HOLTEC DECOMMISSIONING INTERNATIONAL

Krishna P. Singh Technology Campus, 1 Holtec Blvd., Camden, NJ 08104
Telephone (856) 797-0900
Fax (856) 797-0909

HDI-IPEC-22-031

10 CFR 140.8
10 CFR 140.11(a)(4)

March 25, 2022

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Indian Point Energy Center
Provisional License No. DPR-5
Renewed Facility License No. DPR-26 and DPR-64
NRC Docket Nos. 50-003, 50-247, 50-286, and 72-051

Subject: Request for Exemption from 10 CFR 140.11(a)(4) Concerning Primary and Secondary Liability Insurance

References:

1. Entergy letter to U.S. NRC, "Notification of Unit 1 Transfer of 160 Spent Fuel Assemblies from the Spent Fuel Pool to the Indian Point Independent Spent Fuel Storage Installation," (ADAMS Accession No. ML083510667), dated December 11, 2008

2. Entergy letter to U.S. NRC, "Certifications of Permanent Cessation of Power Operations and Permanent Removal of Fuel from the Reactor Vessel, Indian Point Nuclear Generating Unit No. 2," (ADAMS Accession No. ML20133J902), dated May 12, 2020

3. Entergy letter to U.S. NRC, "Certifications of Permanent Cessation of Power Operations and Permanent Removal of Fuel from the Reactor Vessel, Indian Point Nuclear Generating Unit No. 3," (ADAMS Accession No. ML21131A157), dated May 11, 2021

4. Holtec Decommissioning International, LLC (HDI) letter to U.S. NRC, "Supplement to HDI Request for Exemptions from Certain Emergency Planning Requirements of 10 CFR 50.47 and 10 CFR 50, Appendix E, Indian Point Nuclear Generating Unit Nos. 1, 2, and 3 Including Site-Specific Calculations," (ADAMS Accession No's ML22032A017 and ML22032A027), dated February 1, 2022

In accordance with Title10 of the Code of Federal Regulations (10 CFR) 140.8, "Specific exemptions," Holtec Decommissioning International, LLC (HDI), on behalf of Holtec Indian Point 2, LLC (IP1 & IP2) and Holtec Indian Point 3, LLC (IP3), collectively referred to as Indian Point Energy Center (IPEC), requests a permanent exemption from 10 CFR 140.11(a)(4) for IP1, IP2, and IP3. The provisions of 10 CFR 140.11(a)(4) require the licensee to have and maintain two levels of financial protection against offsite liability for each nuclear reactor which is licensed to operate, designed for the production of electrical energy, and has a rated capacity of 100,000 kilowatts electric (kWe) or more. The two levels of financial protection are as follows:

- Primary insurance coverage of $450,000,000 from private sources (referred to as "primary offsite liability insurance"); and

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- Secondary financial protection in the form of private liability insurance available under an industry retrospective rating plan (referred to as "secondary financial protection").

HDI is requesting an exemption from 10 CFR 140.11(a)(4) for IPEC to (1) reduce the required level of primary offsite liability insurance to $100,000,000 and (2) eliminate the requirement to carry secondary financial protection for IPEC. The exemption request is provided in the Enclosure to this letter.

Operation of IP1 was suspended on October 31, 1974, and all fuel was removed from the reactor vessel in 1975. On December 11, 2008, Entergy notified the NRC that all remaining spent fuel assemblies had been removed from the IP1 spent fuel pool (SFP) and placed in the existing Independent Spent Fuel Storage Installation (ISFSI) (Reference 1).

In References 2 and 3, Entergy certified to the NRC, in accordance with 10 CFR 50.82(a)(1)(i), that power operations ceased at IP2 on April 30, 2020, and at IP3 on April 30, 2021. In addition, Entergy certified in accordance with 10 CFR 50.82(a)(1)(ii), that the fuel was permanently removed from the IP2 reactor vessel and placed in the IP2 SFP on May 12, 2020, and that the fuel was permanently removed from the IP3 reactor vessel and placed in the IP3 SFP on May 11, 2021.

The underlying purpose of the 10 CFR 140.11(a)(4) is to require sufficient liability insurance to ensure adequate funding of any claims resulting from a potential nuclear incident or precautionary evacuation associated with an individual power reactor. However, the regulation does not take into consideration the reduced potential for, and consequences of, such nuclear incidents at permanently shutdown facilities. The proposed exemption would allow a reduction in the level of offsite insurance coverage for the three-unit IPEC reactor site to a level that is commensurate with the permanently shutdown and defueled status of all three IPEC reactors, while still meeting the underlying purpose of the 10 CFR 140.11(a)(4).

Holtec has performed analyses showing that 15 months after IP3's shutdown, the spent fuel stored in each of the unit's SFPs will have decayed sufficiently such that there is a significant reduction in risk from a theoretical SFP draindown event. This reduction in risk supports the basis for the proposed exemption from 10 CFR 140.11(a)(4) provided in the Enclosure to this letter. The analyses establishing the 15-month spent fuel decay time was provided to the NRC in Reference 4.

The 15-month spent fuel decay period for IP3 will expire by August 1, 2022. Therefore, HDI requests NRC review and approval of the requested exemption by July 1, 2022, with an effective date of August 1, 2022 and a 30-day implementation period from the effective date.

This letter contains no new regulatory commitments.

If you have any questions or need further information, please contact Mr. Walter Wittich, IPEC Licensing or myself at (856) 797-0900, ext. 3578.

