 3.3.22 for plenum definitions~~ .

Substantiation: This comment is intended to bring consistency to this section. The FPN nomenclature or terminology needs to correspond to the terminology in the charging paragraph.

The term "air duct" is not used in this section or elsewhere in the article. The definitions from NFPA 90A are not necessary since this FPN sends the NEC user directly to the relevant sections for the requirements.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Accept in Principle in Part

Panel Statement: The panel accepts in principle the recommendations to revise the informational notes. As recommended by the submitter, the panel text provides information on air handling spaces using NEC terminology in lieu of NFPA 90A terminology as was used in the ROP text. See panel action on Comment 16-233.

The panel does not accept the recommendations to include "wires" in the text because there are no wires in Article 820, only coaxial cables.

The panel accepts in principle adding the word "cables" after each cable type. See panel action on Comment 16-233.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-236 Log #1636 NEC-P16 **Final Action: Accept in Principle**
(820.133(A)(1)(a))

TCC Action: In order to correlate with the action on Comment 3-96, the Technical Correlating Committee changes the action on Comment 16-236 from "Accept" to "Accept in Principle" and revises 820.133(A)(1) to read as follows:

"(a) Optical Fiber and Communications Cables. Coaxial cables shall be permitted in the same raceway, cable tray, or enclosure, or cable routing assembly with jacketed cables of any of the following:

(1) Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770

(2) Communications circuits in compliance with Parts I and IV of Article 800

(3) Low-power network-powered broadband communications circuits in compliance with Parts I and IV of Article 830.

(b) Other Circuits. Coaxial cables shall be permitted in the same raceway, cable tray, or enclosure with jacketed cables of any of the following:

(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and III of Article 725

(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760."

Change existing (b) to (c).

Submitter: Craig Sato, Underwriters Laboratories Inc.

Comment on Proposal No: 16-273

Recommendation: Continue to accept Proposal 16-273 in part in principle and make the following editorial revisions:

Delete "or" between "cable tray" and "enclosure".

Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

The task group supports the panel action on the proposal to incorporate cable routing assemblies into the section. However in its review of this and related proposals, the task group found a minor error. This comment is editorial.

Panel Meeting Action: Accept

Panel Statement: The panel notes that the text in the draft is correct.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

Comment on Affirmative:

DORNA, G.: The Panel 3 & 16 Reconciliation Task Group submitted Comments 3-96, 16-41, 16-143, 16-236 and 16-296, all dealing with the commingling of cables in raceways, cable trays, enclosures and cable routing assemblies. In the ROP, CMP 16 had had taken actions (accept, accept in principle, accept in principle in part) to treat cable routing assemblies in the same manner as raceways, cable trays, and enclosures, while CMP 3 had rejected the coordinating proposals. The Reconciliation Task Group's comments recommended that CMP 16 continue its direction and that CMP 3 recognize cable routing assemblies and provide for their use. CMP 16 accepted the Reconciliation Task Group's comments and CMP 3 rejected them.

The CMP 3 rejection statement on Comment 3-96 included an alert to the TCC:

"In addition it is brought to the attention of the technical correlating committee that CMP 16 has accepted changes that will allow the use of cable routing assemblies for the installation of Class 2 & 3 circuits and power-limited fire alarm circuits."

The text of 820.133(A)(1)(a) as modified by Proposal 16-273 and Comment 16-236 is shown below. The underlining was added for emphasis.

(a) *Other Circuits.* Coaxial cables shall be permitted in the same raceway, cable tray, enclosure, or cable routing assembly with jacketed cables of any of the following:

(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and III of Article 725

(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760

(3) Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770

(4) Communications circuits in compliance with Parts I and IV of Article 800

(5) Low-power network-powered broadband communications circuits in compliance with Parts I and IV of Article 830

The text of 820.133(A)(1)(a) clearly shows that coaxial cables are permitted to be installed in cable routing assemblies along with other cables that are installed in accordance with their own articles. Class 2 and Class 3 cables must be installed compliant with Article 725. Likewise power-limited fire alarm cables must be installed compliant with Article 760.

The CMP 3 statement that "CMP 16 has accepted changes that will allow the use of cable routing assemblies for the installation of Class 2 & 3 circuits and power-limited fire alarm circuits" is not correct.

The Panel 16 actions on Proposal 16-273 and Comment 16-236 permit coaxial cables to be installed in the same routing assembly with Class 2, Class 3 and power-limited fire alarm cables only if the Class 2, Class 3 and power-limited fire alarm cables are installed in compliance with Articles 725 and 760. Obviously, CMP 16 has taken no actions that change the cable installation requirements in Articles 725 and 760.

See also, my affirmative comments on Comments 16-41 and 16-143.

16-237 Log #2683 NEC-P16 **Final Action: Reject**
(820.133(A)(2) Exception No. 3 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 16-274

Recommendation: Accept the proposal.

Substantiation: The first portion of the panel statement regarding the absence of a specific application cited is difficult to understand. The substantiation cited an actual NEC section [334.116(C)] that recognizes such a construction. However, Chapter 8 will trump that allowance unless correlating language is in place. This needs correlation, the wording of Exception No. 2 does not require listing and seems to describe something CMP 3 described in its statement on a companion proposal for 725.136(I)(3) (Proposal 3-195).

Because of the Chapter 8 location, this issue still needs attention, only partially due to formal recognition of this construction in some form in 334.116(C). In addition, CMP 16 (and 3) will have on its ROC agenda, courtesy of CMP 9 and the TCC sending it there, Proposal 9-8 which covers a form of tray cable with this type of separation. This submitter has rigorously defended the system separation rules in print for decades, but the issues don't go away, and technology may have advanced to the point where some form of these cable constructions can be recognized.

Panel Meeting Action: Reject

Panel Statement: The submitter did not provide any listing requirements. See 800.179(I) for an example of a listing requirement for a hybrid power and communications cable.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-238 Log #880 NEC-P16 **Final Action: Reject**
(820.133(B))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 16-275

Recommendation: Accept the proposal with the following revisions:

Coaxial cables shall not be attached to the exterior of any raceway, cable, or conductor as a means of support.

Exception No. 1: Overhead aerial spans shall be permitted to be attached to an approved raceway mast. Cables shall be permitted to be supported by a messenger wire that is not a circuit conductor.

Substantiation: The purpose of raceways is already covered in the definition of raceway in Article 100. Raceway masts and messenger wires should be specified as acceptable means of support.

Panel Meeting Action: Reject

Panel Statement: The proposed editorial changes provide no additional clarity.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-239 Log #1640 NEC-P16 **Final Action: Accept in Principle (820.154)**

TCC Action: The Technical Correlating Committee directs the phrase "and plenums" be removed from the application columns in Table 820.154 and the Informational Note that follows Table 820.154.
Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-278
Recommendation: Revise 820.154 to read as follows:
820.154 Applications of Listed CATV Cables. Permitted and non-permitted applications of listed coaxial cables shall be as indicated in Table 820.154(A). The permitted applications are subject to the installation rules of 820.113. The substitutions for coaxial cables listed in Table 820.154(B) and illustrated in Figure 820.154 shall be permitted.

See Table 820.154(A) on Page 636

(E) Cable Substitutions. The uses and substitutions for CATV coaxial cables listed in Table 820.154(B) and illustrated in Figure 820.154 shall be permitted.

FPN: The substitute cables in Table 820.154(B) and Figure 820.154 are only coaxial-type cables.

Renumber Table 820.154(E) to become Table 820.154(B).
Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

The task group supports the panel action on the proposal to incorporate installation of cables in cable routing assemblies into the section. However the task group recommends that the listing, applications and installation of the cable routing assemblies be consolidated into Article 770 and not be duplicated in each of panel sixteen's articles. Accordingly the recommended text for this section includes applications of wires and cables in cable routing assemblies and omits the installation of the cable routing assemblies which belong in 770.154.

Table 820.154(A) has been reformatted in 'landscape' and is recommended by the Task Group to be presented this way in the Code to enhance readability and use.

Most of the text in this comment was submitted by Gerald Dorna as an affirmative ballot comments on this proposal. See the ROP.
Panel Meeting Action: Accept in Principle

See TG revised Table 820.154(A) rev 5 on page 636

Panel Statement: "Y" was changed to "Y*" to emphasize to the user that installation rules apply.

Add "In..." to the second column in Table 820.154(A) as a prefix to each phrase.

"Chapter 3 raceway" was changed to "In any raceway recognized in Chapter 3 " for consistency with the installation rules.

See panel action on Comment 16-235.

The panel added eight rows to clarify the issues raised in Comment 16-241 including adding rows dealing with installations in raceways and cable trays. An editorial change was made to clarify that air handling spaces refers to 300.22(B) & (C) spaces.

The box "In Air-Handling Spaces" was divided into the component sections "In Fabricated Ducts and Plenums as Described in 300.22(B)" and "In Other Spaces Used for Environmental Air as Described in 300.22(C)" in order to reduce repetition in the next column.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-240 Log #2128 NEC-P16 **Final Action: Reject (820.154)**

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-278
Recommendation: It is understood 16-278 is a companion proposal to 16-267.

Revise the first sentence of 820.154 to read: Permitted and non-permitted applications of listed coaxial cables shall be as indicated in ~~Table 820.154(A)~~ 820.110 and 820.113.
Substantiation: A comment has been submitted to delete Table 820.154(A). 820.154 will need to be revised for correlation if the Table is deleted.
The following is our reason for deleting the Table.

Table 820.154(A) is very confusing and will lead to misapplication. A number of notes are needed if this table moves forward. Many users will simply take the table as fact without reading limiting requirements applicable per 820.10 and 800.13 A simple "yes" or "no" does not always fit and will lead to misinterpretation.

Several cycles ago both CMP 8 and CMP 7 rewrote their articles. At that time both attempted to develop tables such as 820.154A. There was such a hue and cry against this and so many notes needed to explain what is actually permitted both Panels dropped the tables. Most tables in the NEC are there to clarify special conditions, not normal use. Text, as opposed to tables, is much easier to interpret and enforce correctly.

Just in case the Panel rejects this comment and continues with the Table, we have submitted a separate comment for 16-278 containing notes to the table. However, REMOVING THE TABLE IS MUCH MORE USER FRIENDLY AS PAST CODE DEVELOPMENT HAS SHOWN. Thorough reading of 820-110 and 820-113 by users will lead to easier and better enforcement and avoid installers having to remove and redo an installation due to noncompliance.
Panel Meeting Action: Reject
Panel Statement: The recommended action was intended to correlate with the acceptance of Comment 16-242. The panel rejected Comment 16-242.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-241 Log #2129 NEC-P16 **Final Action: Accept in Principle in Part (Table 820.154(A))**

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-278
Recommendation: If the Table is not deleted as proposed in a separate comment, revise Table 820.154(A) as follows:

Add Notes to clarify and change some Y(es) and N(o) permitted uses.

For reference purposes the columns of the draft Table have been numbered in numerical sequence from left to right. The cable and/or raceway types are for identification as shown in the far left product column. It is the intent that a parenthetical note number be placed with the identified product Y or N, with the corresponding note(s) at the bottom of the Table.

Column one – **CATVP Cable** – Indicate Note (1) Text: Note (1). CATVP Cable in free air in a 300.22(B) location must be associated with the air distribution system and is limited to 1.22mm (4 ft); the length limitation does not apply where the cable is installed in a raceway complying with 300.22(B).

Columns one and two – **CATVP, CATVR, CATV, and CATVX** -- Indicate Note (2). Change N to Y for CATVR, CATV, CATVX and apply Note (2).

Text: Note 2. In 300.22(B) and (C) locations these cables are permitted in raceways that comply with 300.22(B) and (C).

Column 6 – **CATVX –** Indicate Note (3). Text: Note 3. Limited to 3 m (10 ft) exposed in non-concealed spaces.

Column 6 – **CATVP, CATVR, CATV, and CATVX** -- Indicate Note (4). Text: Note 4. Permitted in. any raceway in Chapter 3, subject to 300.22.

Also change N to Y to agree with 820.113 (I)(4).

Column seven and eight – **CATVX** – Indicate Note (5). Text: Note 5. Limited to less than 10mm (0.375 in) in diameter.

Column Eleven – **CATVP, CATVR, CATV, and CATVX** – Indicate Note (6). Text: Note 6. Subject to requirements of 300.22.

Column Twelve – **CATVR, CATV and CATVX.** Indicate Note (7) Text: Note 7. Although permitted in plenum communications raceways in locations other than plenums and environmental air spaces, this combination of raceway and cable is not permitted in 300.22 locations. Cables must be CMP.

Column Thirteen – **CATV and CATVX** -- Indicate Note (8). Text: Note 8. Although permitted in riser communications raceways in other locations, this combination of raceway and cable is not permitted in riser applications. The cable must be riser cable.

Column Fourteen – **CATVP and CATVR --** Indicate Note (9). Text: Note 9. CATVP or CATVR in General Purpose Communications Raceway does not constitute a plenum or riser complying installation.
Substantiation: The following are the reasons for suggesting these notes:

Note (1) Per **820.113(B)**.

Note (2) Per **820.113(B)**(2) and **820.113(C)**(2).

Note (3) Per **820.113(I)**(2)

Note (4) Per **820.113(I)**(4),

Note (5) Per **820.113**(J)(2)

Note (6) To clarify that although all the cables are permitted in any Chapter 3 raceway 300.22 has specific limits on which raceways can be used in those locations. The uses permitted in 820.113 (A) and (B) are crossover requirements. Unfortunately, there are some who will wonder if column 11 doesn't supersede those sections

Notes (7) and (8) are intended to clarify that when plenum or riser raceways are used that does not translate to a plenum or riser installation unless CMP or Riser cable (as applicable) are used.

Note (9) is intended to clarify that the use of plenum or riser cable in a general purpose communications raceway still is suitable for only a general purpose application.
Panel Meeting Action: Accept in Principle in Part

The panel accepts in principle recommendation 1. See Informational Note No 2 in Table 820.154(A).

The panel accepts in principle recommendation 2. See The row "In metal raceway that complies with 300.22(B)".

Table 820.154(A), Applications of Listed Coaxial Cables

Applications		Cable Type			
		CATVP	CATVR	CATV	CATVX
In Air-Handling Spaces	Fabricated Ducts and plenums as described in 300.22(B)	Y	N	N	N
	Other spaces used for environmental air (plenums) as described in 300.22(C)	Y	N	N	N
In Risers	Vertical runs	Y	Y	N	N
	Metal raceways	Y	Y	Y	Y
	Fireproof shafts	Y	Y	Y	Y
	One-and two- family dwellings	Y	Y	Y	Y
Within Buildings in Other Than Air-Handling Spaces and Risers	General	Y	Y	Y	Y
	One- and two-family dwellings	Y	Y	Y	Y
	Multifamily dwellings	Y	Y	Y	Y
	Nonconcealed spaces	Y	Y	Y	Y
	Cable trays	Y	Y	Y	N
	Distributing frames and cross-connect arrays	Y	Y	Y	N
	Chapter 3 raceway	Y	Y	Y	Y
	Plenum communications raceways	Y	Y	Y	N
	Riser communications raceways	Y	Y	Y	N
	General-purpose communications raceways	Y	Y	Y	N
	Riser cable routing assemblies	Y	Y	Y	N
	General-purpose cable routing assemblies	Y	Y	Y	N

Note: An 'N' in the table indicates that the cable type shall not be permitted to be installed in the application. A 'Y' indicates that the cable shall be permitted to be installed in the application, subject to the limitations described in 820.113.

Table 820.154(A)
Applications of Listed Coaxial Cables in Buildings

Applications		**Cable Type**			
		CATVP	CATVR	CATV	CATVX
In Fabricated Ducts and Plenums as Described in 300.22(B)	In fabricated ducts and plenums as described in 300.22(B)	Y*	N	N	N
	In metal raceway that complies with 300.22(B)	Y*	Y*	Y*	Y*
In Other Spaces Used for Environmental Air as Described in 300.22(C)	In other spaces used for environmental air (plenums) as described in 300.22(C)	Y*	N	N	N
	In metal raceway that complies with 300.22(C)	Y*	Y*	Y*	Y*
	In plenum communications raceways	Y*	N	N	N
	Supported by open metal cable trays	Y*	N	N	N
	Supported by solid bottom metal cable trays with solid metal covers	Y*	Y*	Y*	Y*
In Risers	In vertical runs	Y*	Y*	N	N
	In metal raceways	Y*	Y*	Y*	Y*
	In fireproof shafts	Y*	Y*	Y*	Y*
	In plenum communications raceways	Y*	Y*	N	N
	In riser communications raceways	Y*	Y*	N	N
	In riser cable routing assemblies	Y*	Y*	N	N
	In one-and two- family dwellings	Y*	Y*	Y*	Y*
Within Buildings in Other Than Air-Handling Spaces and Risers	General	Y*	Y*	Y*	Y*
	In one- and two-family dwellings	Y*	Y*	Y*	Y*
	In multifamily dwellings	Y*	Y*	Y*	Y*
	In nonconcealed spaces	Y*	Y*	Y*	Y*
	Supported by cable trays	Y*	Y*	Y*	N
	In distributing frames and cross-connect arrays	Y*	Y*	Y*	N
	In any raceway recognized in Chapter 3	Y*	Y*	Y*	Y*
	In plenum communications raceways	Y*	Y*	Y*	N
	In riser communications raceways	Y*	Y*	Y*	N
	In general-purpose communications raceways	Y*	Y*	Y*	N
	In riser cable routing assemblies	Y*	Y*	Y*	N
	In general-purpose cable routing assemblies	Y*	Y*	Y*	N

Note: An 'N' in the table indicates that the cable type shall not be permitted to be installed in the application. A 'Y*' indicates that the cable shall be permitted to be installed in the application, subject to the limitations described in 820.113.

Informational Note 1: Part V of Article 820 covers installation methods within buildings. This table covers the applications of listed coaxial cables in buildings. The definition of point of entrance is in 820.2. Coaxial entrance cables that have not emerged from the rigid metal conduit or intermediate metal conduit are not considered to be in the building.

Informational Note No. 2: For information on the restrictions to the installation of communications cables in fabricated ducts and plenums see 820.113(B).

The panel accepts in principle recommendation 3. The information in recommended Note (3) is in 820.113(J).

The panel accepts in principle recommendation 4. See The row "In metal raceway that complies with 300.22(B)" and the row "In metal raceway that complies with 300.22(C)".

The panel accepts in principle recommendation 5. The information in recommended Note (5) is in 820.113(G).

The panel accepts in principle recommendation 6. See The row "In metal raceway that complies with 300.22(B)" and the row "In metal raceway that complies with 300.22(C)".

The panel does not accept recommendation 7. See 820.113(C) which only permits Type CATVP.

The panel accepts in principle recommendation 8. See the rows "In plenum communications raceways" and "In riser communications raceways."

The panel does not accept recommendation 9. See 820.113(C) which only permits Type CATVP.

Panel Statement: See panel action on Comments 16-233 and 16-239.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-242 Log #2130 NEC-P16 **Final Action: Reject**
(Table 820.154(A))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-278
Recommendation: Delete Table 820.154(A).
Substantiation: This is a companion comment for revision of 820.154.

See also comment to add notes to Table 820.154(A) if this comment is not accepted.

Panel Meeting Action: Reject
Panel Statement: The submitter has provided no substantiation for the recommended action.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-243 Log #2131 NEC-P16 **Final Action: Hold**
(Table 820.154(A))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-278
Recommendation: For the purpose of this comment the columns are referenced numerically from left to right and as shown in the draft.

Revise column headings as follows:

1. Add "Specifically" before "Fabricated"; delete "and plenums"
4. Change "fireproof" to "fire-resistance- rated."

Substantiation: 1. To correlate with the title of 300.22(B) and avoid confusion.

4. The term "fireproof " is being replaced with the correct description "fire-resistance-rated" throughout ASTM fire related standards and other codes. It is a known fact that that "fireproof" is not a legally defensible term. A comment has been submitted to change the term in 820.113(E).

Panel Meeting Action: Hold
Panel Statement: Changing "fireproof" to "fire-resistance rated" is a concept that has not had public review by being published in the ROP.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-244 Log #642 NEC-P16 **Final Action: Accept**
(820.154(B)(1))

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-282
Recommendation: Continue to accept this proposal in principle.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel action to accept this proposal in principle. We agree with Jerry Dorna's ballot comment:

The current riser requirements are so complicated that they could be considered to be a "vague and unenforceable".

Section 820.154(B)(1) requires that "Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type CATVR. Floor penetrations requiring Type CATVR shall contain only cables suitable for riser or plenum use". Consequently at least two floor penetrations are required, one for plenum and riser cables and another for general-purpose cables.

The panel action on this proposal greatly simplifies the installation rules for cables in risers in other than one and two-family dwellings. The installation rules for one and two-family dwellings are already simplified since any listed cable is permitted.

Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-245 Log #19 NEC-P16 **Final Action: Accept**
(Table 820.179)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-278
Recommendation: Delete the "Reference" column in Table 820.179.
Substantiation: The panel action on proposal 16-278 changed the references to 820.154. Rather than correcting the references, simply delete the "Reference" column because it is not needed. See Tables 725.179 and 760.179(I) which have no "Reference" column.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-246 Log #643 NEC-P16 **Final Action: Accept**
(820.179(A), FPN)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-283
Recommendation: Continue to reject this proposal.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel action to reject this proposal and recommends that the panel continue to reject it.

A fine print note giving information on fire testing of plenum cable has been in the NEC since the 1984 edition. It has undergone only minor editorial changes since 1984. It provides extremely useful to cable manufacturers. The proposed change would remove essential information.

Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-247 Log #1007 NEC-P16 **Final Action: Reject**
(820.179(A), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-283
Recommendation: The Proposal should be Accepted in Principle, revised and the following words "and Annex A Explanatory Material" added after "NFPA 262-2007" so the revised text reads as follows:

~~FPN~~ Informational Note: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is ~~that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with~~ described in NFPA 262-2007, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, and Annex A Explanatory Material.

Substantiation: The FPN refers to a test method and defines the maximum values, which are not specified in the body of NFPA 262. Inclusion of the maximum values in the FPN are requirements and this violates 3.1.3 of the NEC Style Manual.

NFPA 262 defines the Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces but it does not specify any pass/fail criteria.

While the values specified for maximum peak optical density, maximum average optical density, and maximum allowable flame travel distance in the FPN are not included in the body of NFPA 262, they are contained in Annex A Explanatory Material. Addition of the words "and Annex A Explanatory Material" will reference the maximum values that are in the FPN and the proposed revised FPN will comply with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining a low-smoke producing and fire-resistant cable.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-248 Log #1354 NEC-P16 **Final Action: Reject**
(820.179(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-283
Recommendation: 820.179 Coaxial Cables.

Cables shall be listed in accordance with 820.179(A) through (D) and marked

in accordance with Table 820.179. The cable voltage rating shall not be marked on the cable.

FPN: Voltage markings on cables could be misinterpreted to suggest that the cables may be suitable for Class 1, electric light, and power applications.

Exception: Voltage markings shall be permitted where the cable has multiple listings and voltage marking is required for one or more of the listings.

(A) Type CATVP. Type CATVP community antenna television plenum coaxial cables shall be listed as being suitable for use in ducts, plenums, and other spaces used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.

Substantiation: Retain the FPN as in the current NEC, but only if the FPNs from CMP 3 are not changed to the same language. This comment is being written just in case CMP 3 is willing to change to existing NEC language.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Reject

Panel Statement: The panel upholds its position to not change the FPN.

The panel agrees with the submitter's statement that "the FPN is worded correctly".

See panel action and statement on Comment 16-61.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-249 Log #1355 NEC-P16 **Final Action: Reject**
(820.179(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council

Comment on Proposal No: 16-283

Recommendation: 820.179 Coaxial Cables.

Cables shall be listed in accordance with 820.179(A) through (D) and marked in accordance with Table 820.179. The cable voltage rating shall not be marked on the cable.

FPN: Voltage markings on cables could be misinterpreted to suggest that the cables may be suitable for Class 1, electric light, and power applications.

Exception: Voltage markings shall be permitted where the cable has multiple listings and voltage marking is required for one or more of the listings.

(A) Type CATVP. Type CATVP community antenna television plenum coaxial cables shall be listed as being suitable for use in ducts, plenums, and other spaces used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN: One method of defining low smoke producing and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.

~~FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.~~

Substantiation: This comment is intended to bring consistency to the NEC. In Articles 770, 800, 820 and 830, the FPN is worded correctly but different from what CMP 3 recommended. The original proposal I made to CMP 3 and CMP 16 was already made in the 2005 and 2008 NEC cycles, but was caught up in the "plenum cable moratorium" in the opinion of CMP 3 but not of CMP 16. The present wording also follows the requirements of the preceding section, which requires that the cable be listed as having both "adequate fire-resistant and low smoke-producing characteristics". The wording of CMP 3 (although adequate also) does not explain what is needed to define a cable that is a "low smoke-producing and fire-resistant cable" by omitting the words "a cable that is". However, if CMP 16 makes this change consistency is achieved in the NEC.

With regard to the comment by Mr. Ayers to the proposals in CMP 3, I agree with him, but the (incorrect) use of the term "fire-resistant cable" is consistent in not just the FPNs in all 6 relevant articles (725, 760, 770, 800, 820 and 830) but is also consistent with the use in the charging paragraph.

If CMP 3 and CMP 16 would both like to eliminate the term "fire-resistant cable", consistently in all locations, and replace it by a term such as "low flame spread cable", that would be an excellent idea, but it does require consistency (and probably a task group of both panels). In the meantime the use of the term "fire-resistant cable" is necessary to correlate with the charging paragraph.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Reject

Panel Statement: The panel upholds its position to not change the FPN.

The panel agrees with the submitter's statement that "the FPN is worded correctly".