Sincerely,

Jean A. Fleming

Digitally signed by Jean A. Fleming
Date: 2022.03.25 11:51:46 -04'00'

Jean A. Fleming
HDI Vice President, Regulatory and Environmental Affairs
Holtec Decommissioning International, LLC

HOLTEC
DECOMMISSIONING
INTERNATIONAL

Krishna P. Singh Technology Campus, 1 Holtec Blvd., Camden, NJ 08104
Telephone (856) 797-0900
Fax (856) 797-0909

Enclosure: Request for Exemption from 10 CFR 140.11(a)(4)

cc: NRC Senior Project Manager, NRC NMSS
NRC Region I Regional Administrator
NRC Senior Regional Inspector, Indian Point Energy Center
New York State Liaison Officer Designee, NYSERDA
New York State (NYS) Public Service Commission

Enclosure

HDI-22-031

Request for Exemption from 10 CFR 140.11(a)(4)

DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGES

I. SPECIFIC EXEMPTION REQUEST

In accordance with Title10 of the Code of Federal Regulations (10 CFR) 10 CFR 140.8, "Specific exemptions," Holtec Decommissioning International, LLC (HDI), on behalf of Holtec Indian Point 2, LLC (IP1 & IP2) and Holtec Indian Point 3, LLC (IP3), collectively referred to as Indian Point Energy Center (IPEC), requests a permanent exemption from 10 CFR 140.11(a)(4) for IP1, IP2, and IP3. The provisions of 10 CFR 140.11(a)(4) require the licensee to have and maintain two levels of financial protection against offsite liability for each nuclear reactor which is licensed to operate, designed for the production of electrical energy, and has a rated capacity of 100,000 kilowatts electric (kWe) or more. The two levels of financial protection are as follows:

- Primary insurance coverage of $450,000,000 from private sources (referred to as "primary offsite liability insurance"); and

- Secondary financial protection in the form of private liability insurance available under an industry retrospective rating plan (referred to as "secondary financial protection").

HDI is requesting an exemption from 10 CFR 140.11(a)(4) for IPEC to (1) reduce the required level of primary offsite liability insurance to $100,000,000 and (2) eliminate the requirement to carry secondary financial protection for IPEC.

II. BACKGROUND

IPEC is located on the east bank of the Hudson River at Indian Point, in the Village of Buchanan, in upper Westchester County, New York. The site is operated by Holtec Decommissioning International, LLC (HDI) and contains facilities located on approximately 239 acres, bounded on the north, south, and east by privately owned land and on the west by the Hudson River. IP2 and IP3 are located north and south, respectively, of IP1, which is in safe storage (SAFSTOR) until subsequent decommissioning. The site is located about 24 miles north of the New York City boundary line. The nearest urban area within 6 miles of the site is the City of Peekskill, New York, which is located approximately 2.5 miles northeast of the IPEC site.

IP1 was permanently shutdown on October 31, 1974, and all spent fuel was removed from the IP1 reactor vessel in 1975. On December 11, 2008, Entergy notified the NRC that all remaining spent fuel assemblies had been removed from the IP1 spent fuel pool (SFP) and placed in the existing Independent Spent Fuel Storage Installation (ISFSI) (Reference 1). The IP1 Provisional Operating License prohibits taking the reactor to criticality or operation of the facility at any power level, and the IP1 Technical Specifications do not allow fuel to be loaded into the reactor core or moved into the reactor containment building without prior review and authorization by the U.S. Nuclear Regulatory Commission (NRC). The IP1 Technical Specifications also preclude fuel from being stored in the IP1 fuel storage area. Based on its current configuration and licensing basis, with no spent fuel stored in the IP1 SFP, there are no postulated Design Basis Accidents (DBAs) that remain applicable to IP1. The IP1 SFP is no longer in use because all spent fuel and other material has been removed, and the IP1 SFP has been drained.

By letters dated May 12, 2020 and May 11, 2021 (References 2 and 3), Entergy certified to the NRC, in accordance with 10 CFR 50.82(a)(1)(i), that power operations ceased at IP2 on April 30, 2020, and at IP3 on April 30, 2021. In addition, Entergy certified in accordance with 10 CFR 50.82(a)(1)(ii), that the fuel was permanently removed from the lIP2 reactor vessel and placed in

the IP2 SFP on May 12, 2020, and that the fuel was permanently removed from the IP3 reactor vessel and placed in the IP3 SFP on May 11, 2021.

After a reactor is in a permanently defueled condition, the operational focus is with the spent fuel and the spent fuel pool (SFP) cooling systems. In this condition, the spectrum of credible accidents is much smaller than for an operational plant. Further, with the IP2 and IP3 certifications of permanent shutdown and defuel, in accordance with 10 CFR 50.82(a)(1)(i) and (ii), the 10 CFR Part 50 licenses for IP2 and IP3 no longer authorize operation of the respective unit's reactor or emplacement or retention of fuel in the unit's reactor vessel. As such, the majority of the design basis accident (DBA) scenarios previously postulated in the safety analyses for the plant are no longer possible and were removed under the provisions of 10 CFR 50.59.

III. DETAILED DESCRIPTION

In accordance with 10 CFR 140.8, "Specific exemptions," HDI requests a permanent exemption from 10 CFR 140.11(a)(4) for IPEC. The provisions of 10 CFR 140.11(a)(4) require licensees to have and maintain two levels of financial protection against offsite liability for each nuclear reactor which is licensed to operate, designed for the production of electrical energy, and has a rated capacity of 100,000 kilowatt electric (kWe) or more. The two levels of financial protection are as follows:

- Primary insurance coverage of $450,000,000 from private sources (referred to as "primary offsite liability insurance"); and
- Secondary financial protection in the form of private liability insurance available under an industry retrospective rating plan (referred to as "secondary financial protection").

HDI is requesting an exemption from 10 CFR 140.11(a)(4) for IPEC to (1) reduce the required level of primary offsite liability insurance to $100,000,000 and (2) eliminate the requirement to carry secondary insurance coverage for IPEC.

10 CFR 140.11(a)(4) reads as follows:

"(a) Each licensee is required to have and maintain financial protection:

[…]

(4) In an amount equal to the sum of $450,000,000 and the amount available as secondary financial protection (in the form of private liability insurance available under an industry retrospective rating plan providing for deferred premium charges equal to the pro rata share of the aggregate public liability claims and costs, excluding costs payment of which is not authorized by section 170o.(1)(D) of the Act, in excess of that covered by primary financial protection) for each nuclear reactor which is licensed to operate and which is designed for the production of electrical energy and has a rated capacity of 100,000 electrical kilowatts or more: Provided, however, that under such a plan for deferred premium charges for each nuclear reactor that is licensed to operate, no more than $131,056,000 with respect to any nuclear incident (plus any surcharge assessed under subsection 170o.(1)(E) of the Act) and no more than $20,496,000 per incident within one calendar year shall be charged. Except that, where a person is authorized to operate a

> *combination of 2 or more nuclear reactors located at a single site, each of which has a rated capacity of 100,000 or more electrical kilowatts but not more than 300,000 electrical kilowatts with a combined rated capacity of not more than 1,300,000 electrical kilowatts, each such combination of reactors shall be considered to be a single nuclear reactor for the sole purpose of assessing the applicable financial protection required under this section."*

Holtec has performed analyses showing that 15 months after IP3's shutdown, the spent fuel stored in the SFPs will have decayed sufficiently such that there is a significant reduction in risk from postulated events. This reduction in risk supports the basis for this proposed exemption from 10 CFR 140.11(a)(4). The analyses establishing the 15-month spent fuel decay time was provided to the NRC in Reference 4.