See panel action and statement on Comment 16-61.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-250 Log #1008 NEC-P16 **Final Action: Reject**
(820.179(B), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-285

Recommendation: The Proposal should be Accepted in Principle and revised as follows:

~~FPN~~ Informational Note: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the cables pass the requirements of~~ ANSI/UL 1666-2002, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts.*

Substantiation: The existing phrase "…that the cables pass the requirements…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject

Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining fire-resistant characteristics capable of carrying fire floor to floor.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-251 Log #1009 NEC-P16 **Final Action: Reject**
(820.179(C), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-288

Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:

~~FPN~~ Informational Note: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.

Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.

Substantiation: Acceptance of the revised wording shown above will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPN's not contain requirements. The pass/fail criteria are already defined in those two standards.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject

Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on two methods of defining resistant to the spread of fire.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-252 Log #1010 NEC-P16 **Final Action: Reject**
(820.179(D), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-289
Recommendation: The Proposal should be Accepted in Principle and the FPN revised to read:

~~FPN~~ Informational Note: One method of determining that the cable is resistant to flame spread is ~~by testing the cable to~~ described in the VW-1 (vertical-wire) flame test in ANSI/UL 1581-2001, *Reference Standard for Electrical Wires, Cables and Flexible Cords.*

Substantiation: The addition of the word "coaxial" in 820.179(D) was accepted in the 2008 Code cycle.

The existing phrase "…by testing the cable to…" specifies a requirement which violates 3.1.3 of the NEC Style Manual.

The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of determining that the cable is resistant to flame spread.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-253 Log #1011 NEC-P16 **Final Action: Reject**
(820.182(A), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-290
Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:

~~FPN~~ Informational Note: One method of defining that an optical fiber raceway is a low smoke producing raceway and a fire-resistant raceway is ~~that the raceway exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with~~ described in the plenum test in UL 2024, Standard for Optical Fiber Cable Raceway.

Substantiation: The existing phrases in 800.182(A) FPN that specify the maximum values when tested in accordance with UL 2024 specifies a requirement which violates 3.1.3 of the NEC Style Manual.

The revised text will still provide the user with references that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining a low-smoke producing and fire-resistant raceway.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-254 Log #1012 NEC-P16 **Final Action: Reject**
(820.182(B), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-291
Recommendation: The Proposal should be Accepted in Principle in Part and revised as follows:

~~FPN~~ Informational Note: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the raceways pass the requirements of~~ the Test for Flame Propagation (Riser) in UL 2024, Standard for Optical Fiber Cable Raceway.

Substantiation: The existing phrase in the FPN "…that the raceways pass the requirements of…" specifies a requirement which violates 3.1.3 of the NEC Style Manual.

The revised text will still provide the user with references that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining fire-resistant characteristics capable of carrying fire floor to floor.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-255 Log #1013 NEC-P16 **Final Action: Reject**
(820.182(C), FPN)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-292
Recommendation: The Proposal should be Accepted in Principle and revised to read:

~~FPN~~ Informational Note: One method of defining resistance to the spread of fire is ~~that the raceway passes the requirements of~~ described in the "Vertical-Tray Flame Test (General Use) in UL 2024, Standard for Optical Fiber Cable Raceway.

Substantiation: The existing phrase "…that the raceway passes the requirements of…" specifies a requirement which violates 3.1.3 of the NEC Style Manual.

The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject
Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on one method of defining resistance to the spread of fire.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

ARTICLE 830 — NETWORK-POWERED BROADBAND COMMUNICATIONS SYSTEMS

16-256 Log #553 NEC-P16 **Final Action: Reject**
(830)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-293
Recommendation: Continue to reject this proposal.
Substantiation: See my explanation on Comment to Proposal 16-91.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the submitter. The panel has reviewed the proposed grounding terminology changes and has accepted the changes with editorial revisions in an effort to ensure consistent terminology throughout the Code.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
PIRKLE, W.: See comment on 16-85.

16-257 Log #614 NEC-P16 **Final Action: Accept in Principle**
(830)

Submitter: Travis Lindsey, Travis Lindsey Consulting Services
Comment on Proposal No: 16-293
Recommendation: Replace the term "~~grounding conductor~~", with the term "grounding electrode conductor", throughout this article.
Substantiation: The term "grounding electrode conductor", is a specific term and thus it is easier for most people in the industry to understand the purpose. The generic term "grounding conductor" is so general that most people can misunderstand the application. It cannot be held to be in the best interest of safety for a general misunderstanding of terms to be an allowable mode in the NEC process.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-282.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-258 Log #1271 NEC-P16 **Final Action: Accept in Principle (830)**

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 16-293
Recommendation: I highly encourage CMP-16 to accept this proposal in principle and accept the coordinated set of comments that provide the completed revisions throughout Article 830.
Substantiation: This comment responds to action by CMP-5 to delete the term "grounding conductor" and revise the term "grounding electrode conductor." Two definitions that apply to a conductive path in the grounding scheme that functions as a grounding electrode conductor are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 830. The coordinated comments actually even correct misuse of grounding terms in a few locations that existed for a few cycles.

CMP-5 has responsibilities for defined grounding and bonding terms (Code wide). This comment respects the independence of CMP-16 regarding Chapter 8 based on 90.3: this work is not an effort to remove that independence. These proposed revisions are technically correct and result in grounding and bonding terms being used consistently with how they are defined. The term "grounding conductor" is too broad and has been part of a planned migration for removal since the 2005 edition. This planned revision is part of a larger plan implemented by the NEC-2008 TCC assigned grounding and bonding task group work. The grounding and bonding concepts are simple. If grounding happens, a connection is made to an electrode by use of a grounding electrode conductor. Bonding connected conductive parts to establish continuity and conductivity between them. The proposed revisions do not change anything technically in the article: they only make the use of grounding terms consistent with how they are defined, improving the current text. The only change proposed is in use of terms. All other rules such as sizing, installation and so forth remain as specified in this article, as before.

Not accepting the proposed revisions shows a deliberate action to allow continued inconsistency and subjectivity to remain in the NEC. CMP-5 actions have deleted the term "grounding conductor" from Article 100 and revised the term "grounding electrode conductor" to work consistently with the limited energy articles in Chapter 8. The term "grounding conductor" has been removed or replaced in Article 250 and other articles of the NEC. Not accepting the proposed revisions in the coordinated comments will result in the continued use of an orphaned term that is not specific and can lead to subjectivity. The proposed changes are technically correct and there have been no technical reasons brought forward to reject what is being proposed. I highly encourage CMP-16 to give strong consideration to the coordinated comments submitted that resolve these inconsistencies and improve clarity and usability within the limited energy articles with regards to grounding and bonding rules. The best approach in Code development work is to look at the long range objectives and what would be best for the NEC. It needs to be practical, understandable, and enforceable. These proposed revisions are in the spirit of accomplishing all three of these objectives. It's not about who is right or wrong, it is about being successful and ending up with the best Code as a result.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel disagrees with the submitter. The panel has reviewed the proposed grounding terminology changes and has accepted the changes with editorial revisions in an effort to ensure consistent terminology throughout the Code.

See panel action and statement on Comment 16-282.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-259 Log #2000 NEC-P16 **Final Action: Accept in Principle (830)**

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 16-293
Recommendation: Replace the term "grounding conductor" with "grounding electrode conductor" throughout this Article.
Substantiation: I agree with the submitter that the term "grounding conductor" and "grounding electrode conductor" are all but identical. The term "grounding electrode conductor" will not be mistaken in the field for the grounded conductor and refers to any point on the grounding electrode system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-282.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-260 Log #2098 NEC-P16 **Final Action: Accept in Principle (830)**

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 16-293
Recommendation: Revise the proposal as follows: Replace the term "grounding conductor" with "bonding conductor" or "grounding electrode conductor" throughout the article as appropriate.
Substantiation: The present term "grounding conductor" is proposed to be deleted by CMP5. The present term is not correct in most applications. I was part of a CMP-5 and CMP-16 Task Group that could not come to a consensus. The members of CMP-5 went through all the sections in Articles 770, 800, 810, 830 and the proposed new Article 840. The proposed changes are being presented by Phil Simmons and I urge the code panel to either agree with the submitter or make additional changes as needed to remove the term "grounding conductor from these articles.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-282.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-261 Log #2271 NEC-P16 **Final Action: Accept in Principle (830)**

Submitter: Terry C. Coleman, National Joint Apprentice & Training Committee / Rep. IBEW
Comment on Proposal No: 16-293
Recommendation: Accept Proposal 16-293 as intended to delete the term "grounding conductor" and replace it with the term "grounding electrode conductor" throughout this Article 830.
Substantiation: Proposal 5-13 deleted the definition of "Grounding Conductor" in Article 100 during the 2011 ROP stage as well as the revision of the term" Grounding Electrode Conductor. The revision of the term "grounding electrode conductor" in Article 100 included wording necessary for the Chapter 8 Articles, therefore, the term "grounding conductor" is no longer needed or required. The term "grounding electrode conductor" is more correct than the term "grounding conductor". Proposal 5-18 which was accepted in principle and revised by CMP-1 reads as follows:

Grounding Electrode Condcutor (GEC). A conductor used to connect the system grounded conductor, equipment, communications system protectors, antenna discharge units, communications cables or network interface units to a grounding electrode or to a point on the grounding system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-282.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-262 Log #2894 NEC-P16 **Final Action: Accept in Principle (830)**

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-293
Recommendation: Accept Proposal 16-293 as intended to delete the term "grounding conductor" and replace it with the term "grounding electrode conductor" throughout Article 830.
Substantiation: Proposal 5-13 deleted the definition of "Grounding Conductor" in Article 100 during the 2011 ROP stage as well as the revision of the term "Grounding Electrode Conductor". The revision of the term "grounding electrode conductor" in Article 100 included wording necessary for the Chapter 8 Articles, therefore, the term "grounding conductor" is no longer needed or required. The term "grounding electrode conductor" is more correct than the term "grounding conductor". Proposal 5-18 which was accepted in principle and revised by CMP 1 reads as follows:

Grounding Electrode Conductor (GEC). A conductor used to connect the system grounded conductor, equipment, communications system protectors, antenna discharge units, communications cables or network interface units to a grounding electrode or to a point on the grounding system.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-282.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-263 Log #464 NEC-P16 **Final Action: Reject**
(830.2)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 16-294
Recommendation: The Proposal action should have been to Accept in Principle and changed to read as follows:

Exposed (to Accidental Contact). A circuit that is in such a position that, in case of failure of supports or insulation, contact with another circuit ~~may~~ results.

Substantiation: This Proposal was one of several that were submitted regarding the use of the word "may" in the text of the NEC. The Submitter of the Proposal noted in several of the substantiations that Table 3.2.1 of the NEC Style Manual lists this word as one of several "Possibly Unenforceable and Vague Terms." In most Panel responses, the text of Section 3.2.1 was correctly referenced where it allows those terms where they have been "reviewed in context" and found to be clear.

However, Section 3.1.1 of the NEC Style Manual regarding Mandatory Rules expressly states that "The terms may or can shall not be used." Similarly, Section 3.1.2 of the NEC Style Manual regarding Permissive Rules also expressly states that "The term may shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."

Since the use of the term may in this Section does not meet these criteria, it should be changed.
Panel Meeting Action: Reject
Panel Statement: The submitter's proposed text indicates that in the event of a failure of supports or insulation, contact with an electrical circuit **will** result. Such contact is a possibility but not a certainty.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-264 Log #785 NEC-P16 **Final Action: Reject**
(830.2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-294
Recommendation: Revise text to read as follows:

Exposed (to accidental contact). A conductor in such a position that in case of failure of supports or insulation, is likely to contact another conductor.

Substantiation: Failure can cause contact or with other conductors which are not a "circuit" such as a grounding conductor. "Likely" is a term used 80+ times in the NEC. Per 3.1.2 of the NEC Style Manual, "may" shall only be used as a discretionary judgement by the Authority Having Jurisdiction.
Panel Meeting Action: Reject
Panel Statement: The term "may" as used in the present text connotes "a possibility"; the term "likely" connotes "is probable". The panel does not agree that these are probable events. Of concern is contact with other electric circuits that could energize the communications circuit resulting in an electrical safety hazard. Contact with "other conductors" such as "grounding conductors" would not result in an electrical safety hazard.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-265 Log #2437 NEC-P16 **Final Action: Accept in Principle**
(830.2.Point of Entrance)

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:
Point of Entrance. The point within a building at which the cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC) connected by a grounding electrode conductor to an electrode in accordance with 830.100(B).
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept in Principle
Panel Statement: See action and statement on Comment 16-266.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-266 Log #1904 NEC-P16 **Final Action: Accept in Principle**
(830.2 Point of Entrance)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:
Point of Entrance. The point within a building at which the cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC) connected by a grounding electrode conductor to an electrode in accordance with 830.100(B).
Substantiation: This comment responds to the action of CMP-5 to delete the term "grounding conductor" and revise the term "grounding electrode conductor." Two definitions that apply to a conductive path in the grounding scheme that functions as a grounding electrode conductor are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 820.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept in Principle

Revise text to read as follows:

Point of Entrance. The point within a building at which the cable emerges from an external wall, from a concrete
floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC) connected
by a bonding conductor or grounding electrode conductor ~~to an electrode~~ in accordance with 830.100(B).

Panel Statement: The panel agrees with the submitter and edits the text as 830.100(B) includes both bonding conductors and grounding electrode conductors.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-267 Log #315 NEC-P16 **Final Action: Accept**
(830.3(A) (New))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-299
Recommendation: The Technical Correlating Committee directs that the panel reconsider its action on this proposal since there is no need to duplicate 90.3 in accordance with 4.1 of the NEC Style Manual.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review its action on Proposal 16-299.

See panel action and statement on Comment 16-268.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-268 Log #552 NEC-P16 **Final Action: Reject**
(830.3(A) (New))

TCC Action: In accordance with 4.1 of the NEC Style Manual, the Technical Correlating Committee directs that this comment and Proposal 16-299 be reported as "Reject" since there is no need to duplicate part of 90.3.
Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-299
Recommendation: Revise the panel action to "Accept in Part". Accept the part as follows that states: "Re-letter the existing (A) to (B), (B) to (C), etc. and establish a new (A). **(A) Chapters 1 through 7.** The requirements of Chapters 1 through 7 shall not apply to Article ~~800~~ 830 except where the requirements are specifically referenced in Article ~~800~~ 830."

Delete the part that states: "See 90.3."
Substantiation: Removes the reference to 90.3 as flagged by the Technical Correlating Committee. Corrects a typographical error by changing "800" to

"830". Note that the preprint is incorrect with respect to the typographical error.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-269 Log #551 NEC-P16 **Final Action: Accept**
(830.25)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-305
Recommendation: Continue to reject this proposal.
Substantiation: The submitter has provided no substantiation for the new requirement that is essentially unenforceable.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-270 Log #644 NEC-P16 **Final Action: Accept**
(830.25)

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-305
Recommendation: Continue to reject this proposal.
Substantiation: Panel 1 rejected similar Proposals 1-139 and 1-146 with the statement "The submitter has not substantiated that a problem exists, or that the problem would be alleviated by removing abandoned cables and equipment neatly. Rather, the panel concludes, that in some cases, abandoned cables and equipment are best left abandoned. The proposed text is unnecessary as the section more appropriately applies to "Requirements for Electrical Installations" and "Mechanical Execution of Work.""

Panel 3 rejected similar Proposals 3-173 and 3-253 with the statement. "The submitter has not provided technical substantiation for the proposed change, and compliance with this requirement would be unenforceable. This is already covered under 90.4 and 110.2.

Panel 12 rejected similar Proposals 12-114, 12-146 with the statement. "The requirement is unenforceable. Disposition of removed materials is not a code responsibility. The remaining installation is required to be in accordance with 110.3, which is enforceable."
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-271 Log #1400 NEC-P16 **Final Action: Reject**
(830.26)

Submitter: Russell LeBlanc, The Peterson School
Comment on Proposal No: 16-306
Recommendation: The proposal should be accepted in principal but modified as follows:

If a conduit or raceway of metric designator 53 (trade size 2 inch) or larger, penetrates a fire-resistance-rated wall, partition, floor, or ceiling, and that same conduit or raceway also enters an enclosure of the ventilated type, that conduit or raceway shall be sealed or plugged with an approved fire stopping material at the point of entrance to the enclosure to prevent fire, smoke, or other products of combustion from passing through the raceway or conduit into other areas of the building or structure.

Substantiation: I have modified the wording for clarity and so the application is more focused, and less of a "sweeping" change.

In my original proposal I provided a first hand eyewitness account of what happened.

This was NOT a second hand or third hand story. I saw it happen with my own eyes! I am not a novice. I have been in the trade for over 25 years. I have also been teaching electrician classes for over 10 years. I am OSHA certified. I am an instructor approved by the Mass. Dept. of Education, and The Board of Examiners of Electricians. I have authored several other code changes. I am a member of NFPA. No, I am not a Fire chief or fire science engineer, or some other Fire Dept. Official. But I know what I saw, and it just did NOT seem right to me. I am very concerned. The smoke simply should NOT have been able to spread through the building via the raceways. What more technical substantiation is needed than that?

Lets break it down to simple science and logic.

If I build a fire in a fireplace, the smoke will go up the chimney flue, if the flue damper is OPEN.

If I build a fire in a fireplace, the smoke will NOT go up the chimney flue, if the flue damper is CLOSED!

Try it!

Apply logic here.

If I am wrong then maybe we don't need to seal the raceway ends. But this "chimney effect" of the unsealed pipes has already happened once. I have seen it. If it happens again, the occupants may not be as lucky as the first time I saw this phenomenon happen.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The recommended text is vague, unenforceable and lacks specificity. Insufficient data has been provided to justify such a change. Selection of conduit size requiring fire stopping is arbitrary. This may be more of a building Code issue rather than an electrical Code issue.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 1
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:
IVANS, R.: The submitter identifies a concern associated with conduit providing a bypass of firebreaks between floors that should not be ignored. Although there may be issues associated with the general nature of the original proposal or the seemingly arbitrary selection of 2" conduit, the solutions are not technically insurmountable. I am aware of installations where such sealing of conduit was required by local building codes and effectively implemented This item should have been put on hold for further study rather than rejected.

16-272 Log #2783 NEC-P16 **Final Action: Accept**
(830.44(C) Exception)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 16-310
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-273 Log #316 NEC-P16 **Final Action: Accept**
(830.44(H) and Exception)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-312
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal relating to "identified for the purpose" in compliance with the NEC Style Manual.

This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise text as follows:

"**(F) Between Buildings.** Network-powered broadband communications cables extending between buildings or structures and also the supports or attachment fixtures shall be identified ~~for the purpose~~ as suitable for outdoor aerial applications and shall have sufficient strength to withstand the loads to which they may be subjected."
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on Proposal 16-312.
The addition of the phrase "as suitable for outdoor aerial installations" clarifies "identified" and complies with the NEC Style Manual discouraging the use of vague terms.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-274 Log #2784 NEC-P16 **Final Action: Accept**
(830.47(B) Exception No. 1)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Accept" to correlate with similar accepted comments acted on by other panels.
Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 16-315
Recommendation: Proposal should be rejected.
Substantiation: CMP 4 rewrote the definitions and subsequent requirements for the installation of the service conductors that the submitter is referencing in his proposal. The submitter presented rationale in his substantiation based on the presumption that CMP 4 would accept his proposals to CMP 4, we did not. The submitter is incorrect that under existing NEC requirements all "service drop" and "service entrance" conductors are utility owned, they

are not. Utilizing the word "service" in 408.3 will be sufficient whether the recommended changes in Article 430 pass or not.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its position on Proposal 16-315.
The addition of the word "entrance" adds clarity.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-275 Log #879 NEC-P16 **Final Action: Reject**
(830.47(B) Exception No. 1 and No. 2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-316
Recommendation: Delete exception No. 1.
Revise Exception No. 2 to read as follows:
Exception: Where conductors of other systems are installed in a raceway(s), in metal-covered cables(s), or as Type UF or USE cable(s): or the network-powered broadband communications cables have metal armor or are enclosed in a raceway.
Substantiation: Exception No. 1 is covered by proposed exception which covers all conductors of other systems; lighting, power, Class 1, fire alarm, etc.
Panel Meeting Action: Reject
Panel Statement: The submitter's recommended text does not provide any additional clarity.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-276 Log #406 NEC-P16 **Final Action: Reject**
(830.90(A), FPN No. 2(2))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 16-317
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."
There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its position on Proposal 16-317.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 13 Negative: 2
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:
BRUNSSEN, J.: The Panel acted to accept similar comment 16-118. The Panel Meeting Action should have been consistent to accept this comment as well.
GUBISCH, R.: I am voting negative so that this action will be consistent with the panel action taken on Comment 16-118.

16-277 Log #1896 NEC-P16 **Final Action: Accept**
(830.90(B)(3), FPN)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:
Informational Note: Selecting a network interface unit and primary protector location to achieve the shortest practicable primary protector bonding conductor or grounding electrode conductor helps limit potential differences between communications circuits and other metallic systems.
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 830.
These comments address the changes suggested in Proposal 16-293 in each section within Article 830 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.
Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-278 Log #1905 NEC-P16 **Final Action: Accept**
(830.93)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-293
Recommendation: Revise the text of the 2011 NEC ROP Draft as follows:
Informational Note: Selecting a network interface unit and primary protector location to achieve the shortest practicable primary protector bonding conductor or grounding electrode conductor helps limit potential differences between communications circuits and other metallic systems.
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 830.
These comments address the changes suggested in Proposal 16-293 in each section within Article 830 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.
Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-279 Log #2439 NEC-P16 **Final Action: Accept**
(830.93)

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:
830.93 Grounding or Interruption of Metallic Members of Network-Powered Broadband Communications Cables. Network-powered communications cables entering buildings or attaching to buildings shall comply with 830.93(A) or (B). For purposes of this section, grounding located at mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, or at a mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, shall be considered to meet the requirements of this section.
Informational Note: Selecting a grounding location to achieve the shortest practicable bonding conductor or grounding electrode conductor helps limit

potential differences between the network-powered broadband communications circuits and other metallic systems.

Sections 830.93(A) and (B) are not affected by this Comment.

Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.

Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-280 Log #2438 NEC-P16 **Final Action: Accept**
(830.93(B)(3), FPN)

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:

Informational Note: Selecting a network interface unit and primary protector location to achieve the shortest practicable primary protector bonding conductor or grounding electrode conductor helps limit potential differences between communications circuits and other metallic systems.

Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.

Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-281 Log #550 NEC-P16 **Final Action: Accept**
(830.100 (New))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-319
Recommendation: Continue to reject this proposal.
Substantiation: The proposed revision is unnecessary. The Panel Statement has correctly indicated that all Article 250 grounding requirements that are applicable to communications are presently fully covered in Article 830, IV, *Grounding Methods*, with reference to specific sections of Article 250 as appropriate. Further, the NEC Style Manual prohibits reference to complete articles.

Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-282 Log #1907 NEC-P16 **Final Action: Accept in Principle**
(830.100(A) and (B))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:

830.100 Cable, Network Interface Unit, and Primary Protector Grounding. Network interface units containing protectors, NIUs with metallic enclosures, primary protectors, and the metallic members of the network-powered broadband communications cable that are intended to be grounded shall be grounded as specified in 830.100(A) through (D).

(A) Bonding Conductor or Grounding Electrode Conductor.

(1) Insulation. The bonding conductor or grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.

(2) Material. The bonding conductor or grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.

(3) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 14 AWG and shall have a current-carrying capacity not less than that of the grounded metallic member(s) and protected conductor(s) of the

network-powered broadband communications cable. The bonding conductor or grounding electrode conductor shall not be required to exceed 6 AWG.
(4) Length. The bonding conductor and grounding electrode conductor shall be as short as practicable. In one- and two-family dwellings, the bonding conductor and grounding electrode conductor shall be as short as practicable, not to exceed 6.0 m (20 ft) in length.

Informational Note: Similar grounding bonding conductor and electrode conductor length limitations applied at apartment buildings and commercial buildings help to reduce voltages that may be developed between the building's power and communications systems during lightning events.
Exception: In one- and two-family dwellings where it is not practicable to achieve an overall maximum bonding conductor or grounding electrode conductor length of 6.0 m (20 ft), a separate communications ground rod meeting the minimum dimensional criteria of 830.100(B)(3)(2) shall be driven, and the grounding electrode conductor shall be connected to the communications ground rod in accordance with 830.100(C). The communications ground rod shall be bonded to the power grounding electrode system in accordance with 830.100(D).
(5) Run in Straight Line. The bonding conductor and grounding electrode conductor shall be run to the grounding electrode in as straight a line as practicable.
(6) Physical Protection. ~~The~~ Bonding conductors and grounding electrode conductors shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is installed ~~run~~ in a metal raceway, both ends of the raceway shall be bonded to the ~~grounding~~ contained conductor or to the same terminal or electrode to which the bonding conductor or grounding electrode conductor is connected.
(B) Electrode. The bonding conductor or grounding electrode conductor shall be connected in accordance with 830.100(B)(1), (B)(2), or (B)(3).
(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.
Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.
(2) In Existing Buildings or Structures without an Intersystem Bonding Termination ~~Grounding Means~~.
If the existing building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on one of the following:
(1) The building or structure grounding electrode system as covered in 250.50
(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from its point of entrance to the building, as covered in 250.52
(3) The power service accessible means external to enclosures as covered in 250.94 Exception
(4) The nonflexible metallic power service raceway
(5) The service equipment enclosure
(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure, or
(7) The grounding electrode conductor or the grounding electrode of a building or structure disconnecting means that is connected to an electrode as covered in 250.32
A bonding device intended to provide a termination point for the grounding electrode conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is non-removable.
For purposes of this section, the mobile home service equipment or the mobile home disconnecting means, as described in 830.93, shall be considered accessible.
(3) In Existing Buildings or Structures Without an Intersystem Bonding Termination or Grounding Electrode(s) ~~Means~~. If the existing building or structure served has no intersystem bonding termination or grounding electrode(s) ~~means, as described in 830.100(B)(2),~~ the grounding electrode conductor shall be connected to either of the following:
(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)
(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 830.100(B)(2) or (B)(3)(1), to any one of the individual electrodes described in 250.52(A)(7) and (A)(8), or to a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (1/2 in.) in diameter, driven, where practicable, into permanently damp earth and separated from lightning conductors as covered in 800.53 and at least 1.8 m (6 ft) from electrodes of other systems. Steam or hot water pipes or lightning-rod conductors shall not be employed as grounding electrodes for protectors, NIUs with integral protection, grounded metallic members, NIUs with metallic enclosures, and other equipment.
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 830.