IV. BASIS FOR EXEMPTION REQUEST

The underlying purpose of 10 CFR 140.11(a)(4) is to require sufficient liability insurance to ensure adequate funding of any claims resulting from a potential nuclear incident or precautionary evacuation associated with an individual power reactor. The financial protection limits of 10 CFR 140.11(a)(4) were established to require that licensees maintain sufficient insurance to cover the costs of a nuclear incident at an operating reactor.

This regulation does not take into consideration the reduced potential for and consequences of such nuclear incidents at permanently shutdown facilities. IPEC is a three-unit multiple reactor site, with the three onsite reactors (IP1, IP2 and IP3) already permanently shutdown and defueled. The proposed exemption would allow a reduction in the level of offsite insurance coverage for the three-unit IPEC multiple reactor site to a level that is commensurate with the permanently shutdown and defueled status of all three onsite reactors and the underlying purpose of 10 CFR 140.11(a)(4).

Although the likelihood of an accident at an operating reactor is small, the consequences can be large, in part due to the high temperatures and pressures of the reactor coolant system as well as the inventory of radionuclides. For permanently shutdown and defueled reactors, such as IP1, IP2, and IP3, nuclear accidents involving the reactors and their associated systems, structures, and components (SSCs) are no longer possible. Furthermore, reductions in the probability and consequences of non-operating reactor nuclear incidents are substantially reduced because: 1) the decay heat from the spent fuel decreases over time, which reduces the amount of cooling required to prevent the spent fuel from heating up to a temperature that could compromise the ability of the fuel cladding to retain fission products; and 2) the relatively short-lived radionuclides contained in the spent fuel, particularly volatile components like iodine and noble gasses, decay away, thus reducing the inventory of radioactive materials available for release.

Although the potential for, and consequences of, nuclear accidents decline substantially after the IPEC reactors are permanently defueled, they are not completely eliminated. There are potential onsite and offsite radiological consequences that could be associated with the onsite storage of the spent fuel in the SFP. In addition, a site with multiple permanently shutdown and defueled reactors, such as IPEC, may contain an inventory of radioactive liquids, activated reactor components, and contaminated materials. For the purposes of modifying the amount of offsite insurance coverage maintained for a site with multiple permanently shutdown and defueled reactors, the potential radiological consequences of non-operating reactor nuclear incidents are appropriate to consider, despite their very low probability of occurrence.

The NRC has generically evaluated the legal, technical, and policy issues regarding the financial protection requirements for large nuclear power plants that have been permanently shutdown and recommended changes to the power reactor financial protection regulations that would allow licensees to lower offsite insurance levels to $100 million. The results of the NRC evaluations were summarized in SECY-96-256 (Reference 5) and the NRC recommended course of action was approved by the Commission in a Staff Requirements Memorandum (SRM) (Reference 6). These documents established the basis for the NRC exercising its discretionary authority to specify an appropriate level of onsite insurance coverage for permanently shutdown nuclear power reactors.

In SECY-00-145 (Reference 7) and SECY-01-0100 (Reference 8), the NRC discussed additional information concerning SFP zirconium fire risks at decommissioning reactors and associated implications for offsite property damage insurance. Analyzing when spent fuel stored in the SFP is capable of adequate air-cooling is one measure that demonstrates when the probability of a zirconium fire would be exceedingly low.

As discussed in the NRC response to a comment submitted by the Nuclear Energy Institute (NEI) in SECY-00-145 (see "NRC Staff Responses to NEI White Paper Comments on Improving Decommissioning Regulations," page 5, response to Comment 3):

> *"… the staff believes that full insurance coverage must be maintained for 5 years or until a licensee can show by analysis that its spent fuel pool is no longer vulnerable to such [a zirconium] fire."*

In addition, as discussed in the NRC response to another NEI comment in SECY-00-145 (see "NRC Staff Responses to NEI White Paper Comments on Improving Decommissioning Regulations," page 6, response to Comment 4):

> *"Since the zirconium fire scenario would be possible for up to several years following shutdown, and since the consequences of such fire could be severe in terms of offsite health consequences, property damage, and land contamination, the staff position is that full offsite liability coverage (both primary and secondary levels) must be retained for five years or until analysis has indicated that a zirconium fire is no longer possible. At that point, primary coverage would be reduced from $200 million to $100 million and participation in the secondary retrospective rating pool would no longer be required…"*

Note: the primary financial protection coverage specified in 10 CFR 140.11(a)(4) was increased from $200 million to $450 million (81 FR 96348) separate from the above quoted NEI comment response in SECY-00-145. The NRC's recommendation for a reduction in the required insurance coverage to $100 million and the supporting basis for the reduced coverage did not change.

V. TECHNICAL EVALUATION

IP1 was permanently shutdown on October 31, 1974, and all spent fuel was removed from the IP1 reactor vessel in 1975. On December 11, 2008, Entergy notified the NRC that all remaining spent fuel assemblies had been removed from the IP1 spent fuel pool (SFP) and placed in the existing Independent Spent Fuel Storage Installation (ISFSI) (Reference 1). The IP1 Provisional Operating License prohibits taking the reactor to criticality or operation of the facility at any power level, and the IP1 Technical Specifications do not allow fuel to be loaded into the reactor core or moved into the reactor containment building without prior review and authorization by the U.S.

Nuclear Regulatory Commission (NRC). The IP1 Technical Specifications also preclude fuel from being stored in the IP1 fuel storage area. Based on its current configuration and licensing basis, with no spent fuel stored in the IP1 SFP, there are no postulated Design Basis Accidents (DBAs) that remain applicable to IP1. The IP1 SFP is no longer in use because all spent fuel and other material has been removed, and the IP1 SFP has been drained.