These comments address the changes suggested in Proposal 16-293 in each section within Article 830 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Other editorial changes are included to improve the syntax but intend to maintain the existing meaning without introducing a new concept. This includes adding "existing" to 830.100(B)(2) and (3). The provisions in these sections should properly apply to only existing installations to correlate with the rules in 250.94.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
830.100 Cable, Network Interface Unit, and Primary Protector Bonding and Grounding. Network interface units containing protectors, NIUs with metallic enclosures, primary protectors, and the metallic members of the network-powered broadband communications cable that are intended to be bonded or grounded shall be connected ~~grounded~~ as specified in 830.100(A) through (D).
(A) Bonding Conductor or Grounding Electrode Conductor.
(1) Insulation. The bonding conductor or grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.
(2) Material. The bonding conductor or grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.
(3) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 14 AWG and shall have a current-carrying capacity not less than that of the grounded metallic member(s) and protected conductor(s) of the network-powered broadband communications cable. The bonding conductor or grounding electrode conductor shall not be required to exceed 6 AWG.
(4) Length. The bonding conductor and grounding electrode conductor shall be as short as practicable. In one- and two-family dwellings, the bonding conductor and grounding electrode conductor shall be as short as practicable, not to exceed 6.0 m (20 ft) in length.

Informational Note: Similar ~~grounding~~ bonding conductor or ~~and~~ grounding electrode conductor length limitations applied at apartment buildings and commercial buildings help to reduce voltages that may be developed between the building's power and communications systems during lightning events.
Exception: In one- and two-family dwellings where it is not practicable to achieve an overall maximum bonding conductor or grounding electrode conductor length of 6.0 m (20 ft), a separate communications ground rod meeting the minimum dimensional criteria of 830.100(B)(3)(2) shall be driven, and the grounding electrode conductor shall be connected to the communications ground rod in accordance with 830.100(C). The communications ground rod shall be bonded to the power grounding electrode system in accordance with 830.100(D).
(5) Run in Straight Line. The bonding conductor or ~~and~~ grounding electrode conductor shall be run ~~to the grounding electrode~~ in as straight a line as practicable.
(6) Physical Protection. ~~The~~ Bonding conductors and grounding electrode conductors shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is installed ~~run~~ in a metal raceway, both ends of the raceway shall be bonded to the ~~grounding~~ contained conductor or to the same terminal or electrode to which the bonding conductor or grounding electrode conductor is connected.
(B) Electrode. The bonding conductor or grounding electrode conductor shall be connected in accordance with 830.100(B)(1), (B)(2), or (B)(3).
(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.
(2) In ~~Existing~~ Buildings or Structures ~~without an Intersystem Bonding Termination~~ Grounding Means.
If the ~~existing~~ building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on one of the following:
(1) The building or structure grounding electrode system as covered in 250.50
(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from

its point of entrance to the building, as covered in 250.52
(3) The power service accessible means external to enclosures as covered in 250.94 Exception
(4) The nonflexible metallic power service raceway
(5) The service equipment enclosure
(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure of the power service, or
(7) The grounding electrode conductor or the grounding electrode of a building or structure disconnecting means that is connected to an electrode as covered in 250.32

A bonding device intended to provide a termination point for the grounding electrode conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is non-removable.

For purposes of this section, the mobile home service equipment or the mobile home disconnecting means, as described in 830.93, shall be considered accessible.

(3) In ~~Existing~~ Buildings or Structures Without an Intersystem Bonding Termination or Grounding ~~Electrode(s)~~ Means. If the ~~existing~~ building or structure served has no intersystem bonding termination or grounding electrode(s) means, as described in 830.100(B)(2), the grounding electrode conductor shall be connected to either of the following:

(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)

(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 830.100(B)(2) or (B)(3)(1), to any one of the individual electrodes described in 250.52(A)(7) and (A)(8), or to a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (1/2 in.) in diameter, driven, where practicable, into permanently damp earth and separated from lightning conductors as covered in 800.53 and at least 1.8 m (6 ft) from electrodes of other systems. Steam or hot water pipes or lightning-rod conductors shall not be employed as grounding electrodes for protectors, NIUs with integral protection, grounded metallic members, NIUs with metallic enclosures, and other equipment.

Panel Statement: The panel agrees with the submitter's intent and edits the text for editorial clarification.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

BRUNSSEN, J.: Revise 830.100(A)(4) to read as follows: "(4) Length. The bonding conductor or grounding electrode conductor shall be as short as practicable. In one- and two-family dwellings, the bonding conductor or grounding electrode conductor …". Replace "and" with "or" for consistency with other items in this section and similar sections in Chapter 8. Revise 830.100(A)(6) as follows: "The Bonding conductor or grounding electrode conductor shall be …". Replace "and" with "or" for consistency; "conductors" should be singular. 830.100(B)(3) should read as follows: "If the building or structure served has no intersystem bonding termination, or grounding means as described in 830.100(B)(2), …". The word "electrode(s)" is a typo; the comma needs to be placed after "termination" and not after "means" to distinguish between buildings with an intersystem bonding termination as described in (B)(1) and buildings with grounding means as described in (B)(2). These changes will provide consistency throughout Article 770 and Chapter 8.

OHDE, H.: See our affirmative comment for Comment 16-22.

16-283 Log #2440 NEC-P16 **Final Action: Accept in Principle**
(830.100(A) and (B))

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:

830.100 Cable, Network Interface Unit, and Primary Protector Grounding. Network interface units containing protectors, NIUs with metallic enclosures, primary protectors, and the metallic members of the network-powered broadband communications cable that are intended to be grounded shall be grounded as specified in 830.100(A) through (D).

(A) Bonding Conductor or Grounding Electrode Conductor.

(1) Insulation. The bonding conductor or grounding electrode conductor shall be listed and shall be permitted to be insulated, covered, or bare.
(2) Material. The bonding conductor or grounding electrode conductor shall be copper or other corrosion-resistant conductive material, stranded or solid.
(3) Size. The bonding conductor or grounding electrode conductor shall not be smaller than 14 AWG and shall have a current-carrying capacity not less than that of the grounded metallic member(s) and protected conductor(s) of the network-powered broadband communications cable. The bonding conductor or grounding electrode conductor shall not be required to exceed 6 AWG.
(4) Length. The bonding conductor and grounding electrode conductor shall be as short as practicable. In one- and two-family dwellings, the bonding conductor and grounding electrode conductor shall be as short as practicable, not to exceed 6.0 m (20 ft) in length.

Informational Note: Similar grounding bonding conductor and electrode conductor length limitations applied at apartment buildings and commercial buildings help to reduce voltages that may be developed between the building's power and communications systems during lightning events.

Exception: In one- and two-family dwellings where it is not practicable to achieve an overall maximum bonding conductor or grounding electrode conductor length of 6.0 m (20 ft), a separate communications ground rod meeting the minimum dimensional criteria of 830.100(B)(3)(2) shall be driven, and the grounding electrode conductor shall be connected to the communications ground rod in accordance with 830.100(C). The communications ground rod shall be bonded to the power grounding electrode system in accordance with 830.100(D).

(5) Run in Straight Line. The bonding conductor and grounding electrode conductor shall be run to the grounding electrode in as straight a line as practicable.
(6) Physical Protection. ~~The~~ Bonding conductors and grounding electrode conductors shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is installed ~~run~~ in a metal raceway, both ends of the raceway shall be bonded to the ~~grounding~~ contained conductor or to the same terminal or electrode to which the bonding conductor or grounding electrode conductor is connected.

(B) Electrode. The bonding conductor or grounding electrode conductor shall be connected in accordance with 830.100(B)(1), (B)(2), or (B)(3).

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding ~~grounding~~ conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of *Intersystem Bonding Termination*.

(2) In Existing Buildings or Structures without an Intersystem Bonding Termination ~~Grounding Means~~.
If the existing building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on one of the following:

(1) The building or structure grounding electrode system as covered in 250.50
(2) The grounded interior metal water piping system, within 1.5 m (5 ft) from its point of entrance to the building, as covered in 250.52
(3) The power service accessible means external to enclosures as covered in 250.94 Exception
(4) The nonflexible metallic power service raceway
(5) The service equipment enclosure
(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure, or
(7) The grounding electrode conductor or the grounding electrode of a building or structure disconnecting means that is connected to an electrode as covered in 250.32

A bonding device intended to provide a termination point for the grounding electrode conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is non-removable.

For purposes of this section, the mobile home service equipment or the mobile home disconnecting means, as described in 830.93, shall be considered accessible.

(3) In Existing Buildings or Structures Without an Intersystem Bonding Termination or Grounding Electrode(s) ~~Means~~. If the existing building or structure served has no intersystem bonding termination or grounding electrode(s) ~~means, as described in 830.100(B)(2),~~ the grounding electrode conductor shall be connected to either of the following:

(1) To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)

(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 830.100(B)(2) or (B)(3)(1), to any one of the individual electrodes described in 250.52(A)(7) and (A)(8), or to a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (1/2 in.) in diameter, driven, where practicable, into permanently damp earth and separated from lightning conductors as covered in 800.53 and at least 1.8 m (6 ft) from electrodes of other systems. Steam or hot water pipes or lightning-rod conductors shall not be employed as grounding electrodes for protectors, NIUs with integral protection, grounded metallic members, NIUs with metallic enclosures, and other equipment.

Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-282.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-284 Log #317 NEC-P16 **Final Action: Accept**
(830.100(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-320
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal.
The panel realizes the importance of listing in a communications environment.
The panel intends to require the use of listed insulated, covered or bare conductors in the communications industry.
The panel has obtained verification that listing exists for insulated, covered or bare wire. Listing covers testing and verification of insulation and conductor properties.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-285 Log #318 NEC-P16 **Final Action: Accept**
(830.100(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-321
Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal.
The panel realizes the importance of listing in a communications environment.
The panel intends to require the use of listed insulated, covered or bare conductors in the communications industry.
The panel has obtained verification that listing exists for insulated, covered or bare wire. Listing covers testing and verification of insulation and conductor properties.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-286 Log #878 NEC-P16 **Final Action: Reject**
(830.100(A)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-322
Recommendation: Accept the proposal.
Substantiation: The NEC Style Manual 3.2.5.1 states ampacity is the term to be used for current-carrying capacity of conductors.
Panel Meeting Action: Reject
Panel Statement: Communications grounding conductors are subject to transient conditions resulting from power fault and lightning events. "Ampacity" applies to a continuous (i.e., steady-state) condition and is inappropriate for communications grounding conductors.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-287 Log #1255 NEC-P16 **Final Action: Reject**
(830.100(A)(4) Exception)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 16-323
Recommendation: Accept Proposal 16-323.
Substantiation: Whether or not 830.100(B)(1) through (3) presents a logical sequence for selecting the appropriate telecommunications grounding electrode, in order of preference, was not addressed by Proposal 16-323 and certainly not the purpose of the proposal.

The issue is in specifying a technically sound grounding electrode for electrical systems, such as network-powered broadband communications systems, that will assure such systems are connected to earth in a manner that will limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. This is the purpose of a grounding electrode regardless of the system. The acceptance of both Proposal 16-323 and Proposal 16-327 would assure that appropriate electrodes would be utilized when the "primary protector" (grounding electrode conductor as defined in Article 100) grounding length exceeds 20 feet and where the building or structure served has no natural grounding electrodes.

The electrodes identified in 250.52(A)(4) through (A)(8) are intended as minimum required electrodes that are capable of limiting the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. Note that the key word for electrodes specified by 250.52 is "minimum." Any current limitations concerning network-powered broadband communications systems have little to do with the adequacy of a grounding electrode and especially one with high resistance tendencies such as a 5 ft long ground rod. The claim by the committee that 5 ft long rods have "been used successfully and safely by the telecom industry for decades" is misrepresented as it is widely acknowledged that damage during thunderstorms often occurs to sensitive electronics that are connected to telecom wiring where grounding is often inadequate as lighting surges (direct or indirect) enter facilities on telecom lines. The National Electrical Code is not about telecom the utility but is rather about protecting users from the consequences of lightning, line surges, or unintentional contact with higher-voltage lines. There is no justification in specifying inadequate grounding electrodes that have no independent record of performance and that are obviously technically inferior to those require by 250-52(A)(4) through (A)(8).

Utilizing a 5 ft long ground rod by a particular segment of industry, where that industry may be responsible for that electrode, does not provide technical substantiation as to the worth of that electrode. The "statement "very little resistance change will result from using larger sizes of electrodes" is misapplied in this context. One authoritative reference, the *Soares Book on Grounding* states that the diameter of a ground rod does not materially reduce the resistance of a ground rod but that rather that a ground rod's resistance is substantially reduced by extending the length of a ground rod into earth. By actual calculation this could be as much as a 40%+ reduction in resistance by doubling a 5 ft long ground rod's length to 10 ft. It is assumed that the reference to 16-151 in the panel statement was to the tutorial, *The ABCs of Grounding and Bonding* that states, "Very little resistance change will result from using larger sizes of electrodes." This reference, when taken in context, agrees with Soares on the ineffectiveness of increasing the diameter of a ground rod, but the committee is negligent in not mentioning the effectiveness of increasing the length of a ground rod which is agreed upon in both *Soares Book on Grounding* and *The ABCs of Grounding and Bonding*. Power utilities also realize the advantage of deeper, thus longer, electrodes when grounding distribution systems such as substations where sectional ground rods are commonly installed from 20 to 60 ft deep. In addition, it is unfathomable that the committee would indicate that requiring a minimum standard electrode would be too expensive when compared to the damage and expense a lightning strike could cause to a structure where inadequate grounding is installed and especially where any additional cost is negligible. It is also interesting to note that 820.100(B)(3)(2), as well as the inference in 810.21(F)(3), requires that a rod or pipe electrode shall meet the requirements of 250.52(A)(5) while 830.100(B)(3)(2) allows a ½ inch by 5 ft rod or pipe electrode. This seems to be inconsistent concerning the various requirements between similar articles. Therefore, it is difficult to understand the resistance of the Panel 16 members in not accepting Proposals 16-323 and 16-327 that would provide an acceptable minimum standard for grounding telecommunications systems that would help limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation.

There is no argument that bonding together the communications grounding electrode and power grounding electrode system is an important safety aspect. However that also is not the issue addressed by Proposals 16-323 and 16-327. The issue remains to be that ½ in. diameter by 5 ft long ground rods are not an adequate electrode for grounding telecommunication systems and that the electrodes utilized for telecommunication systems installed as a part of the premise wiring system should meet the same minimum requirements as those in Article 250 as they serve the same purpose. The technical substantiation for this change was in Proposal 16-323 and 16-327 and is expanded in this Comment. Code-Making Panel 5 has the expertise on this subject and the users of the NEC as well as the public deserve a reliable minimum standard for grounding their telecommunications systems.
Panel Meeting Action: Reject
Panel Statement: The submitter has neither provided technical justification nor cited a safety issue to justify the elimination of the 5-foot communications ground rod. See panel action and statement on Comment 16-28.
Number Eligible to Vote: 16

Ballot Results: Affirmative: 14 Negative: 1
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:
BOYER, J.: Proposal 16-323 should be reconsidered and accepted as proposed. It is technically sound, reasonable and will aid in reducing losses from lightning, line surges and unintentional contact with higher-voltage lines. Furthermore, it would help stabilize the voltage to earth during normal operation.

16-288 Log #319 NEC-P16 **Final Action: Accept**
(830.100(B))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 16-324
Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal as the existing numbering complies with the NEC Style Manual and is consistent with other lists in the code.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to to review the proposal to comply with the NEC Style Manual.
See action on Comment 16-26.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-289 Log #1256 NEC-P16 **Final Action: Reject**
(830.100(B)(3))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 16-327
Recommendation: Accept Proposal 16-327.
Substantiation: The issue addressed by this Proposal is in specifying a technically sound grounding electrode for electrical systems, such as telecommunications systems, that will assure such systems are connected to earth in a manner that will limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. This is the purpose of a grounding electrode regardless of the system. The acceptance of both Proposal 16-327 and Proposal 16-323 would assure that appropriate electrodes would be utilized when the "primary protector" (grounding electrode conductor as defined in Article 100) grounding length exceeds 20 feet and where the building or structure served has no natural grounding electrodes.

The electrodes identified in 250.52(A)(4) through (A)(8) are intended as minimum required electrodes that are capable of limiting the voltage imposed on electric and electronic equipment by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. The committee has seemingly sought to minimize the effects of such imposed faults by stating such faults or events such as lighting deal only in limited currents which is not necessarily true. In addition, limited currents have little to do with the adequacy of a grounding electrode and especially one with high resistance tendencies such as a 5 ft long ground rod. The claim by the committee that 5 ft long rods have "been used successfully and safely by the telecom industry for decades" is misrepresented as it is widely acknowledged that damage during thunderstorms often occurs to sensitive electronics that are connected to telecom wiring where grounding is often inadequate as lighting surges (direct or indirect) enter facilities on telecom lines. The National Electrical Code is not about telecom the utility but is rather about protecting users from the consequences of lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation. There is no justification in specifying inadequate grounding electrodes that have no independent record of performance and that are obviously technically inferior to those required by 250-52(A)(4) through (A)(8).

Utilizing a 5 ft long ground rod by a particular segment of industry, where that industry may be responsible for that electrode, does not provide technical substantiation as to the worth of that electrode. The "statement "very little resistance change will result from using larger sizes of electrodes" from *The ABCs of Grounding and Bonding* is misapplied in this context. One authoritative reference, the *Soares Book on Grounding* states that the diameter of a ground rod does not materially reduce the resistance of a ground rod but rather that a ground rod's resistance is substantially reduced by extending the length of a ground rod into earth. By actual calculation this could be as much as a 40%+ reduction in resistance by doubling a 5 ft long ground rod's length to 10 ft. Therefore, the reference from *The ABCs of Grounding and Bonding*, when taken in context, agrees with Soares on the ineffectiveness of increasing the diameter of a ground rod, but the panel is negligent in not mentioning the effectiveness of increasing the length of a ground rod in the panel statement. Power utilities also realize the advantage of deeper, thus longer, electrodes when grounding distribution systems such as substations where sectional ground rods are commonly installed from 20 to 60 ft deep. In addition, it is unfathomable that the committee would indicate that requiring a minimum standard electrode would be too expensive when compared to the damage and expense a lightning strike could cause to a structure where inadequate grounding is installed and especially where any additional installation cost is negligible. It is also interesting to note that 820.100(B)(3)(2), as well as the inference in 810.21(F)(3), specifies that a rod or pipe electrode shall meet the requirements of 250.52(A)(5) while other NEC Chapter 8 Articles as well as 830.100(B)(3)(2) allows the inadequate ½ inch by 5 ft long rod or pipe while all other grounding parameters remain essentially the same. This seems to be inconsistent concerning the various requirements between similar articles. Therefore, it is difficult to understand the resistance of the Panel 16 members in not accepting Proposal 16-327 that would provide an acceptable minimum standard for grounding telecommunications systems that would help limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation..

There is no argument that bonding together the communications grounding electrode and power grounding electrode system is an important safety aspect. However that also is not the issue addressed by Proposal 16-327. The issue remains to be that ½ in. diameter by 5 ft long ground rods are not an adequate electrode for grounding network-powered broadband communication systems and that the electrodes utilized for systems installed as a part of the premise wiring system should meet the same minimum requirements as those in Article 250 as they serve the same purpose. The technical substantiation for this change was in Proposal 16-327 and is expanded in this Comment. Code-Making Panel 5 has the expertise on this subject and the users of the NEC as well as the public deserve a reliable minimum standard for grounding any and all telecommunications systems.

In addressing the last part of the panel statement, section 830.100(B)(3) addresses "In Buildings or Structures Without Intersystem Bonding Termination or Grounding Means", and 830.100(B)(2) addresses "In Buildings or Structures with Grounding Means." What possibly could the panel mean when it states "must be taken in context?" 830.100(B)(3) addresses buildings and structures without electrodes, thus there are no grounding electrode means at the building or structure to be identified. Paragraph 830.100(B)(3)(1) states "To any one of the individual electrodes described in 250.52(A)(1), (A)(2), (A)(3), or (A)(4)", but these are not in existence according to the title of 830.100(B)(3). Therefore, the only choice left is 830.100(B)(3)(2) and that states the electrode shall be a plate electrode (A)(7), a local metal underground system or structure (A)(8), or "a ground rod or pipe not less than 1.5 m (5 ft) in length and 12.7 mm (½ in.) in diameter, driven, where practicable, into permanently damp earth." Not allowed is a ground ring (A)(4) and a listed electrode which is an excellent grounding electrode. A 12.7 mm pipe is approximately a 3/8-inch trade size which is half the required diameter of a pipe electrode of 3/4-inch required by 250.52(A)(5) for a pipe electrode which is considered to be the minimum size for durability that goes back to the 1925 NEC edition. As to a 5 ft rod or pipe being driven into permanently damp earth – where in the US could this be consistently accomplished? The problems in this section alone justify the acceptance of Proposal 16-327.
Panel Meeting Action: Reject
Panel Statement: The panel reiterates its position as stated in the panel statement for the submitter's original proposal. The submitter has neither provided technical justification nor cited a safety issue to justify the elimination of the 5-foot communications ground rod that has been used successfully and safely by the communications industry for decades. It is unreasonable and unnecessary to require installation of such power-oriented grounding means as proposed by the submitter solely for communications applications where power fault and lightning currents are limited by the relatively fine gauge of communications conductors and cable shields.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 1
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:
BOYER, J.: Proposal 327 should be reconsidered and accepted as proposed. It is technically sound, reasonable and will aid in reducing losses from lightning, line surges and unintentional contact with higher-voltage lines. Furthermore, it would help stabilize the voltage to earth during normal operation.

16-290 Log #1908 NEC-P16 **Final Action: Accept in Principle**
(830.106(A))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:
830.106 Grounding and Bonding at Mobile Homes.
(A) Grounding. Grounding shall comply with 830.106(A)(1) or (A)(2).
(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the network-powered broadband communications cable, network interface unit, and primary protector

ground shall be installed connected to a grounding electrode ~~conductor~~ in accordance with 830.100(B)(3).

(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within sight from, and not more than 9.0 m (30 ft) of, the exterior wall of the mobile home it serves, the network-powered broadband communications cable, network interface unit, and primary protector ground shall be installed connected to a grounding electrode ~~conductor~~ in accordance with 830.100(B)(3).

Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 830.

These comments address the changes suggested in Proposal 16-293 in each section within Article 830 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

830.106 Grounding and Bonding at Mobile Homes.

(A) Grounding. Grounding shall comply with 830.106(A)(1) or (A)(2).

(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the network-powered broadband communications cable, network interface unit, and primary protector ground shall be installed connected to a grounding electrode conductor or grounding electrode ~~conductor~~ in accordance with 830.100(B)(3).

(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within sight from, and not more than 9.0 m (30 ft) of, the exterior wall of the mobile home it serves, the network-powered broadband communications cable, network interface unit, and primary protector ground shall be installed connected to a grounding electrode ~~conductor~~ in accordance with 830.100(B)(3).

Panel Statement: The panel accepts the submitter's text and adds "grounding electrode conductor or" to allow the option to connect to the grounding electrode or grounding electrode conductor. This retains the original intent of 830.106(A)(1).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

Comment on Affirmative:

BRUNSSEN, J.: Revise 830.106(A)(1) to read as follows: "(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the network-powered broadband communications cable, network interface unit, and primary protector ground shall be connected to a grounding electrode in accordance with 820.100(B)(3)." It is unlikely that a grounding electrode conductor will be available if there is no mobile home service equipment, a grounding electrode conductor is not mentioned in any of the sections referenced in 830.100(B)(3), and the revision is consistent with the proposed text of 830.106(A)(2).

OHDE, H.: See our affirmative comment for Comment 16-22.

16-291 Log #2441 NEC-P16 **Final Action: Accept in Principle**
(830.106(A))

Submitter: Keith Lofland, IAEI

Comment on Proposal No: 16-293

Recommendation: Revise text to read as follows:

830.106 Grounding and Bonding at Mobile Homes.

(A) Grounding. Grounding shall comply with 830.106(A)(1) or (A)(2).

(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the network-powered broadband communications cable, network interface unit, and primary protector ground shall be installed connected to a grounding electrode ~~conductor~~ in accordance with 830.100(B)(3).

(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within sight from, and not more than 9.0 m (30 ft) of, the exterior wall of the mobile home it serves, the network-powered broadband communications cable, network interface unit, and primary protector ground shall be installed connected to a grounding electrode ~~conductor~~ in accordance with 830.100(B)(3).

Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 16-290.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-292 Log #320 NEC-P16 **Final Action: Accept**
(830.110)

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 16-330

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal related to "Chapter 3 Raceways".

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Revise the title of 770.110(A)(1), 800.110(B), 820.110(B) and 830.110(A) from "Chapter 3 Raceways" to "Raceways Recognized in Chapter 3".

Panel Statement: The panel accepts the direction of the TCC to review "Chapter 3 Raceways".

In its action on proposal 16-330 for section 830.110, the TCC directed (comment 16-292), that the panel clarify the panel action on this proposal related to "Chapter 3 Raceways". The panel complied with the TCC directive and fixed the parallel sections, 770.110, 800.110 and 820.110.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-293 Log #1637 NEC-P16 **Final Action: Accept in Principle**
(830.113)

TCC Action: The Technical Correlating Committee directs the phrase "and plenums" be removed from the title, text, and Informational Note in 830.113(B).

Submitter: Craig Sato, Underwriters Laboratories Inc.