By letters dated May 12, 2020 and May 11, 2021 (References 2 and 3), Entergy certified to the NRC, in accordance with 10 CFR 50.82(a)(1)(i), that power operations ceased at IP2 on April 30, 2020, and at IP3 on April 30, 2021. In addition, Entergy certified in accordance with 10 CFR 50.82(a)(1)(ii), that the fuel was permanently removed from the lIP2 reactor vessel and placed in the IP2 SFP on May 12, 2020, and that the fuel was permanently removed from the lP3 reactor vessel and placed in the IP3 SFP on May 11, 2021.

With the reactor in a permanently defueled condition, the operational focus is with the spent fuel and the spent fuel pool (SFP) cooling systems. In this condition, the spectrum of credible accidents is much smaller than for an operational plant. Further, with the IP2 and IP3 certifications of permanent shutdown and defuel, in accordance with 10 CFR 50.82(a)(1)(i) and (ii), the 10 CFR Part 50 licenses for IP2 and IP3 no longer authorize operation of the respective unit's reactor or emplacement or retention of fuel in the unit's reactor vessel. As such, the majority of the design basis accident (DBA) scenarios previously postulated in the safety analyses for the plant are no longer possible and were removed under the provisions of 10 CFR 50.59. For IP1, due to its current configuration and licensing basis with no spent fuel stored in the IP1 SFP, there are no postulated DBAs that remain applicable to IP1.

Accident Analysis Overview

With the termination of reactor operations and permanent removal of fuel from IP1, IP2 and IP3 reactor vessels, the postulated accidents involving failure or malfunction of the reactor and supporting SSCs are no longer applicable to any of the three IPEC facilities.

The HDI submittal, "Revision to HDI Request for Exemptions from Certain Emergency Planning Requirements of 10 CFR 50.47 and 10 CFR 50, Appendix E, Indian Point Nuclear Generating Unit Nos. 1, 2, and 3," (Reference 9) provides information on the disposition of accidents and other incidents of concern. Furthermore, as discussed in Reference 9, based on its current configuration and licensing basis, with no spent fuel stored in the IP1 SFP, there are no postulated DBAs that remain applicable to IP1. The IP1 SFP is no longer in use because all spent fuel has been transferred to the ISFSI and other material removed, and the IP1 SFP has been drained. Accordingly, the analyses discussed within this section only address the risks associated with the storage of spent fuel in the IP2 and IP3 SFPs. Specific analyses are summarized in the following sections.

A. Consequences of Design Basis Events

The NRC approved the IP2 Permanently Defueled Technical Specifications (PDTS) on April 28, 2020, with the issuance of IP2 License Amendment No. 294 (Reference 10). The license amendment included the statement that the applicable DBAs for IP2 in the permanently defueled condition are: (1) the Fuel Handling Accident (FHA) in the Fuel Storage Building (FSB), (2) an accidental release of waste gas, and (3) an accidental release-recycle of waste liquid.

The NRC approved the IP3 Permanently Defueled Technical Specifications on April 22, 2021, with the issuance of IP3 License Amendment No. 270 (Reference 11) reflecting the permanently shutdown and defueled condition. The IP3 amendment includes the statement that the applicable

DBAs for IP3 in the permanently defueled condition are: (1) the FHA in the FHB, (2) an accidental release of waste gas, and (3) an accidental release-recycle of waste liquid.

The limiting DBA for IP2 and IP3 in the permanently defueled condition is the FHA in the FSB. An FHA may occur in the FSB during movement of a fuel assembly. The fuel assembly is moved under water and the accident is assumed to occur when the fuel assembly is damaged. The IP2 and IP3 post-permanent shutdown FHA (Reference 12) was evaluated utilizing the Alternate Source Term (AST) methodology described in Regulatory Guide 1.183 (Reference 13).This analysis did not credit the function of FSB filtration, high-rad alarm, dispersion from the FSB ventilation system, Control Room isolation, or emergency filtration. The analysis credits the decontamination of the 23 feet of water over the fuel assemblies in the SFP with an overall effective decontamination factor of 200, consistent with Regulatory Guide 1.183 (Reference 13).

The analysis indicates that after a decay time of at least 720 hours (30 days) following permanent cessation of power operations of each unit, the FHA results in an EAB TEDE dose of 0.47 rem (Reference 12), which is below the EPA's early phase PAG criteria of 1 rem TEDE for recommended evacuation.

B. Consequences of Beyond Design Basis Events

Spent Fuel Assembly Heat Up During a Theoretical Drain Down Event

The analyses, provided in Enclosure 1 to Reference 4, compare the heat load limits for the hottest fuel assembly and for a 2X2 group of assemblies stored in each SFP (IP2 and IP3) to a criterion proposed in Commission Paper SECY-99-168, "Improving Decommissioning Regulations for Nuclear Power Plants," (Reference 14) that is applicable to offsite emergency response for nuclear power reactors in the decommissioning process. This criterion considers the time for the hottest assembly to heat up from 30°C to 900°C adiabatically. A heatup time of 10 hours from the time the spent fuel is uncovered, was determined to be sufficient to take mitigating actions.

The bounding analyses for the IP2 and IP3 SFPs (Reference 4) for beyond design basis events demonstrate that 15 months after shutdown of IP3 a minimum of 10 hours is available before the fuel cladding temperature of the hottest fuel assembly in either SFP reaches 900°C with a complete loss of SFP water inventory. As stated in NUREG-1738,"Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," (February 2001) (Reference 15) 900°C is an acceptable temperature to use for assessing the onset of fission product release under transient conditions (to establish the critical decay time for determining availability of 10 hours to evacuate) if fuel and cladding oxidation occurs in air.

Because of the length of time it would take for the fuel to heatup, there is ample time to respond to any draindown event that might cause such an occurrence by restoring cooling or makeup or providing spray to the IP2 or IP3 SFPs. As a result, the likelihood that such a scenario would progress to a zirconium fire is deemed not credible.