Comment on Proposal No: 16-331

Recommendation: Accept Proposal 16-331 in principle by revising 830.113 as follows:

830.113 Installation of Network-Powered Broadband Communications Cables. Installation of network-powered broadband communications cables shall comply with 830.113(A) through (H).

(A) Listing. Network-powered broadband communications cables installed in buildings shall be listed.

(B) Fabricated Ducts and Plenums Used for Environmental Air. The following cables shall be permitted to be installed in air ducts and plenums as described in 300.22(B) if they are directly associated with the air distribution system.

(1) Up to 1.22 m (4 ft) of Type BLP

(2) Types BLP, BMR, BLR, BM, BL and BLX installed in raceways that are installed in compliance with 300.22(B)

Informational Note: For information on fire protection of wiring installed in fabricated ducts and plenums see Sections 4.3.4.1 (air ducts) and 4.3.11.3.3 (apparatus casings plenums) in NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(C) Other Spaces Used For Environmental Air (Plenums). The following cables shall be permitted to be installed in other spaces used for environmental air as described in 300.22(C).

(1) Type BLP

(2) Type BLP installed in plenum communications raceway

(3) Type BLP supported by metallic cable trays or cable tray systems

(4) Types BLP, BMR, BLR, BM, BL and BLX installed in raceways that are installed in compliance with 300.22(C)

Informational Note: For information on fire protection of wiring installed in other spaces used for environmental air see Sections 4.3.11.2 (ceiling cavity plenum), 4.3.11.4 (air-handling unit room plenum) and 4.3.11.5 (raised floor plenum) of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(D) Risers-Cables in Vertical Runs. The following cables shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:
(1) Types BLP, BMR and BLR
(2) Types BLP and BLR installed in
(a) plenum communications raceway
(b) riser communications raceway
(c) riser cable routing assembly
Informational Note: See 830.26 for firestop requirements for floor penetrations.
(E) Risers-Cables in Metal Raceways. The following cables shall be permitted in metal raceway or in a riser having with firestops at each floor:
(1) Types BLP, BMR, BLR, BM, BL and BLX
(2) Types BLP, BLR and BL installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
Informational Note: See 830.26 for firestop requirements for floor penetrations.
(F) Risers-Cables in Fireproof Shafts. The following cables shall be permitted to be installed in fireproof riser shafts with firestops at each floor:
(1) Types BLP, BMR, BLR, BM, BL and BLX
(2) Types BLP, BLR and BL installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
Informational Note: See 830.26 for firestop requirements for floor penetrations.
(G) Risers- One- and Two-Family Dwellings. The following cables shall be permitted one- and two-family dwellings:
(1) Types BLP, BMR, BLR, BM, BL
(2) Types BL and BLX less than 10 mm (0.375 in.) in diameter
(3) Types BLP, BLR, and BL installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
Informational Note: See 830.26 for firestop requirements for floor penetrations.
(H) Other Building Locations. The following cables and raceways shall be permitted to be installed in building locations other than the locations covered in 830.113(B) through (G).
(1) Types BLP, BMR, BLR, BM and BL
(2) Type BLP, BMR, BLR, BM, BL and BLX installed in a raceway
(3) Types BLP, BLR, and BL
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
(4) Types BLX and BL less than 10 mm (0.375 in.) in diameter in one- and two-family dwellings
(5) Types BMU and BLU cables entering the building from outside and run in rigid metal conduit or intermediate metal conduit where the conduits is connected by a grounding conductor to an electrode in accordance with 830.100(B).
Informational Note: This provision limits the length of Type BLX cable to 15 m (50 ft), while 830.90(B) requires that the primary protector, or NIU with integral protection, be located as close as practicable to the point at which the cable enters the building. Therefore, in installations requiring a primary protector, or NIU with integral protection, Type BLX cable may not be permitted to extend 15 m (50 ft) into the building if it is practicable to place the primary protector closer than 15 m (50 ft) to the entrance point.
(6) A maximum length of 15 m (50 ft) within the building of Type BLX cable entering the building from outside and terminated at a NIU or a primary protection location

Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

The task group supports the panel action on the proposal to incorporate cable routing assemblies into the sections 770.133(B) (Proposals 16-51 and 52), 800.133(A)(1)(a) (Proposals 16-165 and 166), 820.133(A)(1)(a) (Proposals 16-272 and 273). Cable routing assemblies need to be included in Article 830 also to correlate with the panel actions on these other proposals. This comment includes provisions for the installation of network-powered broadband cables in cable routing assemblies and in communications raceways in order to correlate with the requirements of 770.133(B), 800.133(A)(1)(a) and 820.133(A)(1)(a).

The recommended text for the informational notes dealing with installations in air handling spaces have been modified to better reflect the contents of the mandatory text.

Panel Meeting Action: Accept in Principle

Revise 830.113 as follows:

830.113 Installation of Network-Powered Broadband Communications Cables. Installation of network-powered broadband communications cables shall comply with 830.113 (A) through (H).

(A) Listing. Network-powered broadband communications cables installed in buildings shall be listed.

(B) Fabricated Ducts and Plenums Used for Environmental Air. The following cables shall be permitted ~~to be installed~~ in ~~air~~ ducts and plenums as described in 300.22(B) if they are directly associated with the air distribution system.
(1) Up to 1.22 m (4 ft) of Type BLP cable
(2) Types BLP, BMR, BLR, BM, BL and BLX cables installed in raceways that are installed in compliance with 300.22(B)
Informational Note: For information on fire protection of wiring installed in fabricated ducts and plenums see sections 4.3.4.1 ~~(air ducts)~~ and 4.3.11.3.3 ~~(apparatus casings plenums)~~ in NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(C) Other Spaces Used For Environmental Air (Plenums). The following cables shall be permitted ~~to be installed~~ in other spaces used for environmental air as described in 300.22(C).
(1) Type BLP cable
(2) Type BLP cable installed in plenum communications raceway
(3) Type BLP cable supported by open metallic cable trays or cable tray systems
(4) Types BLP, BMR, BLR, BM, BL and BLX cables installed in raceways that are installed in compliance with 300.22(C)
(5)Types BLP, BMR, BLR, BM, BL and BLX cables supported by solid bottom metal cable trays with solid metal covers in other spaces used for environmental air (plenums) as described in 300.22(C)
Informational Note: For information on fire protection of wiring installed in other spaces used for environmental air see sections 4.3.11.2 ~~(ceiling cavity plenum)~~, 4.3.11.4 ~~(air-handling unit room plenum)~~ and 4.3.11.5 ~~(raised floor plenum)~~ of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems.*

(D) Risers-Cables in Vertical Runs. The following cables shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:
(1) Types BLP, BMR and BLR cables
(2) Types BLP and BLR cables installed in
(a) plenum communications raceway
(b) riser communications raceway
(c) riser cable routing assembly
Informational Note: See 830.26 for firestop requirements for floor penetrations.

(E) Risers-Cables in Metal Raceways. The following cables shall be permitted in metal raceway ~~or~~ in a riser having with firestops at each floor:
(1) Types BLP, BMR, BLR, BM, BL and BLX cables
(2) Types BLP, BLR and BL cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
Informational Note: See 830.26 for firestop requirements for floor penetrations.

(F) Risers-Cables in Fireproof Shafts. The following cables shall be permitted to be installed in fireproof riser shafts with firestops at each floor:
(1) Types BLP, BMR, BLR, BM, BL and BLX cables
(2) Types BLP, BLR and BL cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
Informational Note: See 830.26 for firestop requirements for floor penetrations.

(G) Risers- One- and Two-Family Dwellings. The following cables shall be permitted one- and two-family dwellings:
(1) Types BLP, BMR, BLR, BM, BL cables and Types BL and BLX cables less than 10 mm (0.375 in.) in diameter
(3) Types BLP, BLR, and BL cables installed in:
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly
Informational Note: See 830.26 for firestop requirements for floor penetrations.

(H) Other Building Locations. The following cables and raceways shall be permitted to be installed in building locations other than the locations covered in 830.113(B) through (G).
(1) Types BLP, BMR, BLR, BM and BL cables
(2) Types BLP, BMR, BLR, BM, BL and BLX cables installed in a raceway
(3) Types BLP, BLR, and BL
a) plenum communications raceway
b) riser communications raceway
c) general-purpose communications raceway
d) riser cable routing assembly
e) general-purpose cable routing assembly

(4) Types BLX and BL cables less than 10 mm (0.375 in.) in diameter in one- and two-family dwellings

(5) Types BMU and BLU cables entering the building from outside and run in rigid metal conduit or intermediate metal conduit where the conduits is connected by a bonding conductor or grounding electrode conductor ~~to an electrode~~ in accordance with 830.100(B).

Informational Note: This provision limits the length of Type BLX cable to 15 m (50 ft), while 830.90(B) requires that the primary protector, or NIU with integral protection, be located as close as practicable to the point at which the cable enters the building. Therefore, in installations requiring a primary protector, or NIU with integral protection, Type BLX cable may not be permitted to extend 15 m (50 ft) into the building if it is practicable to place the primary protector closer than 15 m (50 ft) to the entrance point.

(6) A maximum length of 15 m (50 ft) within the building of Type BLX cable entering the building from outside and terminated at a NIU or a primary protection location.

Panel Statement: The panel deleted the definition of "air duct" in its action on Proposal 16-104.

The panel added text to recognize solid bottom cable trays with a solid covers.

The panel added text to permit plenum raceways to be supported by open cable trays.

The panel added the word "cables" after each cable type. See panel action on Comment 16-295.

The panel made changes relative to deleting "grounding conductor" and replacing with "bonding conductor" or "grounding electrode conductor".

The panel accepts in principle the recommendations to revise the informational notes. The panel text provides information on air handling spaces using NEC terminology in lieu of NFPA 90A terminology as was used in the ROP text. The panel chooses not to include NFPA 90A "titles" in parenthesis following each section reference.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-294 Log #1926 NEC-P16 **Final Action: Hold**
(830.113 (New))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-331
Recommendation: Revise the text as follows:

830.113(B)(2) Types BLP, BMR, BLR, BM, BL and BLX installed in metal raceways ~~that are installed~~ in compliance with 300.22(B).

830.113(C)(3) Types BLP, BMR, BLR, BM, BL, and BLX installed in metal raceways ~~that are installed~~ in compliance with 300.22(C).

830.113(E) Risers- Cables in Metal Raceways or ~~Fireproof~~ Fire-Resistance-Rated Shafts. Types BLP, BMR, BLR, BM, BL, and BLX cables shall be permitted in metal raceway or in a ~~fireproof~~ fire-resistance-rated shaft with firestops at each floor.

Substantiation: In (B)(2), the word "metal" should be added to make this requirement very simple and very clear without having to refer to the entire text of 300.22, just as the Panel clarified in (C)(2) that only *metallic* cable trays are allowed. The informational note in this section refers to NFPA 90A which requires the use of metal raceways in these spaces.

In (C)(3) "metal" was added to clarify that the cables listed must be installed in metal raceways in accordance with the requirements in 300.22(C) and NFPA 90A.

In (E) "Fireproof" was changed to "fire-resistance-rated", which is the appropriate terminology.

Panel Meeting Action: Hold
Panel Statement: Changing "fireproof" to "fire-resistance rated" is a concept that has not had public review by being published in the ROP.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-295 Log #1356 NEC-P16 **Final Action: Accept in Principle in Part**
(830.113(B), FPN and 830.113(C) FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-160
Recommendation: (B) Fabricated Ducts and Plenums Used for Environmental Air. The following wires and cables shall be permitted in ~~air~~ ducts and plenums, as described in 300.22(B), if they are directly associated with the air distribution system:

(1) Up to 1.22 m (4 ft) of Type BLP cables

(2) Types BLP, BMR, BLR, BM, BL and BLX cables installed in raceways that are installed in compliance with 300.22(B)

FPN: See 4.3.4 and 4.3.11.3.3 of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems*, for information on wires and cables installed in fabricated ducts and plenums used for environmental air ~~wire and cables in air ducts and apparatus casings plenums. See 3.3.22 for the definition of an apparatus casing plenum~~.

(C) Other Spaces Used For Environmental Air (Plenums). The following wires and cables shall be permitted in other spaces used for environmental air as described in 300.22(C):

(1) Type BLP cables

(2) Type BLP cables supported by metallic cable trays or cable tray systems

(3) Types BLP, BMR, BLR, BM, BL and BLX cables and listed wires and cables installed in raceways that are installed in compliance with 300.22(C).

FPN: See 4.3.11.2, 4.3.11.4, and 4.3.11.5 of NFPA 90A-2009, *Standard for the Installation of Air-Conditioning and Ventilation Systems*, for information on wires, cables and raceways installed in other spaces used for environmental air (plenums) ~~wire, cables, and raceways in ceiling cavity, raised floor, and air-handling unit room plenums. See 3.3.22 for plenum definitions~~ .

Substantiation: This comment is intended to bring consistency to this section. The FPN nomenclature or terminology needs to correspond to the terminology in the charging paragraph.

The term "air duct" is not used in this section or elsewhere in the article. The definitions from NFPA 90A are not necessary since this FPN sends the NEC user directly to the relevant sections for the requirements.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel accepts in principle the recommendations to revise the informational notes. As recommended by the submitter, the panel text provides information on air handling spaces using NEC terminology in lieu of NFPA 90A terminology as was used in the ROP text.

The comment is on Proposal 16-160 which addresses Article 800. The recommended text is for Article 830. The panel understands that this comment is on Proposal 16-331.

The panel accepts in principle the recommendation to delete the word "air". See panel action on Comment 16-293.

The panel accepts in principle the recommendations to revise the informational notes. See panel action on Comment 16-293.

The panel does not accept the recommendations to include "wires" in the text because there are no wires in Article 830, only cables.

The panel accepts in principle adding the word "cables" after each cable type. See panel action on Comment 16-293.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-296 Log #1638 NEC-P16 **Final Action: Accept in Principle**
(830.133(A)(1)(b) and (c))

TCC Action: In order to correlate with the action on Comment 3-96, the Technical Correlating Committee changes the action on Comment 16-296 from "Accept" to "Accept in Principle" and revises 830.133(A)(1) to read as follows:

"(b) Low-Power Network-Powered Broadband Communications Circuit Cables with Optical Fiber Cables and Other Communications Cables. Low-power network-powered broadband communications cables shall be permitted in the same raceway, cable tray, enclosure or cable routing assembly with jacketed cables of any of the following circuits:

(1) Communications circuits in compliance with Parts I and IV of Article 800

(2) Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770

(3) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820

(c) Low-Power Network-Powered Broadband Communications Circuit Cables With Other Circuits. Low-power network-powered broadband communications cables shall be permitted in the same raceway, cable tray or, enclosure with jacketed cables of any of the following circuits:

(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and III of Article 725

(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760

(d) Medium-Power Network-Powered Broadband Communications Circuit Cables With Optical Fiber Cables and Other Communications Cables. Medium-power network-powered broadband communications cables shall not be permitted in the same raceway, cable tray, enclosure or cable routing assembly with conductors of any of the following circuits:

(1) Communications circuits in compliance with Parts I and IV of Article 800

(2) Conductive optical fiber cables in compliance with Parts I and IV of Article 770

(3) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820

(e) Medium-Power Network-Powered Broadband Communications Circuit Cables With Other Circuits. Medium-power network-powered broadband communications cables shall not be permitted in the same raceway, cable tray, or enclosure with conductors of any of the following circuits:

(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and III of Article 725
(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760."
Change existing (d) to (f).
Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-333
Recommendation: Accept Proposal 16-333 in principle by making the following revisions:

(b) *Low-Power Network-Powered Broadband Communications Circuit Cables.* Low-power network-powered broadband communications cables shall be permitted in the same raceway, cable tray, ~~or~~ enclosure or cable routing assembly with jacketed cables of any of the following circuits:

(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and III of Article 725

(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760

(3) Communications circuits in compliance with Parts I and IV of Article 800

(4) Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770

(5) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820

(c) *Medium-Power Network-Powered Broadband Communications Circuit Cables.* Medium-power network-powered broadband communications cables shall not be permitted in the same raceway, cable tray, ~~or~~ enclosure or cable routing assembly with conductors of any of the following circuits:

(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and III of Article 725

(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760

(3) Communications circuits in compliance with Parts I and IV of Article 800

(4) Conductive optical fiber cables in compliance with Parts I and IV of Article 770

(5) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820

Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

The task group supports the panel action on the proposal to incorporate cable routing assemblies into the sections 770.133(B) (Proposals 16-51 and 52), 800.133(A)(1)(a) (Proposals 16-165 and 166), 820.133 (Proposals 16-272 and 273). Cable routing assemblies need to be included in Article 830 also to correlate with the panel actions on these other proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

DORNA, G.: See my Explanation of Affirmative Vote on Comments 16-41, 16-143 and 16-236.

16-297 Log #2684 NEC-P16 **Final Action: Reject**
(830.133(A)(2) Exception No. 3 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 16-334
Recommendation: Accept the proposal.
Substantiation: The first portion of the panel statement regarding the absence of a specific application cited is difficult to understand. The substantiation cited an actual NEC section [334.116(C)] that recognizes such a construction. However, Chapter 8 will trump that allowance unless correlating language is in place. This needs correlation, the wording of Exception No. 2 does not require listing and seems to describe something CMP 3 described in its statement on a companion proposal for 725.136(I)(3) (Proposal 3-195).

Because of the Chapter 8 location, this issue still needs attention, only partially due to formal recognition of this construction in some form in 334.116(C). In addition, CMP 16 (and 3) will have on its ROC agenda, courtesy of CMP 9 and the TCC sending it there, Proposal 9-8 which covers a form of tray cable with this type of separation. This submitter has rigorously defended the system separation rules in print for decades, but the issues don't go away, and technology may have advanced to the point where some form of these cable constructions can be recognized.
Panel Meeting Action: Reject
Panel Statement: The submitter did not provide any listing requirements. See 800.179(I) for an example of a listing requirement for a hybrid power and communications cable.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-298 Log #1202 NEC-P16 **Final Action: Reject**
(830.135)

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 16-337
Recommendation: This proposal should be Accepted.
Substantiation: Panel member Mr. Ivans is correct in his Negative statement. Network Powered Broadband Circuit cable and connectors carry an electrical current and should not become easily accessible. Outlet Boxes and brackets have been listed by NRT's, such as UL, to insure that incidental contact with other electrical light and power conductors does not occur.
Panel Meeting Action: Reject
Panel Statement: The text, as suggested in Proposal 16-337, is too broad. Not all communications devices or equipment need to be mounted in boxes, on a bracket or in assemblies designed for the purpose (e.g., telephone set, FAX machine).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 1
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:

IVANS, R.: Loose and exposed cable or connectors can pose a risk of electric shock. Ringing voltages can exceed 100V and should not become easily accessible due to weak mounting or terminating methods. Loose cabling and connectors can come into contact with electric light and power conductors.

There are boxes and brackets listed for this purpose using the requirements in UL Subject 2269, "Outline of Investigation for Optical Fiber/ Communications/ Signaling/Coaxial Cable Outlet Boxes." Companies have certifications with UL under the category "Optical Fiber/Communications/Signaling/Coaxial Cable Outlet Boxes", QAZR.

16-299 Log #44 NEC-P16 **Final Action: Accept**
(830.151)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-331
Recommendation: Delete Section 830.151.
Substantiation: "Delete Section 830.151" was the first line of the recommendation in Proposal 16-331. It was overlooked in the panel action. See the ballot comments by Jerry Dorna and Randy Ivan.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-300 Log #645 NEC-P16 **Final Action: Reject**
(830.151(B))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" to correlate with the action taken on Comment 16-299.
Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-338
Recommendation: Continue to accept this proposal in principle.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel action to accept this proposal in principle. We agree with Jerry Dorna's ballot comment:

The current riser requirements are so complicated that they could be considered to be a "vague and unenforceable".

Section 830.151(B) requires that "Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type BMR. Floor penetrations requiring Type BMR shall contain only cables suitable for riser or plenum use". Consequently at least two floor penetrations are required, one for plenum and riser cables and another for general-purpose cables.

The panel action on this proposal greatly simplifies the installation rules for cables in risers in other than one and two-family dwellings. The installation rules for one and two-family dwellings are already simplified since any listed cable is permitted.
Panel Meeting Action: Accept
Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-301 Log #1909 NEC-P16 **Final Action: Reject**
(830.151(C) Exception)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" to correlate with the action taken on Comment 16-299.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:
(C) Other Wiring. Cables installed in locations other than the locations covered in 830.151(A) and (B) shall be Type BM.
Exception: Type BMU cable shall be permitted where the cable enters the building from the outside and is run in rigid metal conduit or intermediate metal conduit, and such conduits are connected by a grounding electrode conductor to a grounding ~~an~~ electrode in accordance with 830.100(B).
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 830.

These comments address the changes suggested in proposal 16-293 in each section within Article 830 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Other editorial changes are included to improve the syntax but intend to maintain the existing meaning without introducing a new concept.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.
Panel Meeting Action: Accept in Principle
Revise text to read as follows:
(C) Other Wiring. Cables installed in locations other than the locations covered in 830.151(A) and (B) shall be Type BM.
Exception: Type BMU cable shall be permitted where the cable enters the building from the outside and is run in rigid metal conduit or intermediate metal conduit, and such conduits are connected ~~by a grounding electrode conductor~~ to a grounding an electrode in accordance with 830.100(B).
Panel Statement: The panel accepts the submitter's text and edits for clarity.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-302 Log #2442 NEC-P16 **Final Action: Reject**
(830.151(C) Exception)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" to correlate with the action taken on Comment 16-299.
Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:
(C) Other Wiring. Cables installed in locations other than the locations covered in 830.151(A) and (B) shall be Type BM.
Exception: Type BMU cable shall be permitted where the cable enters the building from the outside and is run in rigid metal conduit or intermediate metal conduit, and such conduits are connected by a grounding electrode conductor to a grounding ~~an~~ electrode in accordance with 830.100(B).
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-301.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-303 Log #1639 NEC-P16 **Final Action: Accept in Principle**
(830.154)

TCC Action: The Technical Correlating Committee directs that the phrase "and plenums" be removed from the title, text, and informational note in Table 830.154 because the accepted text in the title, text, and the Informational Note in 300.22(B), as accepted in Proposal 3-94, does not include the term "fabricated plenums."
Submitter: Craig Sato, Underwriters Laboratories Inc.
Comment on Proposal No: 16-339
Recommendation: Revise text to read as follows:
830.154 Applications of Network-Powered Broadband Communications System Cables. Permitted and non-permitted applications of listed network-powered broadband communications system cables shall be as indicated in Table 830.154(A). The permitted applications are subject to the installation rules of 830.40, 830.110 and 830.113. The substitutions for network-powered broadband system cables listed in Table 830.154(B) shall be permitted.

See Table 830.154(A) on Page 654

Renumber Table 830.154 to become Table 830.154(B).

Substantiation: At the direction of the TCC, the chairmen of panels 3 and 16 formed a task group to correlate the actions of panels 3 and 16 on the proposals dealing with cable routing assemblies. The panel 3 members of the task group are Larry Ayers and Sandy Egesdal. The panel 16 members are Stan Kaufman and Craig Sato (chairman). This comment is being submitted by the task group chairman on behalf of the task group.

The task group supports the panel action on the proposal to incorporate installation of cables in cable routing assemblies into the section. However the task group recommends that the listing, applications and installation of the cable routing assemblies be consolidated into Article 770 and not be duplicated in each of panel sixteen's articles. Accordingly the recommended text for this section includes applications of wires and cables in cable routing assemblies and omits the installation of the cable routing assemblies which belong in 770.154.

Table 830.154(A) has been reformatted in 'landscape' and is recommended by the Task Group to be presented this way in the Code to enhance readability and use.

Most of the text in this comment was submitted by Gerald Dorna and Randy Ivans as an affirmative ballot comments on this proposal. See the ROP.
Panel Meeting Action: Accept in Principle

See TG revised Table 830.154(B) on page 654

Panel Statement: "Y" was changed to "Y*" to emphasize to the user that installation rules apply.

Add "In..." to the second column in Table 830.154(A) as a prefix to each phrase.

"Chapter 3 raceway" was changed to "In any raceway recognized in Chapter 3 " for consistency with the installation rules.

See panel action on Comment 16-292.

The panel added eight rows to clarify the issues raised in Comment 16-295 including adding rows dealing with installations in raceways and cable trays. An editorial change was made to clarify that air handling spaces refers to 300.22(B) & (C) spaces.

The box "In Air-Handling Spaces" was divided into the component sections "In Fabricated Ducts and Plenums as Described in 300.22(B)" and "In Other Spaces Used for Environmental Air as Described in 300.22(C)" in order to reduce repetition in the next column.
Number Eligible to Vote: 16

Table 830.154(A), Applications of Network Powered Broadband Cables

Applications		Cable Types						
		BLP	BLR	BL	BMR	BM	BLX	BMU, BLU
In Air-Handling Spaces	Fabricated ducts and plenums as described in 300.22(B)	Y	N	N	N	N	N	N
	Other spaces used for environmental air (plenums) as described in 300.22(C)	Y	N	N	N	N	N	N
In Risers	Vertical runs	Y	Y	N	Y	N	N	N
	Metal raceways	Y	Y	Y	Y	Y	Y	N
	Fireproof shafts	Y	Y	Y	Y	Y	Y	N
	One-and two-family dwellings	Y	Y	Y	Y	Y	Y	N
Within Buildings in Other Than Air-Handling Spaces and Risers	General	Y	Y	Y	Y	Y	Y	N
	One-and two-family dwellings	Y	Y	Y	Y	Y	Y	N
	Cable trays	Y	Y	Y	Y	Y	N	N
	Rigid metal conduit and intermediate metal conduit	Y	Y	Y	Y	Y	Y	Y
	Chapter 3 raceway	Y	Y	Y	Y	Y	Y	N
	Plenum communication raceways	Y	Y	Y	N	N	N	N
	Riser communication raceways	Y	Y	Y	N	N	N	N
	General purpose communication raceways	Y	Y	Y	N	N	N	N
	Riser cable routing assemblies	Y	Y	Y	N	N	N	N
	General-purpose cable routing assemblies	Y	Y	Y	N	N	N	N

Note: An ‘N’ in the table indicates that the cable type shall not be permitted to be installed in the application. A ‘Y’ indicates that the cable shall be permitted to be installed in the application, subject to the limitations described in 830.113.