C. Consequences of Other Analyzed Events

Spent Fuel Pool Draindown Event

NRC NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," (Reference 16) Supplement 1, Section 4.3.9, identifies that a SFP draindown

event is a beyond design basis event. The bounding analyses for the IP2 and IP3 SFP draindown event (Reference 4) demonstrate that a significant release of radioactive material from the SFP is not possible within 10 hours from the time the spent fuel is uncovered. However, the potential exists for radiation exposure if shielding of the fuel in the IP2 or IP3 SFP is lost.

HDI analyzed the bounding radiological consequences of a postulated complete loss of SFP water from either the IP2 and IP3 SFPs. The analysis considered the distances from both SFPs to both Control Rooms and the EAB and a combination of IP3 fuel in the IP2 SFP, to bound both units (Reference 17).

The SFP water and the concrete SFP structures serve as radiation shielding. Therefore, a loss of water shielding above the fuel could increase the offsite radiation levels because of the gamma rays streaming up out of the SFP and being scattered back to a receptor at the site boundary. The analysis determined that the limiting dose rate in the IP2 and IP3 Control Rooms at one year after shutdown are less than 0.0259 mrem/hr (Reference 17) and the dose rate to a receptor at the EAB is less than 11.55 mrem/hr (Reference 17), which is less than the EPA PAGs.

Consequences of a Beyond-Design Basis Earthquake

NUREG-1738 (Reference 15) identifies beyond design basis seismic events as the dominant contributor to events that could result in a loss of SFP coolant that uncovers fuel for plants in the Central and Eastern United States. Additionally, NUREG-1738 identifies a zirconium fire resulting from substantial loss-of-water inventory from the SFP, as the only postulated scenario at a decommissioning plant that could result in significant offsite radiological release. The scenarios that lead to this condition have very low frequencies of occurrence (i.e., on the order of one to tens of times in a million years) and are considered beyond design basis events because the SFP and attached systems are designed to prevent a substantial loss of coolant inventory under accident conditions. However, the consequences of such accidents could potentially lead to an offsite radiological dose in excess of the EPA PAGs (Reference 18) at the EAB.

The risk associated with zirconium cladding fire events decreases as the spent fuel ages. As the spent fuel ages, the decay time increases, the decay heat decreases, and the short-lived radionuclides decay away. As the decay time increases, the overall risk of zirconium cladding fire continues to decrease due to two factors: (1) the amount of time available for preventative actions increases, which reduces the probability that the actions would not be successful; and (2) the increased likelihood that the fuel is able to be cooled by air, which decreases the reliance on actions to prevent a zirconium fire. The results of the research conducted for NUREG-1738 and NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor," (September 2014) (Reference 19) suggests that, while other radiological consequences can be extensive, a postulated accident scenario leading to a SFP zirconium fire, where the fuel has had significant decay time, will have little potential to cause offsite early fatalities due to dose, regardless of the type of offsite response.

The purpose of NUREG-2161 (Reference 19) was to determine if accelerated transfer of older, colder spent fuel from the SFP at a reference plant to dry cask storage significantly reduces the risks to public health and safety. The study states that "this study's results are consistent with earlier research studies' conclusions that spent fuel pools are robust structures that are likely to withstand severe earthquakes without leaking cooling water." The study also shows that, in the event of a radiological release, public and environmental effects are generally the same or

smaller than earlier studies.

In SECY-93-127 (Reference 20), the NRC staff considered potential financial liability of a zirconium fire to determine that the overall risk at decommissioning plants does not justify the full insurance coverage once the spent fuel has sufficiently decayed. In its Staff Requirements Memorandum for SECY-93-127 (Reference 21), the Commission approved a policy that authorized reductions in commercial liability insurance coverage through the exemption process after the spent fuel had undergone an appropriate period of cooling, which the NRC staff defined as when the spent fuel could be air-cooled if the spent fuel pool was drained of water.

In NUREG/CR-6451 "A Safety and Regulatory Assessment of Generic BWR and PWR Permanently Shutdown Nuclear Power Plants" (Reference 22) the representative PWR was shown to be able to be air cooled. HDI has compiled data comparing the input parameters between this representative generic analysis and like data for the IP2 and IP3. This information is provided in Table 1 and Table 2.

Table 1 – Fuel Assembly Parameters

Parameter	NUREG/CR-6451	IP2	IP3
Power	1130 MWe (§3.1.1) ~ 3330 MWt *(Note 1)*	3216 MWt	3188.4 MWt *(Note 2)*
Assemblies	193 (§3.1.1)	193	193
MWt/Assembly	17.25 [≈ 3330/193]	16.66 (calculated)	16.52 (calculated)
Fuel			
Design	17 x 17 (p. 3-5)	15 x 15	15 x 15
Burnup	60 GWd/MTU (§3.1.1)	58.832 GWd/MTU	58.832 GWd/MTU
Decay Time	~ 17 months (§3.1.3) (519 days) *(Note 2)*	28.5 months 870 days ≈ (28.5 / 12) x (366) (calculated)	16.5 months 504 days ≈ (16.5 / 12) x (366) (calculated)
Cladding Oxidation Temperature Limit	565°C (§3.1.3)	565°C	565°C
MTU/Fuel Assembly	0.461 *(Note 3)*	0.456848	0.456848
Operating Time	1604.5 days *(Note 4)*	1613.0 days = (58.832) x (0.456848) x ((193) / (3.216)) (calculated)	1627.0 days = (58.832) x (0.456848) x ((193) / (3.1884)) (calculated)
Fuel Assembly Transverse Dimension	8.426 in *(Note 5)*	8.426 in	8.426 in
Rod Center-to-Center Pitch	0.496 in *(Note 3)*	0.563 in	0.563 in
Rod Outside Diameter	0.374 in *(Note 3)*	0.422 in	0.422 in
Active Fuel Height	144 in *(Note 3)*	144 in	144 in

Overall Fuel Rod Length	168 in *(Note 6)* (active + inactive length)	152.88 in	152.88 in
Fuel Rods per Fuel Assembly	289 *(Note 6)*	204	204
Active Volume	10,223.6 in^3 *(Note 7)* (0.1675 m^3)	10,223.6 in^3 = (144 in) x $(8.426\ in)^2$ (0.1675 m^3) (calculated)	10,223.6 in^3 = (144 in) x $(8.426\ in)^2$ (0.1675 m^3) (calculated)
Power Density	103 MWt/m^3 *(Note 8)*	99.5 MWt/m^3 = ((3216) / (193)) / (0.1675) (calculated)	98.6 MWt/m^3 = ((3188.4) / (193)) / (0.1675) (calculated)