Table 830.154(B) PA

Table 830.154(B), Applications of Network Powered Broadband Cables in Buildings

Applications		Cable Types						
		BLP	BLR	BL	BMR	BM	BLX	BMU, BLU
In Fabricated Ducts and Plenums as Described in 300.22(B)	In fabricated ducts and plenums as described in 300.22(B)	Y*	N	N	N	N	N	N
	In metal raceway that complies with 300.22(B)	Y*	Y*	Y*	Y*	Y*	Y*	N
In Other Spaces Used for Environmental Air as Described in 300.22(C)	In other spaces used for environmental air as described in 300.22(C)	Y*	N	N	N	N	N	N
	In metal raceway that complies with 300.22(C)	Y*	Y*	Y*	Y*	Y*	Y*	N
	In plenum communications raceways	Y*	N	N	N	N	N	N
	Supported by open metal cable trays	Y*	N	N	N	N	N	N
	Supported by solid bottom metal cable trays with solid metal covers	Y*	Y*	Y*	Y*	Y*	Y*	N
In Risers	In vertical runs	Y*	Y*	N	Y*	N	N	N
	In metal raceways	Y*	Y*	Y*	Y*	Y*	Y*	N
	In fireproof shafts	Y*	Y*	Y*	Y*	Y*	Y*	N
	In plenum communications raceways	Y*	Y*	N	N	N	N	N
	In riser communications raceways	Y*	Y*	N	N	N	N	N
	In riser cable routing assemblies	Y*	Y*	N	N	N	N	N
	In one-and two-family dwellings	Y*	Y*	Y*	Y*	Y*	Y*	N
Within Buildings in Other Than Air-Handling Spaces and Risers	General	Y*	Y*	Y*	Y*	Y*	Y*	N
	In one-and two-family dwellings	Y*	Y*	Y*	Y*	Y*	Y*	N
	Supported by cable trays	Y*	Y*	Y*	Y*	Y*	N	N
	In rigid metal conduit and intermediate metal conduit	Y*	Y*	Y*	Y*	Y*	Y*	Y*
	In any raceway recognized in Chapter 3	Y*	Y*	Y*	Y*	Y*	Y*	N
	In plenum communications raceways	Y*	Y*	Y*	N	N	N	N
	In riser communications raceways	Y*	Y*	Y*	N	N	N	N
	In general purpose communications raceways	Y*	Y*	Y*	N	N	N	N
	In riser cable routing assemblies	Y*	Y*	Y*	N	N	N	N
	In general-purpose cable routing assemblies	Y*	Y*	Y*	N	N	N	N

Note: An ‘N’ in the table indicates that the cable type shall not be permitted to be installed in the application. A ‘Y*’ indicates that the cable shall be permitted to be installed in the application, subject to the limitations described in 830.113.

Informational Note 1: Part V of Article 830 covers installation methods within buildings. This table covers the applications of listed network-powered broadband communications cables in buildings. The definition of point of entrance is in 830.2. Network-powered broadband communications cables entrance cables that have not emerged from the rigid metal conduit or intermediate metal conduit are not considered to be in the building.

Informational Note No. 2: For information on the restrictions to the installation of network-powered broadband communications cables in fabricated ducts and plenums see 830.113(B).

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-304 Log #2415 NEC-P16 **Final Action: Reject**
(830.154)

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-339
Recommendation: Revise the first sentence of 830.154 to read:
Permitted and non-permitted applications of listed network-powered broadband communications system cables shall be ~~as indicated in Table 830.154(A)~~ in accordance with 830.110 and 830.113.
Substantiation: A comment has been submitted to delete Table 830.154(A). 830.154 will need to be revised for correlation if the Table is deleted.
The following is our reason for deleting the Table.
Proposals to delete all of the Tales in the 800 series. Some are more confusing than others but consistency is needed. A number of notes are needed if this table moves forward. Many users will simply take the table as fact without reading limiting requirements applicable per 830.10 and 830.13 A simple "yes" or "no" does not always fit and will lead to misinterpretation.
Several cycles ago both CMP 8 and CMP 7 rewrote their articles. At that time both attempted to develop tables such as 820.154A. There was such a hue and cry against this and so many notes needed to explain what is actually permitted both Panels dropped the tables. Most tables in the NEC are there to clarify special conditions, not normal use. Text, as opposed to tables, is much easier to interpret and enforce correctly.
Just in case the Panel rejects this comment and continues with the Table, we have submitted a separate comment for 16-278 containing notes to the table.
However, REMOVING THE TABLE IS MUCH MORE USER FRIENDLY AS PAST CODE DEVELOPMENT HAS SHOWN. Thorough reading of 820-110 and 820-113 by users will lead to easier and better enforcement and avoid installers having to remove and redo an installation due to noncompliance.
Panel Meeting Action: Reject
Panel Statement: The recommended action was intended to correlate with the acceptance of Comment 16-306. The panel rejected Comment 16-306.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-305 Log #2416 NEC-P16 **Final Action: Accept in Principle in Part**
(Table 830.154(A))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-339
Recommendation: If the Table is not deleted as proposed in a separate comment, revise Table 830.154(A) as follows:
Add Notes to clarify and change some Y(es) and N(o) permitted uses.
For reference purposes the columns of the draft Table have been numbered in numerical sequence from left to right. The cable and/or raceway types are for identification as shown in the far left product column. It is the intent that a parenthetical note number be placed with the identified product Y or N, with the corresponding note(s) at the bottom of the Table.
Column one –**BLP** – Indicate Note (1) Text: Note (1). in free air in a 300.22(B) location must be directly associated with the air distribution system and is limited to 1.2 2mm (4 ft); the length limitation does not apply where the cable is installed in a raceway complying with 300.22(B).
Columns one and two – **BMR, BLR, BM, BL and BLK** - Indicate Note (2). Change N to Y for CATVR, CATV, CATVX and apply Note (2).
Text: Note 2. In 300.22(B) and (C) locations these cables are permitted in raceways that comply with 300.22(B) and (C).
Column eight - **BMR, BLR, BM, BL, and BLX** --Indicate Note (3). Text: Note 3. In 300.22 locations cable tray is required to be solid metal bottom with solid metal cover.
Column Ten – **BLP, BMR, BLR,BM, BL and BLX --** Indicate Note (4). Text: Note 4. Where these cables are installed in a Chapter 3 raceway located in a 300.22 area the raceway must comply with 300.22 (A) and (B).
Substantiation: Note (1). Per **830.113(B)**.
Note (2) Per **830.113(B)**(2) and **820.113(C)(3**).
Note (3) Per **830.113(B)**(2) and **(C)(3)**
Note (4) Per **This text is needed to assure that "any raceway in Chapter 3" is not misapplied.**
Panel Meeting Action: Accept in Principle in Part
The panel accepts in principle recommendation 1. See Informational Note No 2 in Table 830.154.
The panel does not accept recommendation 2. CATV cables are not included in Table 830.154(A).
The panel does not accept recommendation 3. See panel action on proposal 16-340 which permits plenum cable to be installed metallic cable trays in plenums.
The panel does not accept recommendation 4. Section 300.22(A) states "No wiring systems of any type shall be installed in ducts used to transport dust, loose stock, or flammable vapors."
Panel Statement: See panel action on Comments 16-293 and 16-303.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-306 Log #2417 NEC-P16 **Final Action: Reject**
(Table 830.154(A))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-339
Recommendation: Delete Table 830.154(A).
Substantiation: This is a companion comment for revision of 830.154.
See also comment to add notes to Table 830.154(A) if this comment is not accepted.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no substantiation for the recommended action.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-307 Log #2418 NEC-P16 **Final Action: Hold**
(Table 830.154(A))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 16-339
Recommendation: For the purpose of this comment the columns are referenced numerically from left to right and as shown in the draft.
Revise column headings as follows:
1. Add "Specifically" before "Fabricated"; delete "and plenums"
4. Change "fireproof" to "fire-resistance- rated."
Substantiation: 1. To correlate with the title of 300.22(B) and avoid confusion.
4. The term "fireproof " is being replaced with the correct description "fire-resistance-rated" throughout ASTM fire related standards and other codes. It is a known fact that that "fireproof" is not a legally defensible term. A comment has been submitted to change the term in 830.113.
Panel Meeting Action: Hold
Panel Statement: Changing "fireproof" to "fire-resistance rated" is a concept that has not had public review by being published in the ROP.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-308 Log #623 NEC-P16 **Final Action: Accept**
(830.154(B)(1))

Submitter: Frank W. Peri, Communications Cable & Connectivity Assoc.
Comment on Proposal No: 16-341
Recommendation: Continue to accept this proposal in principle.
Substantiation: The Communications Cable & Connectivity Association agrees with the panel action to accept this proposal in principle. We agree with Jerry Dorna's ballot comment:
The current riser requirements are so complicated that they could be considered to be a "vague and unenforceable".
Section 830.154(B)(1) requires that "Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type BLP, BLR, or BMR. Floor penetrations requiring Type BMR or BLR shall contain only cables suitable for riser or plenum use". Consequently at least two floor penetrations are required, one for plenum and riser cables and another for general-purpose cables.
The panel action on this proposal greatly simplifies the installation rules for cables in risers in other than one and two-family dwellings. The installation rules for one and two-family dwellings are already simplified since any listed cable is permitted.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-309 Log #1910 NEC-P16 **Final Action: Accept in Principle**
(830.154(C)(3))

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:
(3) Type BLU Cable. Type BLU cable entering the building from outside shall be permitted to be run in rigid metal conduit or intermediate metal conduit. Such conduits shall be connected by a grounding electrode conductor to a ~~an~~ grounding electrode in accordance with 830.100(B).
Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to

provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 830.

These comments address the changes suggested in Proposal 16-293 in each section within Article 830 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Other editorial changes are included to improve the syntax but intend to maintain the existing meaning without introducing a new concept.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.

Panel Meeting Action: Accept in Principle
Panel Statement: See action and statement on Comment 16-293.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-310 Log #2443 NEC-P16 **Final Action: Accept in Principle**
(830.154(C)(3))

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-293
Recommendation: Revise text to read as follows:
(3) Type BLU Cable. Type BLU cable entering the building from outside shall be permitted to be run in rigid metal conduit or intermediate metal conduit. Such conduits shall be connected by a grounding electrode conductor to a ~~an~~ grounding electrode in accordance with 830.100(B).
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.

From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.

Panel Meeting Action: Accept in Principle
Panel Statement: See action and statement on Comment 16-293.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-311 Log #1357 NEC-P16 **Final Action: Reject**
(830.179(2), FPN 4)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-343
Recommendation: 830.179 Network-Powered Broadband Communications Equipment and Cables.

Network-powered broadband communications equipment and cables shall be listed as suitable for the purpose.

Exception No. 1: This listing requirement shall not apply to community antenna television and radio distribution system coaxial cables that were installed prior to January 1, 2000, in accordance with Article 820 and are used for low-power network-powered broadband communications circuits.

Exception No. 2: Substitute cables for network-powered broadband communications cables shall be permitted as shown in Table 830.154.

(2) Types BLU, BLX, BL, BLR, and BLP Cables. Network-powered broadband communications low-power underground cable, Type BLU; limited-use network-powered broadband communications low-power cable, Type BLX; network-powered broadband communications low-power cable, Type BL; network-powered broadband communications low-power riser cable, Type BLR; and network-powered broadband communications low-power plenum cable, Type BLP, shall be factory-assembled cables consisting of a jacketed coaxial cable, a jacketed combination of coaxial cable and multiple individual conductors, or a jacketed combination of an optical fiber cable and multiple individual conductors. The insulation for the individual conductors shall be rated for 300 volts minimum. Cables intended for outdoor use shall be listed as suitable for the application. Cables shall be marked in accordance with 310.11. Type BLU cables shall be jacketed and listed as being suitable for outdoor underground use. Type BLX limited-use cables shall be listed as being suitable for use outside, for use in dwellings, and for use in raceways and shall also be listed as being resistant to flame spread. Type BL cables shall be listed as being suitable for general-purpose use, with the exception of risers and plenums, and shall also be listed as being resistant to the spread of fire. Type BLR cables shall be listed as being suitable for use in a vertical run in a shaft or from floor to floor and shall also be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor. Type BLP cables shall be listed as being suitable for use in ducts, plenums, and other spaces used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN No. 4: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.

Substantiation: Retain the FPN as in the current NEC, but only if the FPNs from CMP 3 are not changed to the same language. This comment is being written just in case CMP 3 is willing to change to existing NEC language.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Reject
Panel Statement: The panel upholds its position to not change the FPN.

The panel agrees with the submitter's statement that "the FPN is worded correctly".

See panel action and statement on Comment 16-61.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-312 Log #1358 NEC-P16 **Final Action: Reject**
(830.179(2), FPN 4)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-343
Recommendation: 830.179 Network-Powered Broadband Communications Equipment and Cables.

Network-powered broadband communications equipment and cables shall be listed as suitable for the purpose.

Exception No. 1: This listing requirement shall not apply to community antenna television and radio distribution system coaxial cables that were installed prior to January 1, 2000, in accordance with Article 820 and are used for low-power network-powered broadband communications circuits.

Exception No. 2: Substitute cables for network-powered broadband communications cables shall be permitted as shown in Table 830.154.

(2) Types BLU, BLX, BL, BLR, and BLP Cables. Network-powered broadband communications low-power underground cable, Type BLU; limited-use network-powered broadband communications low-power cable, Type BLX; network-powered broadband communications low-power cable, Type BL; network-powered broadband communications low-power riser cable, Type BLR; and network-powered broadband communications low-power plenum cable, Type BLP, shall be factory-assembled cables consisting of a jacketed coaxial cable, a jacketed combination of coaxial cable and multiple individual conductors, or a jacketed combination of an optical fiber cable and multiple individual conductors. The insulation for the individual conductors shall be rated for 300 volts minimum. Cables intended for outdoor use shall be listed as suitable for the application. Cables shall be marked in accordance with 310.11. Type BLU cables shall be jacketed and listed as being suitable for outdoor underground use. Type BLX limited-use cables shall be listed as being suitable for use outside, for use in dwellings, and for use in raceways and shall also be listed as being resistant to flame spread. Type BL cables shall be listed as being suitable for general-purpose use, with the exception of risers and plenums, and shall also be listed as being resistant to the spread of fire. Type BLR cables shall be listed as being suitable for use in a vertical run in a shaft or from floor to floor and shall also be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor. Type BLP cables shall be listed as being suitable for use in ducts, plenums, and other spaces used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN No. 4: One method of defining low smoke producing and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.

~~FPN No. 4: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262-2007, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.~~

Substantiation: This comment is intended to bring consistency to the NEC. In Articles 770, 800, 820 and 830, the FPN is worded correctly but different from what CMP 3 recommended. The original proposal I made to CMP 3 and CMP 16 was already made in the 2005 and 2008 NEC cycles, but was caught up in the "plenum cable moratorium" in the opinion of CMP 3 but not of CMP 16. The present wording also follows the requirements of the preceding section, which requires that the cable be listed as having both "adequate fire-resistant and low smoke-producing characteristics". The wording of CMP 3 (although adequate also) does not explain what is needed to define a cable that is a "low smoke-producing and fire-resistant cable" by omitting the words "a cable that is". However, if CMP 16 makes this change consistency is achieved in the NEC.

With regard to the comment by Mr. Ayers to the proposals in CMP 3, I agree with him, but the (incorrect) use of the term "fire-resistant cable" is consistent in not just the FPNs in all 6 relevant articles (725, 760, 770, 800, 820 and 830) but is also consistent with the use in the charging paragraph.

If CMP 3 and CMP 16 would both like to eliminate the term "fire-resistant cable", consistently in all locations, and replace it by a term such as "low flame spread cable", that would be an excellent idea, but it does require consistency (and probably a task group of both panels). In the meantime the use of the term "fire-resistant cable" is necessary to correlate with the charging paragraph.

It is understood by the commenter that the Technical Correlating Committee changed the designation of "FPN" to "Informational Note".

Panel Meeting Action: Reject

Panel Statement: The panel upholds its position to not change the FPN.

The panel agrees with the submitter's statement that "the FPN is worded correctly".

See panel action and statement on Comment 16-61.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-313 Log #1014 NEC-P16 **Final Action: Reject**

(830.179(A)(1), FPN No. 1 and No. 2)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-346

Recommendation: The Proposal should be Accepted in Principle in Part and the text revised as follows:

~~FPN No. 1~~ Informational Note No. 1: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.

Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.

~~FPN No. 2~~ Informational Note No. 2: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the cables pass the requirements of~~ ANSI/UL 1666-2002, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts.*

Substantiation: Acceptance of the revised wording in FPN No. 1 will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPNs not contain requirements. The pass/fail criteria are already defined in those two standards.

The existing phrase in FPN No. 2 "…that the cables pass the requirements…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject

Panel Statement: The informational note does not contain requirements and is not written in mandatory language; it provides information on two methods of defining resistant to the spread of fire.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-314 Log #1015 NEC-P16 **Final Action: Reject**

(830.179(A)(1), FPN No. 1 through No. 4)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-348

Recommendation: The Proposal should be Accepted in Principle in Part, revised and the following words "and Annex A Explanatory Material" added after "NFPA 262-2007" in FPN No.4 so the revised FPNs read as follows:

~~FPN No. 2~~ Informational Note No. 2: One method of defining resistant to the spread of fire is ~~that the cables do not spread fire to the top of the tray~~ described in the "UL Flame Exposure, Vertical Tray Flame Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable.

Another method of defining resistant to the spread of fire is ~~for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing~~ described in the CSA "Vertical Flame Test — Cables in Cable Trays," ~~as described~~ in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.

~~FPN No. 3~~ Informational Note No. 3: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is described in ~~that the cables pass the requirements of~~ ANSI/UL 1666-2002, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts.*

~~FPN No. 4~~ Informational Note No. 4: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is ~~that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with~~ described in NFPA 262-2007, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, and Annex A Explanatory Material.

Substantiation: Acceptance of the revised wording in FPN No. 2 will still provide the user with the references to two methods of defining "resistant to the spread of fire" and also comply with the NEC Style Manual that FPNs not contain requirements. The pass/fail criteria are already defined in those two standards.

The existing phrase in FPN No. 3 "…that the cables pass the requirements…" specifies a requirement which violates 3.1.3 of the NEC Style Manual. The revised text will still provide the user with a reference that directs them to the appropriate standard that contains the test requirements and the pass/fail criteria and the revised FPN complies with the NEC Style Manual.

The current text in FPN No. 4 specifies a single test method and defines the maximum values, which are not specified in the body of NFPA 262. Inclusion of the maximum values in the FPN are requirements and this violates 3.1.3 of the NEC Style Manual.

NFPA 262 defines the Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces but it does not specify any pass/fail criteria.

While the values specified for maximum peak optical density, maximum average optical density, and maximum allowable flame travel distance in the FPN are not included in the body of NFPA 262, they are contained in Annex A Explanatory Material. Addition of the words "and Annex A Explanatory Material" will reference the maximum values that are in the FPN and the proposed revised FPN will comply with the NEC Style Manual.

Changing "FPN" to "Informational Note" provides correlation with the TCC Action on Proposal 1-37a.

Panel Meeting Action: Reject

Panel Statement: Informational Note No. 2 does not contain requirements and is not written in mandatory language; it provides information on two methods of defining resistant to the spread of fire.

Informational Note No. 3 note does not contain requirements and is not written in mandatory language; it provides information on one method of defining fire-resistant characteristics capable of carrying fire floor to floor.

Informational Note No. 4 does not contain requirements and is not written in mandatory language; it provides information on one method of defining a low-smoke producing and fire-resistant cable.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

ARTICLE 840 —PREMISES-POWERED BROADBAND COMMUNICATIONS SYSTEMS

16-315 Log #321 NEC-P16 **Final Action: Accept**

(840 (New))

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 16-349

Recommendation: The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the panel action.

The Technical Correlating Committee further directs that the panel review the proposed changes for compliance with the NEC Style Manual with respect to titles for first level subsections.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to review the proposed first level subsections.

See panel action and statement on Comments 16-330, 16-331 and 16-332.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-316 Log #615 NEC-P16 **Final Action: Accept in Principle (840)**

Submitter: Travis Lindsey, Travis Lindsey Consulting Services
Comment on Proposal No: 16-212
Recommendation: Replace the term "~~grounding conductor~~", with the term "grounding electrode conductor", throughout this article.
Substantiation: The term "grounding electrode conductor", is a specific term and thus it is easier for most people in the industry to understand the purpose. The generic term "grounding conductor" is so general that most people can misunderstand the application. It cannot be held to be in the best interest of safety for a general misunderstanding of terms to be an allowable mode in the NEC process.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel understands that the submitter's reference to Proposal 16-212 is incorrect and should be to Proposal 16-349.

The panel refers the submitter to the action and statement on Comment 16-334.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-317 Log #1065 NEC-P16 **Final Action: Accept in Principle (840)**

Submitter: Vijay Ghelani, Alcatel-Lucent
Comment on Proposal No: 16-349
Recommendation: We support and agree with the clarification submitted by Randy Ivans of UL Inc. indicating that Section 840.101 should be reworded as follows:
"840.101 Premises Circuits Not Leaving the Building.
Where the ONT is served by a nonconductive optical fiber cable, or where any non-current-carrying metallic member is interrupted by an insulating joint or equivalent device, and circuits that terminate at the ONT and are completely contained within the building (i.e., do not exit the building), 840.101 (A) or and (B) or and (C) shall apply as applicable.
(A) The shield of coaxial cable shall be grounded by one of the following:
(1) Any of the methods described in 820.100 or 820.106.
(2) A fixed connection when using to an equipment grounding conductor as described in 250.118. Use of the equipment grounding conductor to ground the ONT shall not require additional grounding of the coaxial cable shield.
(3) Connection to the ONT grounding terminal provided that the terminal is connected to an equipment grounding conductor through a listed grounding device that will retain the ground connection if the ONT is unplugged.
(B) Communications circuits shall not be required to be grounded.
(C) The ONT shall not be required to be grounded unless required by its listing. Where grounding is required, connecting to an equipment grounding conductor through a listed grounding device that will retain the ground connection if the ONT is unplugged shall be permitted. If the coaxial cable shield is separately grounded as permitted required in 840.101 (A)(1) or 840.101(A)(2), the use of a cord and plug for the connection to the ONT grounding connection shall be permitted.
FPN No. 1. Where required to be grounded, a listed device that extends the equipment grounding conductor from the receptacle to the ONT equipment grounding terminal is permitted. Sizing of the extended equipment grounding conductor is covered in Table 250.122."
Substantiation: None given.
Panel Meeting Action: Accept in Principle
Panel Statement: See action and statement on Comment 16-329.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-318 Log #1272 NEC-P16 **Final Action: Accept in Principle (840 (New))**

Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 16-349
Recommendation: I highly encourage CMP-16 to accept this proposal in principle and accept the coordinated set of comments that provide the completed revisions throughout Article 840.
Substantiation: This comment responds to action by CMP-5 to delete the term "grounding conductor" and revise the term "grounding electrode conductor." Two definitions that apply to a conductive path in the grounding scheme that functions as a grounding electrode conductor are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 840. The coordinated comments actually even correct misuse of grounding terms in a few locations that existed for a few cycles.

CMP-5 has responsibilities for defined grounding and bonding terms (Code wide). This comment respects the independence of CMP-16 regarding Chapter 8 based on 90.3: this work is not an effort to remove that independence. These proposed revisions are technically correct and result in grounding and bonding terms being used consistently with how they are defined. The term "grounding conductor" is too broad and has been part of a planned migration for removal since the 2005 edition. This planned revision is part of a larger plan implemented by the NEC-2008 TCC assigned grounding and bonding task group work. The grounding and bonding concepts are simple. If grounding happens, a connection is made to an electrode by use of a grounding electrode conductor. Bonding connected conductive parts to establish continuity and conductivity between them. The proposed revisions do not change anything technically in the article: they only make the use of grounding terms consistent with how they are defined, improving the current text. The only change proposed is in use of terms. All other rules such as sizing, installation and so forth remain as specified in this article, as before.

Not accepting the proposed revisions shows a deliberate action to allow continued inconsistency and subjectivity to remain in the NEC. CMP-5 actions have deleted the term "grounding conductor" from Article 100 and revised the term "grounding electrode conductor" to work consistently with the limited energy articles in Chapter 8. The term "grounding conductor" has been removed or replaced in Article 250 and other articles of the NEC. Not accepting the proposed revisions in the coordinated comments will result in the continued use of an orphaned term that is not specific and can lead to subjectivity. The proposed changes are technically correct and there have been no technical reasons brought forward to reject what is being proposed. I highly encourage CMP-16 to give strong consideration to the coordinated comments submitted that resolve these inconsistencies and improve clarity and usability within the limited energy articles with regards to grounding and bonding rules. The best approach in Code development work is to look at the long range objectives and what would be best for the NEC. It needs to be practical, understandable, and enforceable. These proposed revisions are in the spirit of accomplishing all three of these objectives. It's not about who is right or wrong, it is about being successful and ending up with the best Code as a result.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel addressed the submitter's concerns. See action and statement on Comment 16-334.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-319 Log #2099 NEC-P16 **Final Action: Accept in Principle (840 (New))**

Submitter: David A. Williams, Delta Township
Comment on Proposal No: 16-349
Recommendation: Revise the proposal as follows: Replace the term "grounding conductor" with "bonding conductor" or "grounding electrode conductor" throughout the article as appropriate.
Substantiation: The present term "grounding conductor" is proposed to be deleted by CMP5. The present term is not correct in most applications. I was part of a CMP-5 and CMP-16 Task Group that could not come to a consensus. The members of CMP-5 went through all the sections in Articles 770, 800, 810, 830 and the proposed new Article 840. The proposed changes are being presented by Phil Simmons and I urge the code panel to either agree with the submitter or make additional changes as needed to remove the term "grounding conductor from these articles.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel addressed the submitter's concerns. See action and statement on Comment 16-334.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:

OHDE, H.: See our affirmative comment for Comment 16-22.

16-320 Log #2272 NEC-P16 **Final Action: Accept in Principle (840 (New))**

Submitter: Terry C. Coleman, National Joint Apprentice & Training Committee / Rep. IBEW
Comment on Proposal No: 16-349
Recommendation: Accept Proposal 16-349 as intended to delete the term "grounding conductor" and replace it with the term "grounding electrode conductor" throughout this Article 840.
Substantiation: Proposal 5-13 deleted the definition of "Grounding Conductor" in Article 100 during the 2011 ROP stage as well as the revision of the term" Grounding Electrode Conductor. The revision of the term "grounding

electrode conductor" in Article 100 included wording necessary for the Chapter 8 Articles, therefore, the term "grounding conductor" is no longer needed or required. The term "grounding electrode conductor" is more correct than the term "grounding conductor". Proposal 5-18 which was accepted in principle and revised by CMP-1 reads as follows:

Grounding Electrode Condcutor (GEC). A conductor used to connect the system grounded conductor, equipment, communications system protectors, antenna discharge units, communications cables or network interface units to a grounding electrode or to a point on the grounding system.

Panel Meeting Action: Accept in Principle
Panel Statement: The panel addressed the submitter's concerns. See action and statement on Comment 16-334.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-321 Log #2685 NEC-P16 **Final Action: Accept in Principle in Part (840)**

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 16-349
Recommendation: Accept the proposal as in the panel action in the ROP, but make the following additional changes:

I. In 840.2, Optical Network Terminal (ONT), change "component voice, audio, video, data, and/or interactive electrical service signals" to "component signals, including voice, audio, video, data, and interactive electrical service."

II. Delete 840.3(A), reletterering the remaining subsections.

III. In 840.101(A), insert a first level subdivision title as follows: "Shield Grounding."

IV. In 840.101(B), insert a first level subdivision title as follows: "Communications Circuit Grounding."

V. In 840.101(C), insert a first level subdivision title as follows: "Optical Network Terminal Grounding." Begin the third sentence "Where ~~If~~ the coaxial cable …"

VI. Retitle 840.101(C) FPN No. 1 as "Informational Note" (no number)

VII. In 840.106(A), apply second level subdivision titles to (1) and (2), as follows: "(1) Service Equipment Remote" and "(2) Main Disconnect Remote".

Substantiation: These are editorial changes to reflect requirements in the NEC Style Manual (NECSM) as follows:

I. Removes the prohibited wording "and/or".

II through V. Requirement of the NECSM at 2.1.5.2.

V.I Requirement of the NECSM at 2.4.3.

VII. Requirement of the NECSM at 2.1.5.2.

Panel Meeting Action: Accept in Principle in Part
Revise text to read as follows:

840.2 **Optical Network Terminal (ONT).** as follows: **"**A device that converts an optical signal into component signals including voice, audio, video, data, wireless ~~signals~~, and~~/or~~ interactive service electrical ~~signals~~ and is considered…".

Panel Statement: The panel does not accept the submitter's revision of 840.2. The panel has revised the submitter's text of 840.2 to include missing text.

The panel wishes to retain 840.3(A) but has eliminated the reference to 90.3.

See panel action for Comments 16-330, 16-331 and 16-332 for titles to subsections 840.101(A), (B) and(C). See panel action for Comment 16-333 on 840.101(C) FPN.

The panel does not accept the submitter's recommendation VII.

Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
BRUNSSEN, J.: The term "interactive service electrical" is an undefined term.

16-322 Log #554 NEC-P16 **Final Action: Accept (840.1, FPN 1)**

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise the second sentence as follows: "Powering of the ONT is typically accomplished through an ONT power supply Unit (OPSU) and battery backup unit (BBU) that ~~derives~~ derive their power input from the available ac at the premises."
Substantiation: There is a typographical error in the second sentence. The word "derives" should be singular, "derive". Note that the text is incorrect in the preprint.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-323 Log #555 NEC-P16 **Final Action: Accept (840.1, FPN 2)**

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise as follows: "FPN No. 2: See 90.2(B)(4) for installations of premises-powered broadband communications systems that are not covered."
Substantiation: Editorially revise to reflect title and scope of the Article.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-324 Log #556 NEC-P16 **Final Action: Accept (840.2)**

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise 840.2 Optical Network Terminal (ONT) as follows: "…and is considered to be ~~a~~ network interface ~~unit terminating~~ equipment."
Substantiation: The present definition is technically and grammatically incorrect.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-325 Log #557 NEC-P16 **Final Action: Reject (840.3(A))**

TCC Action: In accordance with 4.1 of the NEC Style Manual, the Technical Correlating Committee directs that this comment and Proposal 16-349 be reported as "Reject" since there is no need to duplicate part of 90.3.
Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise 840.3(A) as follows: "**(A) Chapters 1 through 7.** The requirements of Chapters 1 though 7 shall not apply to Article 840 except where the requirements are specifically referenced in Article 840. ~~See 90.3~~."
Substantiation: The Technical Correlating Committee addressed similar text in 800.3(A), 820.3(A) and 830.3(A). This change will provide correlation between Articles 800, 820, 830 and the new Article 840. See my comments on Proposals 16-110, -236 and -299.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-326 Log #558 NEC-P16 **Final Action: Accept (840.3(D))**

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise 840.3(D) as follows: "**(D) Output Circuits.** As appropriate for the services provided, the output circuits derived from the ~~network interface unit~~ optical network terminal shall comply with the requirements of the following:" The remaining text is unchanged.
Substantiation: The first sentence refers to the "network interface unit"; it should refer to the "optical network terminal".
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

16-327 Log #549 NEC-P16 **Final Action: Accept**
(840.47(B))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise 840.47(B) as follows: "(B) **Direct-Buried Cables and Raceways.** Direct-buried ~~premises-powered broadband communications~~ optical fiber cables with a non-current carrying metallic member shall be separated by at least 300 mm (12 in.) from conductors of any light, power, non–power-limited fire alarm circuit conductors or Class 1 circuit.
Substantiation: Revise editorially to be consistent with the title of 840.47 and section 840.47(A).
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-328 Log #604 NEC-P16 **Final Action: Reject**
(840.48)

TCC Action: The Technical Correlating Committee directs this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

The Technical Correlating Committee notes that the wording accepted in Proposal 16-349 remains because deletion of the reference to 770.48 would create a correlation issue resulting in unlisted cables entering a building without an installation application.

Submitter: William J. McCoy, Telco Sales, Inc.
Comment on Proposal No: 16-349
Recommendation: Revise text as follows:

~~Section 770.48 shall apply.~~

Conductive and Nonconductive Cables. Unlisted conductive and nonconductive outside plant optical fiber cables shall be installed up to 15 m (50 ft) from the point of entrance to its termination in compliance with any of the following articles in Chapter 3: Article 342, Intermediate Metal Conduit: Type IMC; Article 344, Rigid Metal Conduit: Type RMC; Article 352, Rigid Polyvinyl Chloride Conduit: Type PVC; and Article 358, Electrical Metallic Tubing: Type EMT.

Section 770.48(B) shall apply.

FPN No. 1: Splice cases or terminal boxes both metallic and plastic types, typically are used as enclosures for splicing or terminating optical fiber cables.

FPN No. 2: See 770.2 for the definition of Point of Entrance.

Substantiation: The 50 feet exemption to install unlisted optical fiber cable past the point of entrance outlined in 770.48 has proved not to be a liability as a source of fire in communications installation when installed in vaults or rooms containing communications type equipment that meet NEBS requirements and/or has a fire suppression system. However, a number of installations for premises-powered equipment involve unlisted conductive and/or non-conductive optical fiber cable being run from the outside and installed up to 50 feet in environments, such as garages, where flammable items are stored and in some cases come in contact with the unlisted cable.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 7 Negative: 8
Ballot Not Returned: 1 Esemplare, R.
Explanation of Negative:

BRUNSSEN, J.: Acceptance of the comment would require all unlisted conductive and non-conductive optical fiber cables to be installed in conduit, thus conflicting with the '50-foot rule' contained in Articles 770, 800, 820 and 830. Non-conductive optical fiber cable is not susceptible to lightning and power influences and hence, is not likely to pose an electrical safety hazard or initiate a fire. The submitter has not adequately substantiated such a change to a rule that has been applied safely and effectively to communications entrance cables for many decades. Further, the comment would permit the use of rigid PVC conduit and electrical metallic tubing (EMT) not currently permitted in Article 770 and the other articles of Chapter 8. This is a significant technical revision that has not been adequately substantiated.

DORNA, G.: The definition of point of entrance in 770.2, 800.2, 820.2 and 830.2 treats outside plant cables run in grounded rigid metal conduit (Type RMC) or intermediate metal conduit (Type IMC) as outside the building. Comment 16-328 effectively extends the point of entrance by permitting the outside plant cables to be run in rigid polyvinyl chloride conduit and electrical metallic tubing.

Section 770.48 permits unlisted nonconductive, but not conductive, optical fiber cables to be run in rigid polyvinyl chloride conduit and electrical metallic tubing. The reason for the different treatment of conductive and nonconductive outside plant entrance cables is that a conductive cable may become accidentally energized and rigid metal conduit and intermediate metal conduit were considered to be adequate to carry a fault current to ground.

If comment 16-328 is accepted, unlisted conductive optical fiber cables will be permitted to be run in rigid polyvinyl chloride conduit and electrical metallic tubing, a significant change that has not been substantiated.

FUNKE, D.: Data provided was insufficient to substantiate a significant safety issue that would require this additional installation restriction.

GUBISCH, R.: There is insufficient substantiation for the need for the changes.

IVANS, R.: Although there might be some merit in revisiting the "50 foot exemption rule" with respect to how installation practices might have changed over the years, more study is required to make sure onerous requirements are not imposed that do not contribute to the level of safety of these installations. This proposal should be rejected based on the following points:

-This is completely new technical material. Although the new Article 840 was widely discussed, this topic, which substantially changes the requirement, was not part of the original proposal or in the report on proposals for the new article.

-No technical substantiation has been provided.

-There have been no reports of problems identified even though permitting outside plant cable to run 50 feet inside of a building has been permitted in Chapter 8 Articles and Article 770 for many years.

-The substantiation refers to potential issues with cables installed in garages, etc. but the proposal does not limit the new requirements to these installations. The other articles that permit outside plant cable to run up to 50 feet inside premises do not restrict the location of the installed cable.

-Adding this requirement to the new article would cause it not to be aligned with other articles where similar cable installation practices are permitted.

-The proposal is incomplete as it does not reference 770.154(C) which limits these installation methods only to locations other than plenums, risers, etc.

JANIKOWSKI, R.: No substantiation was provided to require non-conductive fiber optic cables be installed in a raceway in garages.

JOHNSON, S.: This comment presents new material and would impose additional requirements that have not had public review during the proposal period. Accepting this comment would adopt inconsistent requirements in Article 840 compared to Articles 770, 800, 820, and 830. Further, the text is in conflict with the definition of "point of entrance". The comment talks about allowing unlisted optical fiber cables to be installed beyond the "point of entrance" if said cables are within conduit. One definition of point of entrance is the point where the cable exits the conduit. This comment adds confusion to the requirement.

PIRKLE, W.: Commercial installations normally have a protective raceway to protect this cable. Residential installations in Article 300 list several installation methods to protect this cable from damage.

16-329 Log #2150 NEC-P16 **Final Action: Accept in Principle**
(840.101)

Submitter: Randolph J. Ivans, Underwriters Laboratories Inc.
Comment on Proposal No: 16-349
Recommendation: Agree with the panel decision to accept in principle.

Revise text to read as follows:

840.101 Premises Circuits Not Leaving the Building. Where the ONT is served by a nonconductive optical fiber cable, or where any non-current carrying metallic member is interrupted by an insulating joint or equivalent device, and circuits that terminate at the ONT and are completely contained within the building (i.e., do not exit the building), 840.101 (A) ~~or~~ and (B) ~~or~~ and (C) shall apply as applicable.

(A) The shield of coaxial cable shall be grounded by one of the following:

(1) Any of the methods described in 820.100 or 820.106.

(2) A fixed connection ~~when using~~ to an equipment grounding conductor as described in 250.118. ~~Use of the equipment grounding conductor to ground the ONT shall not require additional grounding of the coaxial cable shield.~~

(3) Connection to the ONT grounding terminal provided that the terminal is connected to ground by one of the methods described in 800.100 or 800.106, or to an equipment grounding conductor through a listed grounding device that will retain the ground connection if the ONT is unplugged.

(B) Communications circuits shall not be required to be grounded.

(C) The ONT shall not be required to be grounded unless required by its listing. ~~Where grounding is required, connecting to an equipment grounding conductor through a listed grounding device that will retain the ground connection if the ONT is unplugged shall be permitted.~~ If the coaxial cable shield is separately grounded as ~~permitted~~ described in 840.101(A)(1) or 840.101(A)(2), the use of a cord and plug for the connection to the ONT grounding connection shall be permitted.

FPN No. 1. Where required to be grounded, a listed device that extends the equipment grounding conductor from the receptacle to the ONT equipment grounding terminal is permitted. Sizing of the extended equipment grounding conductor is covered in Table 250.122.

Substantiation: 1. Opening Paragraph - The paragraph covers the grounding of the shield, communications circuits and the ONT separately. It is therefore necessary to say A and B and C, as applicable. You need to consider grounding (or not) of each of the three items. For example, it would not be appropriate to just not ground a communications circuit, as just applying (B) would permit.

2. In (A)(2), since it is an option, "when using" is not needed. I also struck out "Use of the equipment grounding conductor to ground the ONT shall not require additional grounding of the coaxial cable shield." since this can be

misinterpreted to mean that if I ground the ONT per (C) then I don't need to do anything else. This isn't quite true, especially if the ONT is only grounded via a plug. (C) currently states that permanent grounding is permitted but not required for the ONT.

3. I added (A)(3) which permits the coax shield to be grounded through the ONT ground as long as the ONT ground is permanent. I should point out that a "listed grounding device" can be a specialty device that provides a permanent ground connection to an outlet but can also be a listed grounding clamp, terminal, etc. depending on the installation. "Permitted" is appropriate here since it is one of several alternatives required by "shall be grounded by one of the following" in (A).

4. (C) has been rewritten to only cover the ONT. Since permanent grounding of the coax shield is covered in the proposal by (A), I struck out the wording on the permanent ground connection here. I changed "permitted" to "required" since the permanent grounding of the shield is required by (A) and clarified that this only applies when the shield is grounded separately from the ONT. The last "permitted" is OK since you can ground the shield separately and also permanently ground the ONT if you want to (but don't have to!).

Panel Meeting Action: Accept in Principle

Revise submitter's text for (A)(3) as follows:

"…by one of the methods described in ~~800.100~~ 820.100 or ~~800.106,~~ 820.106 or to an equipment…".

Panel Statement: Article 820 is the appropriate reference for coaxial cable.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-330 Log #559 NEC-P16 **Final Action: Accept in Principle (840.101(A))**

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise 840.101(A) as follows: "**(A) Grounding of the Coaxial Cable Shield.** The shield of coaxial cable shall be grounded by one of the following:" [Note: Staff has already incorporated similar text in the draft.]
Substantiation: A title is required per the NEC Style Manual.
Panel Meeting Action: Accept in Principle

Revise Title to read as follows:

(A) Coaxial Cable Shield Grounding.

Panel Statement: The revision eliminates an unnecessary preposition. This comment changes the title.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-331 Log #560 NEC-P16 **Final Action: Accept in Principle (840.101(B))**

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise 840.101(B) as follows: "**(B) Grounding of Communications Circuits.** Communications circuits shall not be required to be grounded." [Note: Staff has already incorporated similar text in the draft.]
Substantiation: A title is required per the NEC Style Manual.
Panel Meeting Action: Accept in Principle

Revise Title to read as follows:

(B) Communications Circuit Grounding.

Panel Statement: The revision eliminates an unnecessary preposition. This comment changes the title.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-332 Log #561 NEC-P16 **Final Action: Accept in Principle (840.101(C))**

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise 840.101(C) as follows: "**(C) Grounding of The ONT.** The ONT shall not be required to be grounded unless required by its listing." The remaining text is unchanged. [Note: Staff has already incorporated similar text in the draft.]
Substantiation: A title is required per the NEC Style Manual.
Panel Meeting Action: Accept in Principle

Revise Title to read as follows:

"(C) ONT Grounding."

Panel Statement: The revision eliminates an unnecessary preposition. This comment changes the title.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-333 Log #562 NEC-P16 **Final Action: Accept (840.101(C), FPN)**

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise 840.101(C) FPN as follows: "~~FPN No. 1.~~ Informational Note: Where required to be grounded, a listed device …". The remaining text is unchanged. [Note: Staff has already incorporated the revision in the draft.]
Substantiation: "FPN" has been replaced by "Informational Note". There is only one note, hence no need to number.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-334 Log #1906 NEC-P16 **Final Action: Accept in Principle in Part (840.106(A) and (B))**

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 16-349
Recommendation: Revise text to read as follows:

840.106 Grounding and Bonding at Mobile Homes.

(A) Grounding. Grounding shall comply with (1) and (2).

(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the ONT, if required to be grounded, shall be connected to a grounding electrode ~~conductor~~ in accordance with 840.100. Premises communications circuits and premises community antenna television (CATV) circuits shall be grounded in accordance with 840.93.

(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, ONT, if required to be grounded, shall be connected to a grounding electrode ~~conductor~~ in accordance with 840.100. Premises communications circuits and premises community antenna television (CATV) circuits shall be grounded in accordance with 840.93.

(B) Bonding. The ONT grounding terminal or grounding electrode shall be connected to the metal frame or available grounding terminal of the mobile home with a copper grounding electrode conductor not smaller than 12 AWG under any of the following conditions:

(1) Where there is no mobile home service equipment or disconnecting means as in 840.106(A).

(2) Where the mobile home is supplied by cord and plug.

Substantiation: This comment responds to the action of CMP-5 to delete the definition of the term "grounding conductor" in Article 100 and revise the definition of the term "grounding electrode conductor" to include functions necessary in the Chapter 8 articles. As contained in the 2008 edition of the NEC, two different definitions that apply to the same component in the grounding scheme are unnecessary and can lead to confusion. Conductors that connect equipment to the earth through a grounding electrode should be identified as "grounding electrode conductors." This revision is made to provide consistency and correlation with defined grounding and bonding terms in Article 100 and not result in the use of an orphaned undefined term in Article 840.

These comments address the changes suggested in other proposals for Chapter 8 articles for each section within Article 840 where the term "grounding conductor" is used. These comments are developed using the 2011 ROP draft text so the initial work of CMP-16 remains undisturbed. As suggested in the proposal, this comment replaces the term "grounding conductor" with "grounding electrode conductor", or, if more appropriate, with the term "bonding jumper" or "bonding conductor" in each specific section where the term "grounding conductor" is used. The revisions to each section improve clarity, maintain their meaning, and are consistent with the definitions in Article 100 as revised.

Other editorial changes are included to improve the syntax but intend to maintain the existing meaning without introducing a new concept.

Those from CMP-5 who voted in favor of this Comment were Paul Dobrowsky, Phil Simmons and Dave Williams. Those representing CMP-16 on the Task Group who voted against the Comment were Jim Brunssen, Randy Ivans and Steve Johnson. Since this Comment did not pass ballot of the Task Group, it is endorsed by only the CMP-5 members of the Task Group.

Panel Meeting Action: Accept in Principle in Part

Revise text to read as follows:

840.106 Grounding and Bonding at Mobile Homes.

(A) Grounding. Grounding shall comply with (1) and (2).

(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the ONT, if required to be grounded, shall be connected to a grounding electrode ~~conductor~~ in accordance with 840.100. Premises communications circuits and premises community

antenna television (CATV) circuits shall be grounded in accordance with 840.93.
(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, ONT, if required to be grounded, shall be connected to a grounding electrode ~~conductor~~ in accordance with 840.100. Premises communications circuits and premises community antenna television (CATV) circuits shall be grounded in accordance with 840.93.
(B) Bonding. The ONT grounding terminal or grounding electrode shall be connected to the metal frame or available grounding terminal of the mobile home with a copper ~~grounding electrode~~ conductor not smaller than 12 AWG under any of the following conditions:
(1) Where there is no mobile home service equipment or disconnecting means as in 840.106(A).
(2) Where the mobile home is supplied by cord and plug.
Panel Statement: The panel accepts the submitter's text for 840.106(A).
The suggested change to 840.106(B) is inappropriate as it is not a connection to a grounding electrode that is being discussed, but a bond to the metal frame of the mobile home.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
BRUNSSEN, J.: Editorially insert "the" before "ONT" in 840.106(A)(2).
OHDE, H.: See our affirmative comment for Comment 16-22.

16-335 Log #2444 NEC-P16 **Final Action: Accept in Principle**
(840.106(A) and (B))

Submitter: Keith Lofland, IAEI
Comment on Proposal No: 16-349
Recommendation: Revise text to read as follows:
820.106 Grounding and Bonding at Mobile Homes.
(A) Grounding. Grounding shall comply with (1) and (2).
(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the ONT, if required to be grounded, shall be connected to a grounding electrode ~~conductor~~ in accordance with 840.100. Premises communications circuits and premises community antenna television (CATV) circuits shall be grounded in accordance with 840.93.
(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, ONT, if required to be grounded, shall be connected to a grounding electrode ~~conductor~~ in accordance with 840.100. Premises communications circuits and premises community antenna television (CATV) circuits shall be grounded in accordance with 840.93.
(B) Bonding. The ONT grounding terminal or grounding electrode shall be connected to the metal frame or available grounding terminal of the mobile home with a copper grounding electrode conductor not smaller than 12 AWG under any of the following conditions:
(1) Where there is no mobile home service equipment or disconnecting means as in 840.106(A).
(2) Where the mobile home is supplied by cord and plug.
Substantiation: Proposals have been submitted and at current, have been accepted to delete the term "grounding conductor" in Article 100. This proposal and comment for revision should be accepted by CMP-16 to complete the work of the Tack Group from CMP-5 and CMP-16.
From a teaching or instruction standpoint, it is critical to get students of the NEC to use proper terminology. For the sake of the entire student body, the instructor cannot allow a student to call a concrete-encased electrode a "Ufer" ground or refer to nonmetallic-sheathed cable as "romex". For the NEC to use incomplete or inadequate terms such as "grounding conductor" is equally if not more damaging to the learning environment.
Panel Meeting Action: Accept in Principle
Panel Statement: See action and statement on Comment 16-334.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.
Comment on Affirmative:
OHDE, H.: See our affirmative comment for Comment 16-22.

16-336 Log #563 NEC-P16 **Final Action: Reject**
(840.106(A)(1))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise the last sentence of 840.106(A)(1) as follows:
"Premises communications circuits and premises community antenna television (CATV) circuits shall be grounded or interrupted in accordance with 840.93."
Substantiation: Revise to include interruption. 840.93 permits grounding or interruption.
Panel Meeting Action: Reject
Panel Statement: The panel does not accept the submitter's text. Grounding is required; interruption is not an option.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-337 Log #564 NEC-P16 **Final Action: Accept**
(840.106(A)(2))

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise as follows: "(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the ONT, if required to be grounded, shall be connected to a grounding conductor in accordance with ~~840.100(B)(3)~~800.100(B)(3). Premises communications circuits and premises community antenna television (CATV) circuits shall be grounded in accordance with 840.93."
Substantiation: This section refers to 840.100(B)(3) that was deleted by the Panel and is an invalid reference. Under the conditions of 840.106(A)(2), grounding according to 800.100 (B)(3) is appropriate. Grammatically add the article "the" before "ONT".
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-338 Log #565 NEC-P16 **Final Action: Accept**
(840.133)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 16-349
Recommendation: Revise as follows: "**840.133 Installation of Optical Fibers and Electrical Conductors Associated with Premises-Powered Broadband Communications Systems.**
Substantiation: Revise editorially for correlation with 770.133 and the title of Article 840.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

16-339 Log #2146 NEC-P16 **Final Action: Accept**
(840.170(D))

Submitter: Randolph J. Ivans, Underwriters Laboratories Inc.
Comment on Proposal No: 16-349
Recommendation: Agree with the panel decision to accept in principle.
Revise text to read as follows:
(D) Premises Community Antenna Television (CATV) Circuits. Premises community antenna television (CATV) coaxial cables connecting to the ONT shall be listed in accordance with 820.179. Applicable grounding means shall be listed for application with premises-powered broadband communications systems.
Substantiation: Paragraph 840.101(A) requires grounding of the coaxial shield. Grounding methods described in 840.101(A)(1) and 840.101(A)(2) do not require the grounding connection to be made via the ONT. Currently paragraph 840.170(A) requires the ONT grounding means to be listed but this does not necessarily automatically extend to grounding means not associated directly with the ONT. This proposal clarifies the requirement for listing.
Listed devices are readily available and certified under categories such as "Communication Grounding and Bonding Equipment" and "Grounding and Bonding Equipment". The basic standard used to investigate products in these categories is ANSI/UL 467, "Grounding and Bonding Equipment."
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Esemplare, R.

ARTICLE 862

16-340 Log #1213 NEC-P16 **Final Action: Reject**
(862 (New))

Submitter: David H. Kendall, Thomas & Betts Corporation
Comment on Proposal No: 16-350
Recommendation: This proposal should been Accepted.
Substantiation: This proposal and the associated proposals for the new raceway article should have been accepted or accepted in principle. A Panel action to correct the acronym "OFCR" and to revise the definition to remove the reference to a "corrugated raceway of circular cross section" could have been easily completed by Panel 16.