Notes:

1) *The thermal power of the representative PWR in NUREG/CR-6451 is not provided; therefore, an approximate value based on 34 percent thermal efficiency is used.*
2) *IP3 operating power is 3188.4 MWt, and is used in Table 1 calculations. Licensed power is 3216 MWt.*
3) *The number of days is computed as (17 / 12) x 366 days since a longer decay period results in less decay heat and is more conservative for comparing to IP3 with a shorter decay period.*
4) *Refer to Table 2.2 of NUREG/CR-6441 (Reference 23).*
5) *Operating time (t_0) is computed using the burnup (GWd/MTU), plant thermal power (MWt), number of in the core fuel assemblies (n_{FA}), and uranium mass per fuel assembly (MTU/FA).*

$$t_0 = \frac{GWd}{MTU}\ x\ \frac{MTU}{FA}\ x\ \frac{n_{FA}}{MWt}\ x\ \frac{1000\ MW}{1\ GW}$$

6) *The PWR example in NUREG/CR-6441 utilizes a 17 x 17 fuel assembly from a 193-fuel assembly core with a uranium mass of 0.461 MTU.*
7) *Refer to Table A.3 of NUREG/CR-6441 (Reference 23).*
8) *Active Volume = Active Fuel Height x (Fuel Assembly Transverse Dimension)^2*
9) *Power Density = (MWt/Fuel Assembly) / Active Volume*

Table 2 – Spent Fuel Rack Parameters

Parameter	**NUREG/CR-6451**	**IP2** *(Note 1)*		**IP3** *(Note 1)*	
Design	HD *(Notes 2 & 3)*	Region 1 Region 2	Flux Trap HD	Region 1 Region 2	Flux Trap HD
Material	SS *(Note 3)*	Region 1 Region 2	SS SS	Region 1 Region 2	SS SS
Pitch *(Note 4)*	10.40 in	Region 1 Region 2	10.545 in (N/S) 10.765 in (E/W) 9.04 in	Region 1 Region 2	10.760 in 9.075 in
Bottom Orifice	5 in dia.	Regions 1 & 2 Pedestal	6 in dia. 5 in dia.	0.5 in Plate 0.75 in Plate	3.5 in dia. 3.5 in dia. 6 in x 2 in *(Note 5)*
Opening per Cell	8.75 in x 8.75 in	Region 1 Region 2	8.75 in x 8.75 in 8.8 in x 8.8 in	Region 1 Region 2	8.83 in 8.83 in

Cell Wall Thickness	0.185 in	Region 1 Region 2	0.075 in 0.075 in	Region 1 Region 2	0.085 in 0.085 in
Neutron Absorber	Not mentioned	Boraflex *(Note 6)*		Boral	
Downcomer Width *(Note 7)*	3 in	1.25 in to 7 in		3.75 in to 8.86 in	
Plenum Height Under Racks *(Note 8)*	6 in	Regions 1 & 2	8.75 in	Regions 1 & 2	7.125 in
SFP Perimeter *(Note 9)*	119 ft	137 ft 4 in		137 ft 10 in	
Downcomer Area	29.75 ft^2 (2.764 m^2)	67.69 ft^2 (6.288 m^2)		69.05 ft^2 (6.415 m^2)	
Fuel Assemblies in SFP *(Note 10)*	1460	1374 available locations 990 assemblies		1345 available locations 1151 assemblies	

Notes:

1) *IP2 SFP and IP3 SFP each have two fuel storage rack regions (Region 1 and Region 2).*
2) *Region 1 fuel storage rack design incorporates additional water spaces between cells (Flux Trap) to increase effectiveness of neutron absorber material.*
3) *Abbreviations: HD = high density; SS = stainless steel*
4) *Pitch = center to center distance from cell to cell*
5) *Cross section of each 0.75 in lifting plate (4 per rack) is combination of circle and rectangle. First dimension (3.5 in) is diameter of circle, second and third dimensions (6 in, 2 in) are length and width of rectangle.*
6) *Boraflex neutron absorber panels are installed in IP2 fuel racks but are not credited in SFP criticality analysis.*
7) *Width of downcomer varies depending on local geometry and proximity of SFP racks to wall.*
8) *Dimensions for IP2 are total for pedestal and bearing pad. Nominal total is given for IP3.*
9) *SFP perimeter is sum of wall lengths of actual SFP.*
10) *Fuel assemblies in SFP are as of 08/25/2020 and subject to change.*

A comparison of the fuel design parameters for fuel assembly power, power density, and hydraulic resistance of the 15 x 15 fuel assemblies from IP2 and IP3 found that they are the same or conservative when compared to those for the 17 x 17 fuel assemblies modeled in NUREG/CR-6451. It can therefore be concluded that the analytical results for the NUREG/CR-6451 model fuel assembly can be conservatively applied to the IP2 and IP3 fuel assemblies.

The NUREG/CR-6451 SFP storage rack design and configuration were also compared to those for the IP2 and IP3 SFPs. Based on this comparison, it was found that the IP2 and IP3 fuel storage rack Region 2 cell pitch and IP3 cell bottom orifice dimensions are smaller than the values modeled in the NUREG. However, these differences are considered to be conservatively offset by the lower hydraulic resistance and power density of the IP2 and IP3 fuel assemblies, substantially larger SFPs and downcomer areas for improved buoyancy driven air flow and natural circulation, and the fewer number of fuel assemblies that can be stored in the fuel racks as compared to the NUREG/CR-6451 PWR model.

An IPEC analysis (Reference 24) demonstrates successful completion of the Enhanced Seismic Checklist provided in Attachment 1 to Appendix 2B of NUREG-1738 (Reference 15) for the IP2 and IP3 SFPs. Based on the analysis (Reference 24) there is a high confidence in a low probability of failure (HCLPF) for seismic ground motions up to 1.2 g peak spectral acceleration (or with peak ground acceleration (PGA) of approximately 0.5 g), which in turn assures that the frequency of fuel uncovery from seismic events for IP2 and IP3 is less than or equal to $1x10^{-6}$ per year (Reference 24).