I recommend that the Panel Action for this comment be "Hold for Further Study". I also recommend that a NFPA Task Group consisting of Panel Members from Panels 3, 8 and 16 be assembled to address the new raceway article for the 2014 NEC.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided text to address the issues in the panel reject statement in the ROP. The panel has taken steps to reduce the proliferation of raceway types by eliminating CATV raceways to correlate with NFPA 90A, which only recognizes optical fiber and communications raceways.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

CHAPTER 9 TABLES

6-83 Log #566 NEC-P06 **Final Action: Accept**
(Chapter 9, Table Notes)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 6-177
Recommendation: Accept the proposal in principle in part. Accept the part that adds optical fiber cables to Note 5. Revise Note 5 as follows: "(5) For conductors not included in Chapter 9 such as multi-conductor cables and optical fiber cables, the actual dimensions shall be used.
Substantiation: Presently Chapter 9 Table Note (5) only addresses conductors. Optical fiber cables are not considered conductors. Acceptance in Principal in Part of Proposal 6-177 would include optical fiber cables. Inclusion of optical fiber cables in note 5 will bring about correlation with section 770.110 of the current edition of the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-84 Log #576 NEC-P06 **Final Action: Accept**
(Chapter 9, Tables)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 6-181
Recommendation: Accept new text as originally submitted.
Substantiation: Dimensions for Types RHH, RHW, or USE were obtained from industry sources. Bare conductor dimensions are from UL 1581 standard. UL does not specify insulated conductor dimensions, only wall thicknesses.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

8-128 Log #567 NEC-P08 **Final Action: Accept**
(Chapter 9, Table Notes)

Submitter: James E. Brunssen, Telecordia Technologies Inc. / Rep. Alliance for Communications Industry Solutions (ATIS)
Comment on Proposal No: 8-278
Recommendation: Accept the proposal in principle in part. Accept the part that adds optical fiber cables to Note 5. Revise Note 5 as follows:
"(5) For conductors not included in Chapter 9 such as multiconductor cables and optical fiber cables, the actual dimensions shall be used."
Substantiation: Presently, Chapter 9 Table Note (5) only addresses conductors. Optical fiber cables are not considered conductors. Acceptance in Principal in Part of Proposal 8-278 would include optical fiber cables. Inclusion of optical fiber cables in note 5 will bring about correlation with section 770.110 of the current edition of the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

6-85 Log #23 NEC-P06 **Final Action: Accept in Part**
(Chapter 9, Table Notes)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 6-177
Recommendation: Accept the proposed changes in Note 5.
Substantiation: Acceptance of the inclusion of optical fiber cables in note 5 will bring about correlation with section 770.110 of the current edition of the NEC. The last sentence of 770.110 states "Where nonconductive optical fiber cables are installed with electric conductors in a raceway, the raceway fill tables of Chapter 3 and Chapter 9 shall apply."

See also proposal 16-47 which reorganizes section 770.110. Panel 16 action on proposal 16-47 retains the reference to Chapter 9 in 770.110(B)(1) and 770.110(B)(2).
Panel Meeting Action: Accept in Part

See panel action on Comment 6-83.
Panel Statement: The Panel agrees with the inclusion of optical fiber cables in note 5 as recommended in the proposal see panel action on Comment 6-83.

The panel rejects adding the language "flexible cords and cable".

No technical substantiation was provided for the rejected change. There is no evidence that there is a problem or confusion with the current code text.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

8-129 Log #24 NEC-P08 **Final Action: Accept in Part**
(Chapter 9, Table Notes)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 8-278
Recommendation: Accept the proposed changes in Note 5.
Substantiation: Acceptance of the inclusion of optical fiber cables in note 5 will bring about correlation with section 770.110 of the current edition of the NEC. The last sentence of 770.110 states "Where nonconductive optical fiber cables are installed with electric conductors in a raceway, the raceway fill tables of Chapter 3 and Chapter 9 shall apply."

See also proposal 16-47 which reorganizes section 770.110. Panel 16 action on proposal 16-47 retains the reference to Chapter 9 in 770.110(B)(1) and 770.110(B)(2).
Panel Meeting Action: Accept in Part
Panel Statement: See panel action on Comment 8-128. CMP 8 accepts the addition of "and optical fiber cables," and continues to reject the rest of Proposal 8-278.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

1-151 Log #2386 NEC-P01 **Final Action: Accept in Principle**
(Chapter 9, Tables 13(A) and 13(B))

Submitter: Michael A. Anthony, University of Michigan / Rep. APPA.ORG - Association of Education Facility Executives
Comment on Proposal No: 1-274
Recommendation: Accept in Principle. Place this material in a new informational Annex X. A correlating change to Section 110.5 ought to be considered also::

110.5 Conductors. Conductors normally used to carry current shall be of copper unless otherwise provided in this Code. Where the conductor material is not specified, the material and the sizes given in this Code shall apply to copper **or aluminum** conductors. Where other materials are used, the size shall be changed accordingly.
Substantiation: Assuming that the submitter will return in the ROC with UL and CEC with data that lines up accurately and can be formatted according to the NEC Style Manual, let us consider the committee's basis for rejection:.

The panel claims, "The addition of these tightening torque values to the NEC has not been technically substantiated." It is noteworthy that "technical substantiation" is, itself, unsubstantiated, as shown in Section 4.4.3 of the NFPA Regulations Governing Committee Projects.

4.3.3 Content of Proposals. Each Proposal shall be submitted to the Council Secretary and shall include the following:

(a) Identification of the submitter and his or her affiliation (i.e., TC, organization, company), where appropriate

(b) Identification of the Document, edition of the Document, and paragraph of the Document to which the Proposal is directed

(c) Proposed text of the Proposal, including the wording to be added, revised (and how revised), or deleted

(d) Statement of the problem and substantiation for Proposal

(e) The signature of the submitter or other means of authentication approved by the Council Secretary

(f) Two copies of any document(s) (other than an NFPA document) being proposed as a reference standard or publication (see 3.3.7)

The significance of torque-tightening ought to be intuitively obvious. The

Fine Print Note at the end of 110.14 reflects this; reproduced below for the convenience of the Panel.

FPN: Many terminations and equipment are marked with a tightening torque.

Elsewhere, the word torque shows up in NFPA 70B twelve times. To its credit, the Committee gave the submitter a prescription for how this proposal might be rehabilitated and re-submitted in the ROC to increase its chances of eventual integration into the 2011 NEC. There is a strong tailwind in the electrical construction market that needs this change in the NEC now.

Panel Meeting Action: Accept in Principle

See the panel action on Comment 1-152.

Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

6-86 Log #2460 NEC-P06 **Final Action: Reject**
(Chapter 9, Table 5)

Submitter: Edward Walton, WC Services

Comment on Proposal No: 6-179

Recommendation: In response to the panel statement:

1. Revise Table 5 Note to read *Types RHH, RHW and RHW-2 with composite insulation.

2, Insert in the appropriate location of Chapter 9, Table 5 the corrected dimensions for Types RHH*, RHW* and RHW-2* as shown in the table I have provided.

See Chapter 9, Table 5 on Page 665

Substantiation: 1. Conforms with the UL 44 description consisting of an inner and outer layer as shown in UL 44 Table 15 that I have provided.

2. I have also provided a UL Table which contains the corrected diameters and areas for Types RHH, RHW and RHW-2 with composite insulation.

It should be noted that these conductor types require an insulation per Table 15 plus an outer jacket per Table 21 or a composite insulation, but are not approved as an insulation without an outer jacket.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided a specific instruction or complete tables including the retention of the existing conductors without outer jacket. Furthermore, the panel disagrees with the submitters substantiation "It should be noted that these conductor types require an insulation per Table 15 plus an outer jacket per Table 21 or a composite insulation, but are not approved as an insulation without an outer jacket." RHH, RHW, and RHW-2 conductors can be approved as an insulation without an outer jacket.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-87 Log #1019 NEC-P06 **Final Action: Reject**
(Chapter 9, Table 5)

Submitter: John Stuckwisch, Barth Electric / Rep. IEJATC Local 481

Comment on Proposal No: 6-178

Recommendation: To the members of Code-Making Panels 6 and 8 concerning: Proposal 6-178, Log 2554, NEC-P-06 and Proposal 8-282, Log 2554a, NEC-P-08.

Substantiation: There is an error in Annex C for #10 THW conductors. This error has been in the NEC since the 2002 edition when Chapter, 9 Table 5 was condensed. The approximate area of fill for one #10 THW conductor was changed from.0333 in.^{2} to its current 0.0243 in.^{2} (Chapter 9, Table 5 of the 2008 NEC) without making a change to Annex C. (See the paperwork I have provided).

For example: If I needed to find out how many #10 THW conductors will be allowed at 40% fill in a 1 1/4 in. EMT conduit, I would go to Chapter 9, Table 4 and find the area is 0.598 in.^{2}. Dividing 0.598 in.^{2} (40% fill) by 0.0243 in.^{2} (area of a single #10 THW) equals 24 conductors in a 1 1/4 EMT conduit. The Annex C, Table C.1 answer is 18.

Another example: If I needed to find out how many #10 THW conductors will be allowed at 40% fill in a 2 in. Schedule 40 PVC conduit, I would go to Chapter 9, Table 4 and find the area is 1.316 in.^{2}. Dividing 1.316 in.^{2} (40% fill) by 0.0243 in.^{2} (area of a single #10 THW) equals 54 conductors in a 2 in. PVC conduit. The Annex C, Table C.10 answer is 39.

A final example: If I needed to find out how many #10 THW conductors will be allowed at 40% fill in a 3 1/2 in. rigid metal conduit, I would go to Chapter 9, Table 4 and find the area is 1.316 in.^{2}. Dividing 4.004 in.^{2} (40% fill) by 0.243 in.^{2} (area of a single #10 THW) equals 164 conductors in a 3 1/2 in. rigid metal conduit. The Annex C, Table C.8 answer is 120.

All of these examples were calculated and checked using a current 2008 NEC code book.

There are two possible solutions to this problem, either modify Annex C (I have provided examples with corrected numbers), or change the Chapter 9, Table 5 value of #10 THW back to its 1999 NEC value of 0.0333 in.^{2}. I have provided copies of the 1999, 2002 (with 10 THW double listed), 2005, and 2008 Chapter 9, Table 5 areas highlighted. Cod- Making Panel 6 has stated that the Chapter 9, Table 5 values for #10 THW are correct. I was unaware of any change to area of 10 THW between the years 1999 and 2002, but if there was, then the second solution may not be valid.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The panel has confirmed that the values in Table 5 of Chapter 9 are correct. The panel has confirmed that a comment has been submitted to Panel 8 to review Annex C.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-88 Log #2742 NEC-P06 **Final Action: Accept**
(Chapter 9, Table 5(A))

Submitter: Christel K. Hunter, Alcan Cable

Comment on Proposal No: 6-181

Recommendation: Accept the submitter's proposal as submitted.

Substantiation: The data submitted by the proposal is reasonably close to industry sources. In each case where it differs from manufacturer's data, it appears that the proposal data is larger.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-89 Log #322 NEC-P06 **Final Action: Accept**
(Chapter 9, Table 8, FPN)

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 8-281

Recommendation: The Technical Correlating Committee refers this proposal to Code-Making Panel 6 for action.

This action will be considered by Code-Making Panel 6 as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel agrees with Panel 8 action on Proposal 8-281.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-90 Log #407 NEC-P06 **Final Action: Accept**
(Chapter 9, Table 8, FPN)

TCC Action: The Technical Correlating Committee notes that Proposal 8-281 was "Accepted" by Code-Making Panel 8, however, it was inadvertently marked as "Reject" as the final action in the Report on Proposals.

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 8-281

Recommendation: Continue to accept the proposal.

Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

CHAPTER 9, TABLE 5

CORRECTED TABLE 5 DIMENSIONS FOR RHH*, RHW*, RHW-2*

			COMPOSITE INSULATION PER UL 44, TABLE 15 (FOR REFERENCE)		**DIMENSIONS FOR RHH*, RHW*, RHW-2***			
TYPE	SIZE	COND DIA	INNER LAYER	OUTER LAYER	APPROXIMATE DIAMETER		APPROXIMATE AREA	
	AWG/kcmil	in.	in.	in.	in.	mm	sq. in.	sq. mm
‘RHH*, RHW*, RHW-2*	14	0.073	0.030	0.015	0.163	4.140	0.0209	13.46
	12	0.092	0.030	0.015	0.182	4.623	0.0260	16.78
	10	0.116	0.030	0.015	0.206	5.233	0.0333	21.50
	8	0.146	0.045	0.015	0.266	6.757	0.0556	35.84
	6	0.184	0.045	0.030	0.334	8.484	0.0876	56.51
	4	0.232	0.045	0.030	0.382	9.703	0.1146	73.92
	3	0.260	0.045	0.030	0.410	10.414	0.1320	85.15
	2	0.292	0.045	0.030	0.442	11.227	0.1534	98.96
	1	0.332	0.055	0.045	0.532	13.513	0.2223	143.37
	1/0	0.372	0.055	0.045	0.572	14.529	0.2570	165.74
	2/0	0.418	0.055	0.045	0.618	15.698	0.3000	193.47
	3/0	0.470	0.055	0.045	0.670	17.019	0.3526	227.40
	4/0	0.528	0.055	0.045	0.728	18.492	0.4162	268.47
	250	0.575	0.065	0.065	0.835	21.210	0.5476	353.19
	300	0.630	0.065	0.065	0.890	22.607	0.6221	401.25
	350	0.681	0.065	0.065	0.941	23.902	0.6955	448.55
	400	0.728	0.065	0.065	0.988	25.096	0.7667	494.48
	500	0.813	0.065	0.065	1.073	27.255	0.9043	583.22
	600	0.893	0.080	0.065	1.183	30.049	1.0992	708.93
	700	0.964	0.080	0.065	1.254	31.853	1.2351	796.58
	750	0.998	0.080	0.065	1.288	32.716	1.3029	840.36
	800	1.030	0.080	0.065	1.320	33.529	1.3685	882.64
	900	1.094	0.080	0.065	1.384	35.155	1.5044	970.30
	1000	1.152	0.080	0.065	1.442	36.628	1.6331	1053.33
	1250	1.289	0.100	0.095	1.679	42.648	2.2141	1428.03
	1500	1.412	0.100	0.095	1.802	45.773	2.5504	1644.92
	1750	1.526	0.100	0.095	1.916	48.668	2.8832	1859.63
	2000	1.632	0.100	0.095	2.022	51.361	3.2111	2071.08

1-152 Log #2733 NEC-P01 **Final Action: Accept**
(Chapter 9, Tables 13(A) and 13(B))

Submitter: Christel K. Hunter, Alcan Cable
Comment on Proposal No: 1-274
Recommendation: Add language and three Recommended Tightening Torque Tables from UL 486 Standard to a new informational Annex as suggested by the Panel in their ROP Comment to read as follows:

Annex I: Recommended Tightening Torque Tables from UL Standard 486A-B

See Tables 21, 22 and 23 on Page 667

In the absence of connector or equipment manufacturer's recommended torque values, the following tables may be used to correctly tighten screw-type connections for power and lighting circuits*. Control and signal circuits may require different torque values and the manufacturer should be contacted for guidance.
Substantiation: Improper electrical connections are a problem for the entire electrical industry. They are the biggest cause of electrical failures. No less than the Super Haldron particle accelerator in Switzerland, costing billions of dollars, has been shut down because of an electrical connection failure.

The addition of Recommended Torque Tightening Tables would help the electrical industry to reduce connection problems, because their inclusion would make proper tightening torque values readily available where not marked on the connector, or equipment, or where the installation instructions no longer accompany the connector. Furthermore, the explicit inclusion in the Code would also make it very clear that torque wrenches are needed to comply with manufacturers' installation instructions for mechanical set screw connectors.

When independent testing laboratories, such as ETL and UL, do load cycling tests on set-screw mechanical connectors, they are installed on test racks with torque wrenches. If electricians without torque wrenches installed the connectors on test racks, the variations in their performance would be unacceptable, which is why installation to very specific tightening torque is mandated.

Theoretically, 110.3(B) already requires that set-screw mechanical connectors be installed to manufacturers recommended torque values, or in their absence default values from UL Standards. However, the reality in the field is that very few electricians have torque wrenches.

Regarding the concern about control circuit conductor terminals of industrial control equipment, they can easily be excluded with the addition of specific language.

Alcan Cable sponsored torque-tightening demonstrations at the recent NJATC National Training Exposition and the NECA Show And even when given the manufacturers' recommended installation torque values. Fifty-seven percent under-tightened by more than 20 percent, and 19 percent over-tightened by more than 20 percent.

This weak link connecting the NEC, UL performance testing and field installation will be improved by the proposed inclusion of Recommended Torque Tightening Tables in the NEC's new informational annex.
Panel Meeting Action: Accept
Panel Statement: The panel notes that the three tables are the copyrighted property of UL, and permission for their usage has been requested and received by NFPA.

The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ANNEX A – PRODUCT SAFETY STANDARDS

1-153 Log #323 NEC-P01 **Final Action: Accept**
(Annex A)

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 14-301
Recommendation: The Technical Correlating Committee directs that this proposal be forwarded to Code-Making Panel 1 for action

This action will be considered by Code-Making panel 1 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel "Accepts in Part" the action taken by Code-Making Panel 14 on Proposal 14-301, with the exception of the following:

Delete the following reference as the second reference in the proposal to this document is the correct reference.
"ISA 12.13.01, Combustible Gas Detectors, Performance Requirements for ANSI/ISA-60079-29-1."
Panel Statement: The panel accepts the directive of the Technical Correlating Committee to review Proposal 14-301.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ANNEX B – APPLICATION INFORMATION FOR AMPACITY CALCULATION

6-91 Log #408 NEC-P06 **Final Action: Accept**
(Figure B310.3, FPN)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-187
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-92 Log #409 NEC-P06 **Final Action: Accept**
(Figure B310.4, FPN)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-190
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11

Table 21 – Tightening torque for screws (Clauses 9.1.9.4 and 9.1.9.6)

Test conductor installed in connector		Tightening torque, N-m (lbf-in)															
		Slotted head No. 10 and larger[a]								Hexagonal head – external drive socket wrench							
		Slot width – 1.2 mm (0.047 in) or less and slot length – 6.4 mm (1/4 in) or less				Slot width – over 1.2 mm (0.047 in) or slot length – over 8.4 mm (1.4 in)				Split-bolt connectors				Other connectors			
AWG or kcmil	(mm²)	A		B		A		B		A		B		A		B	
30 –10	(0.05 – 5.3)	1.7	(15)	2.3	(20)	2.8	(25)	4.0	(35)	7.3	(65)	9.0	(80)	6.8	(60)	8.5	(75)
8	(8.4)	2.3	(20)	2.8	(25)	3.4	(30)	4.5	(40)	7.3	(65)	9.0	(80)	6.8	(60)	8.5	(75)
6 – 4	(13.2 – 21.2)	2.8	(25)	4.0	(35)	4.0	(35)	5.1	(45)	15.3	(135)	18.5	(165)	10.2	(90)	12.4	(110)
3	(26.7)	2.8	(25)	4.0	(35)	4.5	(40)	5.6	(50)	25.4	(225)	31.1	(275)	14.1	(125)	16.9	(150)
2	(33.6)	3.4	(30)	4.5	(40)	4.5	(40)	5.6	(50)	25.4	(225)	31.1	(275)	14.1	(125)	16.9	(150)
1	(42.4)	–		–		4.5	(40)	5.6	(50)	25.4	(225)	31.1	(275)	14.1	(125)	16.9	(150)
1/0 – 2/0	(53.5 – 67.4)	–		–		4.5	(40)	5.6	(50)	35.6	(315)	43.5	(385)	16.9	(150)	20.3	(180)
3/0 – 4/0	(85.0 – 107.2)	–		–		4.5	(40)	5.6	(50)	45.2	(400)	56.5	(500)	22.6	(200)	28.2	(250)
250 – 350	(127 – 177)	–		–		4.5	(40)	5.6	(50)	62.1	(550)	73.4	(650)	28.2	(250)	36.7	(325)
400	(203)	–		–		4.5	(40)	5.6	(50)	76.3	(675)	93.2	(825)	28.2	(250)	36.7	(325)
500	(253)	–		–		4.5	(40)	5.6	(50)	76.3	(675)	93.2	(825)	33.9	(300)	42.4	(375)
600 – 750	(304 – 380)	–		–		4.5	(40)	5.6	(50)	90.4	(800)	113.0	(1000)	33.9	(300)	42.4	(375)
800 – 1000	(405 – 508)	–		–		4.5	(40)	5.6	(50)	111.7	(900)	124.3	(1100)	45.2	(400)	56.5	(500)
1250 – 2000	(635 –1010)	–		–		–		–		111.7	(900)	124.3	(1100)	56.5	(500)	67.8	(600)

[a] For values of slot width or length not corresponding to those specified select the largest torque value associated with the conductor size. Slot width is the nominal design value. Slot length shall be measured at the bottom of the slot.

Table 22 – Tightening torque for slotted head screws smaller than No. 10 intended for use with 8 AWG (8.4 mm²) or smaller conductors (Clauses 9.1.9.4 and 9.1.9.6)

Slot length of screw[a]		Tightening torque, N-m (lbf-in)			
		Slot width of screw smaller than 1.2 mm (0.047 in)[b]		Slot width of screw 1.2 mm (0.047 in) and larger[b]	
mm	(in)	A	B	A	B
Less than 4	(Less than 5/32)	0.68 (6)	0.79 (7)	0.79 (7)	1.0 (9)
4	(5/32)	0.68 (6)	0.79 (7)	1.1 (10)	1.4 (12)
4.8	(3/16)	0.68 (6)	0.79 (7)	1.1 (10)	1.4 (12)
5.5	(7/32)	0.68 (6)	0.79 (7)	1.1 (10)	1.4 (12)
6.4	(1/4)	0.79 (7)	1.0 (9)	1.1 (10)	1.4 (12)
7.1	(9/32)			1.4 (12)	1.7 (15)
Above 7.1	(Above 9/32)			1.8 (15)	2.3 (20)

[a] For slot lengths of intermediate values, select torques pertaining to next shorter slot lengths. Also, see 9.1.9.6 for screws with multiple tightening means. Slot length shall be measured at the bottom of the slot.

[b] Slot width is the nominal design value.

Table 23 – Tightening torque for screws with recessed alien or square drives (Clauses 9.1.9.4 and 9.1.9.6)

Socket width across flats[a]		Tightening torque, N-m (lbf-in)			
mm	(in)	A		B	
3.2	(1/8)	4.0	(35)	5.1	(45)
4.0	(5/32)	9.0	(80)	11.3	(100)
4.8	(3/16)	11.3	(100)	13.5	(120)
5.5	(7/32)	13.5	(120)	16.9	(150)
6.4	(1/4)	16.9	(150)	22.5	(200)
7.9	(5/16)	25.4	(225)	31.1	(275)
9.5	(3/8)	33.9	(300)	42.4	(375)
12.7	(1/2)	45.2	(400)	56.5	(500)
14.3	(9/16)	56.5	(500)	67.8	(600)

[a] See 9.1.9.6 for screws with multiple tightening means.

*For proper termination of conductors, it is very important that field connections be properly tightened. In the absence of manufacturer's instructions on the equipment, the torque values given in these tables are recommended. Because it is normal for some relaxation to occur in service, checking torque values sometime after installation is not a reliable means of determining the values of torque applied at installation.

Ballot Results: Affirmative: 11

6-93 Log #410 NEC-P06 **Final Action: Accept**
(Table B310.5)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-191
Recommendation: The proposal should be accepted in part. Accept the second change from "per" to "in Accordance with" but reject the first change from "per" to "in Each".
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the portion of this proposal that corrects such an instance is to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of the first change in this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-94 Log #411 NEC-P06 **Final Action: Accept**
(Figure B310.5, FPN)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-192
Recommendation: The proposal should be rejected.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the proposals to correct such instances are to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-95 Log #412 NEC-P06 **Final Action: Accept**
(Table B310.6)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-193
Recommendation: The proposal should be accepted in part. Accept the second change from "per" to "in Accordance with" but reject the first change from "per" to "in Each".
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the portion of this proposal that corrects such an instance is to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of the first change in this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-96 Log #413 NEC-P06 **Final Action: Accept**
(Table B310.7)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-194
Recommendation: The proposal should be accepted in part. Accept the second change from "per" to "in Accordance with" but reject the first change from "per" to "in Each".
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the portion of this proposal that corrects such an instance is to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the subject of the first change in this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-97 Log #414 NEC-P06 **Final Action: Accept**
(Table B310.8)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-195
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-98 Log #415 NEC-P06 **Final Action: Accept**
(Table B310.9)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-196
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-99 Log #416 NEC-P06 **Final Action: Accept**
(Table B310.10)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-197
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-100 Log #472 NEC-P06 **Final Action: Accept in Part**
(Table B310.11)

Submitter: Steven R. Terry, Electronic Theatre Controls Inc.
Comment on Proposal No: 6-199
Recommendation: 1. Revise Table Heading Column 1 of the proposal to: Number of Current-Carrying Conductors (See Note 1).
2. Continue to add Note below the table as per the proposal.
Substantiation: Whether or not the change of the table headings for Tables B.310.11 and 310.15(B)(2)(a) in 1993 from "Number of Conductors" to "Number of Current-Carrying Conductors" were accompanied by an associated Proposal or Panel Action does not alter the fact that the change made the table clearer! CMP 6 did us a favor in 1993 with this editorial change! Previous to this change, there was always confusion between the number of physical conductors, and those conductors that are to be used in this Ampacity Adjustment Factor calculation. This proposal actually improves the situation by the addition of Note 1 to remind the reader how to arrive at the number of current carrying conductors. However, the revision of the table heading is obfuscating and confusing, because it conflicts with the section title and requires the reader to follow Note 1 to determine that this particular "Number of Conductors" is not simply that, but rather a "special definition" arrived at by applying the recommendation of Note 1, not what the heading actually says.
This is very confusing, and the Code would be much better with the original column heading, but with the parenthetical reference to the new Note.
Note: I have made an accompanying comment to Proposal 6-57 for Table B.310.15(B)(2)(a).
Panel Meeting Action: Accept in Part
The panel rejects part 1. With the mandatory note below the table, it is clear that all conductors, except in accordance with 310.15(B)(4) and (5), are to be included. The panel accepts Part 2 of the submitters comment.
Panel Statement: The panel continues to accept Part 2 of the comment while rejecting Part 1 of the comment. See panel action and statement on Comment 6-24.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-101 Log #2686 NEC-P06 **Final Action: Accept**
(Table B.310.11)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-199
Recommendation: Accept the panel action in part.
Reject the deletion of the word "total" from the description of the term "N".
Substantiation: The word "total" is a significant help with assisting with general understanding of the point that all potentially current-carrying conductors are counted. It is quite true that upon reflection the "number of conductors that may be current-carrying" does involve the total, but the word should be left to make the point immediately intuitively obvious.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ANNEX C – CONDUIT AND TUBING FILL FOR CONDUCTORS AND FIXTURE WIRES OF THE SAME SIZE

8-130 Log #1019a NEC-P08 **Final Action: Reject**
(Annex C)

TCC Action: The Technical Correlating Committee directs the chair of Code-Making Panel 6 to appoint a Task Group comprised of members from Code-Making Panels 6 and 8 to review Annex C for correlation to evaluate and provide any necessary corrections to tables that pertain to raceway fill for the 2014 edition of the NEC.