Conclusion

Using the Holtec Spent Fuel Pool Heat Up Calculation Methodology, the analysis submitted to NRC in Reference 4 for the IP2 and IP3 SFPs demonstrate that a minimum of 10 hours is available before the fuel cladding temperature of the hottest fuel assembly in the SFP reaches the zirconium fire temperature of 900 degrees Celsius (°C) with a beyond design basis complete loss of SFP water inventory. In addition, the IP2 and IP3 spent fuel and SFP conditions were determined to be bounded by the NUREG/CR-6451 benchmark. Thus, demonstrating that spent fuel would be air coolable at 15 months after permanent shutdown. Regarding the dose assessments, as described above, the dose for the FHA or the BDBE SFP drain down event would be below regulatory limits.

VI. JUSTIFICATION FOR EXEMPTION AND SPECIAL CIRCUMSTANCES

As stated in 10 CFR 140.8, the Commission may, upon application by any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and are otherwise in the public interest.

As discussed below, this exemption request satisfies the provisions of 10 CFR 140.8.

A. The exemption is authorized by law

The proposed exemption is consistent with the requirements of the Atomic Energy Act of 1954, as amended (Price-Anderson Act), which requires that power reactor licensees maintain some level of public liability financial protection. The NRC has granted exemptions to other licensees for insurance reductions of the same regulation being requested here by HDI and have been previously determined to be authorized by law and granted (see Section VII of this Enclosure).

In addition, as discussed in an NRC letter to Dominion Nuclear Connecticut, Inc. (Reference 25), post-shutdown insurance requirements for nuclear power plants undergoing decommissioning were addressed in a letter from the NRC Executive Director for Operations to the Chairman of the Advisory Committee on Reactor Safeguards (ACRS), dated September 17, 2001. The NRC staff and the ACRS agreed that onsite and offsite insurance coverage can be substantially reduced shortly after a facility permanently shuts down. The ACRS also accepted the NRC staff's assessment that the primary offsite liability can be reduced to $100 million and that decommissioning licensees can be released from participation in the secondary insurance pool. Therefore, the exemptions are authorized by law

B. The exemption is otherwise in the public interest

Approval of the exemption request would result in more efficient use of funds in the HDI decommissioning trust funds. The reduction in offsite protection for IPEC from $450 million to $100 million and elimination of the requirement to participate in the secondary insurance pool would continue to require a level of financial protection commensurate with the underlying purpose of 10 CFR 140.11(a)(4) while eliminating an unnecessary financial burden. Therefore, the proposed exemption is otherwise in the public interest.

VII. PRECEDENT

The exemption request for 10 CFR 140.11(a)(4) is consistent with exemption requests that recently have been issued by the NRC for other nuclear power reactor facilities beginning decommissioning. Specifically, the NRC granted similar exemptions to Holtec Decommissioning International, LLC, for Pilgrim Nuclear Power Station (Reference 26); Exelon Generation Company, LLC, for Oyster Creek (Reference 27); Southern California Edison Company, for San Onofre Nuclear Generating Station, Units 1, 2, and 3 (Reference 28); Entergy Nuclear Operations, Inc., for Vermont Yankee (Reference 29); Duke Energy Florida, Inc., for Crystal River, Unit 3 (Reference 30); Dominion Energy Kewaunee, Inc., for Kewaunee Power Station (Reference 31), and Florida Power & Light for NextEra Energy Duane Arnold (Reference 32).

Similar to the current request, these precedents each resulted in exemptions from the requirements in 10 CFR 140.11(a)(4).

VIII. ENVIRONMENTAL ASSESSMENT

The proposed exemption meets the eligibility criterion of categorical exclusion set forth in 10 CFR 51.22(c)(25) because the proposed exemption involves: (i) no significant hazards consideration; (ii) no significant change in the types or significant increase in the amounts of any effluents that may be released offsite; (iii) no significant increase in individual or cumulative public or occupational radiation exposure; (iv) no significant construction impact; (v) no significant increase in the potential for or consequences from radiological accidents; and (vi) the requirements from which the exemption is sought involve surety, insurance, or indemnity requirements. Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed exemption.

(i) No Significant Hazards Consideration Determination

HDI has evaluated the proposed exemption from 10 CFR 140.11(a)(4)) for IPEC to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92 as discussed below:

1. Does the proposed exemption involve a significant increase in the probability or consequences of an accident previously evaluated?

   The proposed exemption has no effect on structures, systems, and components (SSCs) and is unrelated to the capability of any plant SSC to perform its design function. The proposed exemption would not increase the likelihood of the malfunction of any plant SSC.

   When the exemption becomes effective, there will be no credible events that would result in doses to the public beyond the exclusion area boundary (EAB) that would exceed the Environmental Protection Agency (EPA) Protective Action Guidelines (PAGs). The probability of occurrence of previously evaluated accidents is not increased, since most previously analyzed accidents will no longer be possible and the probability and consequences of the remaining design basis accidents (DBAs) are not adversely affected by the proposed exemption.

Therefore, the proposed exemption does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed exemption create the possibility of a new or different kind of accident from any accident previously evaluated?

   The proposed exemption does not involve a physical alteration of the IPEC plants. No new or different type of equipment will be installed and there are no physical modifications to existing equipment associated with the proposed exemption. Similarly, the proposed exemption will not physically change any SSCs involved in the mitigation of any accidents. Thus, no new initiators or precursors of a new or different kind of accident are created. Furthermore, the proposed exemption does not create the possibility of a new accident as a result of new failure modes associated with any equipment or personnel failures. No changes are being made to parameters within which the plants are normally operated, or in setpoints which initiate protective or mitigative actions, and no new failure modes are being introduced.

   Therefore, the proposed exemption does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed exemption involve a significant reduction in a margin of safety?

   The proposed exemption does not alter the design basis or any safety limits for the IPEC plants. The proposed exemption does not impact facility operation or any plant SSC that is relied upon for accident mitigation.

   Therefore, the proposed exemption does not involve a significant reduction in a margin of safety.