Submitter: John Stuckwisch, Barth Electric / Rep. IEJATC Local 481
Comment on Proposal No: 8-282
Recommendation: To the members of Code-Making Panels 6 and 8 concerning: Proposal 6-178, Log 2554, NEC-P-06 and Proposal 8-282, Log 2554a, NEC-P-08.
Substantiation: There is an error in Annex C for #10 THW conductors. This error has been in the NEC since the 2002 edition when Chapter, 9 Table 5 was condensed. The approximate area of fill for one #10 THW conductor was changed from.0333 in.^{2} to its current 0.0243 in.^{2} (Chapter 9, Table 5 of the 2008 NEC) without making a change to Annex C. (See the paperwork I have provided).
For example: If I needed to find out how many #10 THW conductors will be allowed at 40% fill in a 1 1/4 in. EMT conduit, I would go to Chapter 9, Table 4 and find the area is 0.598 in.^{2}. Dividing 0.598 in.^{2} (40% fill) by 0.0243 in.^{2} (area of a single #10 THW) equals 24 conductors in a 1 1/4 EMT conduit. The Annex C, Table C.1 answer is 18.
Another example: If I needed to find out how many #10 THW conductors will be allowed at 40% fill in a 2 in. Schedule 40 PVC conduit, I would go to Chapter 9, Table 4 and find the area is 1.316 in.^{2}. Dividing 1.316 in.^{2} (40% fill) by 0.0243 in.^{2} (area of a single #10 THW) equals 54 conductors in a 2 in. PVC conduit. The Annex C, Table C.10 answer is 39.
A final example: If I needed to find out how many #10 THW conductors will be allowed at 40% fill in a 3 1/2 in. rigid metal conduit, I would go to Chapter 9, Table 4 and find the area is 1.316 in.^{2}. Dividing 4.004 in.^{2} (40% fill) by 0.243 in.^{2} (area of a single #10 THW) equals 164 conductors in a 3 1/2 in. rigid metal conduit. The Annex C, Table C.8 answer is 120.
All of these examples were calculated and checked using a current 2008 NEC code book.
There are two possible solutions to this problem, either modify Annex C (I have provided examples with corrected numbers), or change the Chapter 9, Table 5 value of #10 THW back to its 1999 NEC value of 0.0333 in.^{2}. I have provided copies of the 1999, 2002 (with 10 THW double listed), 2005, and 2008 Chapter 9, Table 5 areas highlighted. Cod- Making Panel 6 has stated that the Chapter 9, Table 5 values for #10 THW are correct. I was unaware of any change to area of 10 THW between the years 1999 and 2002, but if there was, then the second solution may not be valid.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: This comment does not comply with Section 4.4.5 of the NFPA Regulations Governing Committee Projects in that it does not provide text of the comment, including the wording to be added, revised (and how revised), or deleted.
Per the panel action and statement on Proposal 6-178, CMP 6 states that the dimension for 10 AWG THW in Chapter 9, Table 5 is correct. The new numbers of conductors for Annex C seem correct however, the new values require public review before publication. Informational Annexes are not mandatory.
CMP 8 recommends a task group be formed comprised of CMP 6 and CMP 8 members to review for accuracy the tables in Informational Annex C.
CMP 8 understands that a change in conductor type THW insulation thickness occurred in the 2002 code cycle, and CMP 8 at that time rejected a proposal to revise annex C for this conductor type based on products manufactured prior to the effective date were still being installed.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Griffith, M.

2-189 Log #2687 NEC-P02 **Final Action: Accept in Principle**
(Annex A through H)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-372
Recommendation: Correct the title of Annex C in the proposal wording to say "…Conductors and Fixtures Wires…".
Substantiation: This Annex was not retitled. A proposal to substitute luminaire wires for fixture wires in Article 402 (Proposal 6-172) failed, as it should have failed, and this annex title should not be changed.

Panel Meeting Action: Accept in Principle
Panel Statement: The panel agrees with the submitter; however, this is a staff responsibility.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ANNEX D − EXAMPLES

2-190 Log #417 NEC-P02 **Final Action: Accept**
(Example D.1(a))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-374
Recommendation: The Proposal should continue to be accepted.
Substantiation: Although the use of the word "per" in this context does not violate the NEC Style Manual, its use in this context where the other units are abbreviated is appropriate. The context is a formula, and the multiplication of terms (ft^2 by VA/ft^2) is more easily understood by a reader as leading to the correct unit (VA). This comment is offered in distinction to others by this submitter opposing the withdrawal of the term "per" so as to help clarify when this change would be editorially correct. It may be well advised, however, to await any advice from the Glossary of Terms Committee before making any such changes.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-191 Log #2756 NEC-P02 **Final Action: Accept**
(Example D.1(a))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-373
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-192 Log #418 NEC-P02 **Final Action: Accept**
(Example D.1(b))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-376
Recommendation: The proposal should be accepted in principle and in part. Do not remove the word "per". Accept in principle correcting the reference to a "line", but do so by replacing "line" with "conductor."
Substantiation: All three columns have load totals that reflect some definite current loading on a set of service (or feeder) conductors, and this comment makes the required correction. Of course, the principal focus of the original proposal is to remove "per" from the NEC on the grounds that it does not belong in a standard. That premise is frequently correct, such as when it is used as a slang term for "in accordance with", and in some other cases where a slash mark (meaning division) can be used in a formulaic presentation. However, it is not correct when it is used in the sense of "for each".

The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel." A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-193 Log #419 NEC-P02 **Final Action: Accept**
(Example D.2(a))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-378
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-194 Log #420 NEC-P02 **Final Action: Accept**
(Example D.2(b))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-379
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-195 Log #421 NEC-P02 **Final Action: Accept**
(Example D.3)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-380
Recommendation: The proposal should continue to be accepted.
Substantiation: Although the use of the word "per" in this context does not violate the NEC Style Manual, its use in this context where the other units are abbreviated is appropriate. The context is a formula, and the multiplication of terms (ft^2 by VA/ft^2) is more easily understood by a reader as leading to the correct unit (VA). This comment is offered in distinction to others by this submitter opposing the withdrawal of the term "per" so as to help clarify when this change would be editorially correct. It may be well advised, however, to await any advice from the Glossary of Terms Committee before making any such changes.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-196 Log #719 NEC-P02 **Final Action: Accept**
(Example D.3)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-377
Recommendation: The Proposal should be accepted in principle and "Table 310.16" should be revised to read "Table 310.15(B)(16)".
Substantiation: Panel 6 Accepted in Principal Proposal 6-52 and renumbered Table 310.16 as Table 310.15(B)(16). Acceptance of this Comment will provide correlation.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-197 Log #720 NEC-P02 **Final Action: Accept**
(Example D.3(a))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-382
Recommendation: The Proposal should be Accepted in Principle.

In Ungrounded Feeder Conductors, change "Table 310.16" to "Table 310.15(B)(16)" in six places. In the last paragraph under Feeder Neutral Conductor, change "Table 310.16" to "Table 310.15(B)(16)".
Substantiation: Panel 6 Accepted in Principal Proposal 6-52 and renumbered Table 310.16 as Table 310.15(B)(16). Acceptance of this Comment will provide correlation.
Panel Meeting Action: Accept
Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-198 Log #422 NEC-P02 **Final Action: Accept**
(Example D.4(a))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-386
Recommendation: The proposal should continue to be accepted.
Substantiation: Although the use of the word "per" in the first instance does not violate the NEC Style Manual, its use here where the other units are abbreviated is appropriate. The context is a formula, and the multiplication of terms (ft^2 by VA/ft^2) is more easily understood by a reader as leading to the correct unit (VA). This comment is offered in distinction to others by this submitter opposing the withdrawal of the term "per" so as to help clarify when this change would be editorially correct. The second change is also appropriate because the use of "per" as verbal shorthand for "in accordance with" amounts to slang and should not be in the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-199 Log #2758 NEC-P02 **Final Action: Accept**
(Example D.4(a))

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 2-385
Recommendation: Continue to reject.
Substantiation: The task group agrees with the panel action on this proposal, in addition the concerns of the submitter were addressed by CMP 4 actions during actions on proposals.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-200 Log #721 NEC-P02 **Final Action: Accept**
(Example D.4(a))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-384
Recommendation: The Proposal should be Accepted in Principle.

In the very last line, change "See Table 310.16 through 310.21, and 310.15(B)(2) and (B)(4)" to "See Table 310.15(B)(16) through Table 310.15(B)(21), and 310.15(B)(2), (B)(3) and (B)(5)".
Substantiation: Panel 6 Accepted in Principal Proposal 6-52 and renumbered Table 310.16 through Table 310.21 as Table 310.15(B)(16) through Table 310.15(B)(21).

Panel 6 Accepted Proposal 6-53 which added 310.15(B)(2) and renumbered existing Sections 310.15(B)(2) and 310.15(B)(4) as Sections 310.15(B)(3) and 310.15(B)(5) respectively.

Acceptance of this Comment will provide correlation.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-201 Log #423 NEC-P02 **Final Action: Accept**
(Example D.4(b))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-387
Recommendation: Continue to accept the Proposal.
Substantiation: Although the use of the word "per" in this context does not violate the NEC Style Manual, its use in this context where the other units are abbreviated is appropriate. The context is a formula, and the multiplication of terms (ft^2 by VA/ft^2) is more easily understood by a reader as leading to the correct unit (VA). This comment is offered in distinction to others by this submitter opposing the withdrawal of the term "per" so as to help clarify when this change would be editorially correct. It may be well advised, however, to await any advice from the Glossary of Terms Committee before making any such changes.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-202 Log #424 NEC-P02 **Final Action: Accept**
(Example D.5(a))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-388
Recommendation: The proposal should be accepted in part. Accept the first change that changes "per" to "in accordance with" Reject the reminder of the proposal.
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the first part of this proposal to correct such an instance is to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in cases such as the second and third recommendations of this proposal, the existing use is correct and should not be changed. A majority of the code-making panels have made a similar assessment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-203 Log #425 NEC-P02 **Final Action: Accept**
(Example D.5(b))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-389
Recommendation: The proposal should be accepted in part. Accept the first change that replaces "per" with "in accordance with". Reject the second change that results in "120V/leg".
Substantiation: The preposition "per" in the English language carries the precise meaning of "for each" in the context in which it is used. The use has been consistent for many centuries because it is carried over from Latin. It is not subject to misunderstanding, and there is no substantiation available that it is being misapplied in the field. The NEC Style Manual does not list this word in "Table 3.2.1, Possibly Unenforceable and Vague Terms." Section 3.3.4 of the same document requires that "NEC language shall be brief, clear, and emphatic." Its use in this section and in similar contexts elsewhere is just so. Its use is not proscribed by the NFPA Style Manual and even appears in that manual as an example of properly worded text. Refer to A.2.3.5.2, which cites the following example: "Where joist channels are wider than 0.6 m (2 ft), more than one discharge device shall be required per channel."

There are instances where there are better choices of wording, such as where it is used as a slang expression meaning "in accordance with" and the first part of this proposal to correct such an instance is to be supported. In some instances where used in what is essentially a formula a slash can be substituted, and companion comments have been submitted to support such changes as well. However, in this case it would be confusing and less clear because the remainder of the line uses division symbols that create a flow of text. The slash mark is confusing in this case because it would is a second and differing mathematical symbol also intended to convey the sense of division, but in this case with "leg" in the denominator. This is more confusing to the reader than the simple (and proper) use of the word "per" as in "for each".
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-114 Log #426 NEC-P12 **Final Action: Accept**
(Example D.9(a), (e), and (f))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-185
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-115 Log #427 NEC-P12 **Final Action: Accept**
(Example D.10(b), (c), and (d))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-160
Recommendation: Continue to accept the proposal.
Substantiation: This proposal removes the slang construction that substitutes "per" for "in accordance with" and is correct and enhances clarity. It is therefore to be distinguished from those proposals that would remove a perfectly concise and correct use of the word as a proposition meaning "for each". Comments have been submitted on all such proposals accordingly.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-116 Log #324 NEC-P12 **Final Action: Accept**
(Example D.10(b), (c), and (d))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 11-160
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 12 for Action.
The action will be considered by Code-Making Panel 12 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review Proposal 11-160.
See panel action on Comment 12-115 which accepts the original Proposal 11-160.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

19-219 Log #428 NEC-P19 **Final Action: Reject**
(Example D.11)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-310
Recommendation: Accept the proposal in part. Accept the first change that converts "VA per ft2" to "VA/ft2" and the part of the last change that replaces "50A" with "50-ampere"; continue to reject the other proposed changes.
Substantiation: Although the use of the word "per" in the first instance does not violate the NEC Style Manual, its use here where the other units are abbreviated is appropriate. The context is a formula, and the multiplication of terms (ft by ft by VA/ft2) is more easily understood by a reader as leading to the correct unit (VA). The second change should continue to be rejected for a closely related reason; the ampere value obtained will immediately become the subject of further mathematical calculations, and here again, anything that enhances a reader's understanding of how the cancellation (or non-cancellation) of units can be used to judge the correctness of a final result is to be encouraged. The term "leg is indeed used in other residential examples, including Example D5(a) and D5(b). The conclusion should read "… a 50-ampere supply cord" because the general rules in the Style Manual should be applied here, the point where there are no further calculations to be made.
Panel Meeting Action: Reject
Panel Statement: The panel has rejected this comment to maintain consistency throughout the Code.
The Technical Correlating Committee may want to consider addressing this issue in the next revision of the NEC Style Manual.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-220 Log #1031 NEC-P19 **Final Action: Reject**
(Example D.11)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-310
Recommendation: The Proposal should be Accepted in Part and revise under Lighting and Small-Appliance Load: "Lighting (70 ft × 10 ft × 3 VA/ft^2 ~~VA per ft2~~)"
The remainder of the Proposal should continue to be Rejected.
Substantiation: While the NEC Style Manual does not specifically show VA/ft^2, it does show that cubic feet per minute should be styled as "ft^3/min" and this would be analogous to the proposed "VA/ft^2".
Panel Meeting Action: Reject
Panel Statement: The panel has rejected this comment to maintain consistency throughout the Code.
The Technical Correlating Committee may want to consider addressing this issue in the next revision of the NEC Style Manual.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-221 Log #429 NEC-P19 **Final Action: Reject**
(Example D.12)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-311
Recommendation: Accept the proposal in part. Accept the first change that converts "VA per ft^2" to "VA/ft^2" and the part of the last change that replaces "50A" with "50-ampere"; continue to reject the other proposed changes.
Substantiation: Although the use of the word "per" in the first instance does not violate the NEC Style Manual, its use here where the other units are abbreviated is appropriate. The context is a formula, and the multiplication of terms (ft by ft by VA/ft^2) is more easily understood by a reader as leading to the correct unit (VA). The second change should continue to be rejected for a closely related reason; the ampere value obtained will immediately become the subject of further mathematical calculations, and here again, anything that enhances a reader's understanding of how the cancellation (or non-cancellation) of units can be used to judge the correctness of a final result is to be encouraged. The term "leg is indeed used in other residential examples, including Example D5(a) and D5(b). The conclusion should read "… a 50-ampere supply cord" because the general rules in the Style Manual should be applied here, the point where there are no further calculations to be made.
Panel Meeting Action: Reject
Panel Statement: The panel has rejected this comment to maintain consistency throughout the Code.
The Technical Correlating Committee may want to consider addressing this issue in the next revision of the NEC Style Manual.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-222 Log #1032 NEC-P19 **Final Action: Reject**
(Example D.12)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-311
Recommendation: The Proposal should be Accepted in Part and revise under Lighting and Small-Appliance Load: "Lighting (70 ft × 10 ft × 3 VA/ft^2 ~~VA per ft2~~)"
The remainder of the Proposal should continue to be Rejected.
Substantiation: While the NEC Style Manual does not specifically show VA/ft^2, it does show that cubic feet per minute should be styled as "ft^3/min" and this would be analogous to the proposed "VA/ft^2".
Panel Meeting Action: Reject
Panel Statement: The panel has rejected this comment to maintain consistency throughout the Code.
The Technical Correlating Committee may want to consider addressing this issue in the next revision of the NEC Style Manual.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

ANNEX I

3-249 Log #2851 NEC-P03 **Final Action: Reject**
(Annex I (New))

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 3-340
Recommendation: The panel should accept the proposal and develop the new Annex I.
Substantiation: The panel statement that this "information is valuable for the user of the code, and the user should not have to go back to an annex for this information" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-161.
Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

16-341 Log #2850 NEC-P16 **Final Action: Reject**
(Annex I (New))

Submitter: T David Mills, T. David Mills Associates
Comment on Proposal No: 16-351
Recommendation: The Panel should accept this proposal and develop the new Annex I.
Substantiation: The panel statement that "the FPNs are more user-friendly in current locations" implies that the user in the field actually has access to the referenced testing standards. While this may be true for most FPN's, it does not apply in the case where the FPN only references another standard, which would require the acquisition of the referenced standard anyway. For a user to refer to an annex for testing information does not impede field installation practices. Annex I would only be used for referenced standards, not other FPN information.
The number of fine print notes (FPNs) solely to reference other documents has continued to grow significantly and many are repeated verbatim in several different sections of the Code. This undesirable and user unfriendly situation can be alleviated by forming an informative annex that can be referenced by multiple FPNs without repeating duplicate paragraphs of words.
Panel Meeting Action: Reject
Panel Statement: The panel sees the addition of an Annex as unnecessary.
FPN information is valuable for the user of the Code and the user should not have to go back to an annex to find it.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Esemplare, R.

Errata

NFPA 70®

National Electrical Code® (Report on Proposals)

Proposed 2011 Edition

Reference: **4-263 (Log #4499) Panel Statement**

The National Electrical Code Technical Correlating Committee notes the following error in the ROP on NFPA 70®, *National Electrical Code*®.

1. Proposal 4-263 on page 889 of the ROP has an incorrect panel statement. This proposal recommends a new Article 694. The published panel statement repeated the panel action. Shown below is the panel statement as it should have been published.

Panel Statement:

1. In the definitions, the term "battery" was replaced by "battery or other energy storage device" to allow new devices such as UltraCapacitors to be included.
2. The "Rated Power" definition was revised to recognize that maximum turbine power output can occur at wind speeds of less than 11 m/s.
3. The "Maximum Power" definition was revised – "peak instantaneous" was changed to "instantaneous", "peak" being redundant.
4. The reference to "motor generators" was removed from 694.4(B) to eliminate ambiguity and because motor generators are not used in Small Wind Electric Systems.
5. 694.4(A) was changed to be the same as the language in 690 (indicating that one or more systems are permissible).
6. 694.4(B) was reworded to improve clarity.
7. The location requirement in 694.14(C)(5) (grouping) was moved to 694.14(C)(1) (location) and reworded to improve clarity.
8. The exception to 694.9 was changed to recognize that, unlike PV systems, wind turbine inverters may be designed to backfeed alternators for starting or speed control
9. 694.9(B) was changed to be the same as the new language being proposed for Article 690.
10. The allowance for the use of shorting plugs was moved from 694.16 to 694.15. Shorting switches were also included.
11. 694.31(B) was modified to permit use of flexible cables to allow "ready removal for maintenance and repair", and 694.31(C) was added to mirror dc cable requirements for PV systems.
12. 694.63 was revised to improve clarity. Some of the justification text, including the definition of normal voltage ranges, was moved to an FPN.
13. 694.64 Section changed to refer to Article 705.
14. 694.71(G)(1) was removed as there is no corresponding section 694.41. This was residual text from 690.71.
15. 694.72(B)(2)(1) was changed from turbine to small wind electric system output to cover the more general case.

The panel revised the proposed language to comply with the NEC Style Manual:

16. Definitions were sorted in alphabetical order
17. Optional plurals "(s)" were replaced with normal plurals.
18. The where was changed to when in all cases not referring to location.
19. References to other standards were moved into FPNs.
20. References to entire articles were changed to refer to parts.

21. Small typographical errors were also corrected, and the part numbering was changed from 69x to 694 to reflect the proposed new article number.

Errata

NFPA 70®

National Electrical Code® (Report on Proposals)

Proposed 2011 Edition

Reference: **16-212 (Log #4186) Committee Action**

The National Electrical Code Technical Correlating Committee notes the following error in the ROP on NFPA 70®, *National Electrical Code*®.

1. Proposal 16-212 on page 1114 of the ROP has an incorrect committee action. The published committee action should be Reject. Shown below is the proposal with the committee action as it should have been published.

Report on Proposals – June 2010 **NFPA 70**

16-212 Log #4186 NEC-P16 **Final Action: Reject**
(810)

TCC Action: It was the action of the Technical Correlating Committee that a Task Group be formed including members from Code-Making Panels 5 and 16 to review and make recommendations on revising the use of the phrase "grounding conductor" and revising it to "grounding electrode conductor."
Submitter: Paul Dobrowsky, Holley, NY
Recommendation: Replace the term "grounding conductor" with "grounding electrode conductor" throughout this Article.
Substantiation: The term "Grounding Conductor" is being proposed to be deleted because it is almost identical to the term "grounding electrode conductor". The defined term "grounding electrode conductor" includes the ability of connecting to a point on the grounding electrode system. This has been submitted as a single proposal to the Article instead of numerous proposals to allow the panel to ensure the resulting language still meets their intent in each specific section.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Proposal 16-91.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
JANIKOWSKI, R.: I agree with the submitter that the term "grounding conductor" and "grounding electrode conductor" are all but identical. The term "grounding electrode conductor" will not be mistaken in the field for the grounded conductor and refers to any point on the grounding electrode system.
Comment on Affirmative:
BRUNSSEN, J.: This is a correlation issue with Panel 5. Although the deletion of the term "grounding conductor" is appropriate for articles covered by Panel 5, the term is used over 120 times in Chapter 8 articles covering low power communications circuits and elsewhere in the code. The term "Grounding Conductor" has proven a useful and well understood term within the communications articles and a definition should be retained in Article 100. Substitution of "Grounding Conductor" with "Grounding Electrode Conductor" is not appropriate for all uses in Chapter 8 articles. The definition of "Grounding Conductor" could be modified to make it more specific to communications circuits as follows: "**Grounding Conductor**. A conductor used to connect communications equipment and cable shield, as required, to a grounding electrode system or grounding electrode(s)." This definition would meet the needs of Chapter 8.

Errata

NFPA 70®

National Electrical Code® (Report on Proposals)

Proposed 2011 Edition

Reference: **16-293 (Log #4183) Committee Action**

The National Electrical Code Technical Correlating Committee notes the following error in the ROP on NFPA 70®, *National Electrical Code®*.

1. Proposal 16-293 on page 1139 of the ROP has an incorrect committee action. The published committee action should be Reject. Shown below is the proposal with the committee action as it should have been published.

Report on Proposals – June 2010 **NFPA 70**

16-293 Log #4183 NEC-P16 **Final Action: Reject**
(830)

TCC Action: It was the action of the Technical Correlating Committee that a Task Group be formed including members from Code-Making Panels 5 and 16 to review and make recommendations on revising the use of the phrase “grounding conductor” and revising it to “grounding electrode conductor.”
Submitter: Paul Dobrowsky, Holley, NY
Recommendation: Replace the term "grounding conductor" with "grounding electrode conductor" throughout this Article.
Substantiation: The term "Grounding Conductor" is being proposed to be deleted because it is almost identical to the term "grounding electrode conductor". The defined term "grounding electrode conductor" includes the ability of connecting to a point on the grounding electrode system. This has been submitted as a single proposal to the Article instead of numerous proposals to allow the panel to ensure the resulting language still meets their intent in each specific section.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Proposal 16-91.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:
JANIKOWSKI, R.: I agree with the submitter that the term "grounding conductor" and "grounding electrode conductor" are all but identical. The term "grounding electrode conductor" will not be mistaken in the field for the grounded conductor and refers to any point on the grounding electrode system.
Comment on Affirmative:
BRUNSSEN, J.: This is a correlation issue with Panel 5. Although the deletion of the term "grounding conductor" is appropriate for articles covered by Panel 5, the term is used over 120 times in Chapter 8 articles covering low power communications circuits and elsewhere in the code. The term "Grounding Conductor" has proven a useful and well understood term within the communications articles and a definition should be retained in Article 100. Substitution of "Grounding Conductor" with “Grounding Electrode Conductor” is not appropriate for all uses in Chapter 8 articles. The definition of “Grounding Conductor" could be modified to make it more specific to communications circuits as follows: “**Grounding Conductor.** A conductor used to connect communications equipment and cable shield, as required, to a grounding electrode system or grounding electrode(s).” This definition would meet the needs of Chapter 8.