Based on the above, HDI concludes that the proposed exemption presents no significant hazards consideration, and, accordingly, a finding of "no significant hazards consideration" is justified.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

There are no expected changes in the types, characteristics, or quantities of effluents discharged to the environment associated with the proposed exemption. There are no materials or chemicals introduced into the IPEC plants that could affect the characteristics of types of effluents released offsite. In addition, the method of operation of waste processing systems will not be affected by the exemption. The proposed exemption will not result in changes to the design basis requirements of SSCs that function to limit or monitor the release of effluents. All the SSCs associated with limiting the release of effluents will continue to be able to perform their functions. Therefore, the proposed exemption will result in no significant change to the types or significant increase in the amounts of any effluents that may be released offsite.

(iii) There is no significant increase in individual or cumulative public or occupational radiation exposure.

The proposed exemption does not involve any physical alterations to the configuration of the plants or any changes to operation of the facility that could lead to a significant increase in individual or cumulative occupational radiation exposure to either the workforce or the public.

(iv) There is no significant construction impact.

No construction activities are associated with the proposed exemption.

(v) There is no significant increase in the potential for or consequences from radiological accidents.

See the no significant hazards considerations discussion in Item (i)(1) above.

(vi) The requirements from which exemption is sought involve surety, insurance or indemnity requirements.

The requirements from which the exemption is sought involve financial protection and for the indemnification and limitation of liability in accordance with Section 170 of the Atomic Energy Action of 1954, as amended, and 10 CFR 140.11(a)(4).

IX. CONCLUSION

In accordance with 10 CFR 140.8, HDI is requesting a permanent exemption from 10 CFR 140.11(a)(4) for the IPEC site. Based on the considerations discussed above, the requested exemption is authorized by law and is otherwise in the public interest.

REFERENCES

1. Entergy letter to U.S. NRC, "Notification of Unit 1 Transfer of 160 Spent Fuel Assemblies from the Spent Fuel Pool to the Indian Point Independent Spent Fuel Storage Installation," (ADAMS Accession No. ML083510667), dated December 11, 2008

2. Entergy letter to U.S. NRC, "Certifications of Permanent Cessation of Power Operations and Permanent Removal of Fuel from the Reactor Vessel, Indian Point Nuclear Generating Unit No. 2," (ADAMS Accession No. ML20133J902), dated May 12, 2020

3. Entergy letter to U.S. NRC, "Certifications of Permanent Cessation of Power Operations and Permanent Removal of Fuel from the Reactor Vessel, Indian Point Nuclear Generating Unit No. 3," (ADAMS Accession No. ML21131A157), dated May 11, 2021

4. Holtec Decommissioning International, LLC (HDI) letter to U.S. NRC, "Supplement to HDI Request for Exemptions from Certain Emergency Planning Requirements of 10 CFR 50.47 and 10 CFR 50, Appendix E, Indian Point Nuclear Generating Unit Nos. 1, 2, and 3 Including Site-Specific Calculations," (ADAMS Accession No's ML22032A017 and ML22032A027), dated February 1, 2022

5. U.S. NRC Commission Paper, SECY-96-256, "Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR 140.11, (ADAMS Accession No. ML15062A483), dated December 17, 1996

6. Staff Requirements Memorandum, "Re: SECY-96-256, "Changes to Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors," (ADAMS Accession No. ML15062A454), dated January 28, 1997

7. U.S. NRC Commission Paper, SECY-00-145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," (ADAMS Accession No. ML003721626), dated June 28, 2000

8. U.S. NRC Commission Paper, SECY-01-0100, "Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools," (ADAMS Accession No. ML011450420), dated June 4, 2001

9. Holtec Decommissioning International, LLC (HDI) letter to U.S. NRC, “Revision to Holtec Decommissioning International, LLC (HDI) Request for Exemptions from Certain Emergency Planning Requirements of 10 CFR 50.47 and 10 CFR Part 59, Appendix E,” (Letter HDI-IPEC-22-014) (ADAMS Accession No. ML22033A348) dated February 2, 2022

10. U.S. NRC letter to Entergy, "Indian Point Nuclear Generating Unit No. 2 – Issuance of Amendment No. 294 RE: Permanently Defueled Technical Specifications (EPID L-2019-LLA-0079)," (ADAMS Accession No. ML20081J402), dated April 28, 2020

11. U.S. NRC letter to Entergy, "Indian Point Nuclear Generating Unit No. 3 – Issuance of Amendment No. 270 Re: Permanently Defueled Technical Specifications (EPID L-2020- LLA-0090)," (ADAMS Accession No. ML21074A000), dated April 22, 2021

12. Calculation IP-CALC-19-00003, "Post-Permanent Shutdown Analyses of Fuel Handling, Waste Handling, and High Integrity Container Drop Accidents for Indian Point Units 2 and 3," Revision 0, March 13, 2019

13. U.S. Nuclear Regulatory Commission Regulatory Guide 1.183, “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors,” (ADAMS Accession No. ML003716792), dated July 2000

14. U.S. NRC Commission Paper, SECY-99-168, "Improving Decommissioning Regulations for Nuclear Power Plants," (ADAMS Accession No. ML992800087), dated June 30, 1999

15. U.S. NRC NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," (ADAMS Accession No. ML010430066), dated February 2001

16. U.S. NRC NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," (ADAMS Accession Nos. ML023470327 and ML023500228), dated October 2002

17. Calculation IP-CALC-18-00066, "Shine Dose to Exclusion Area Boundary and Control Room from Spent Fuel Pool During SAFSTOR," Revision 1, July 15, 2019

18. U.S. Environmental Protection Agency, "Protective Action Guides and Planning Guidance for Radiological Incidents," EPA-400/R-17-001, (EPA PAG Manual), dated January 2017

19. U.S. NRC NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor," (ADAMS Accession No. 14255A365), dated September 2014

20. SECY-93-127, "Financial Protection Required of Licensees of Large Nuclear Power Plants During Decommissioning," dated May 10, 1993(ML12257A628)

21. Staff Requirements Memorandum, "SECY-93-127 – Financial Protection Required of Licensees of Large Nuclear Power Plants During Decommissioning," (ADAMS Accession No. ML003760936), dated July 13, 1993

22. U.S. NRC NUREG/CR-6451, "A Safety and Regulatory Assessment of Generic BWR and PWR Permanently Shutdown Nuclear Power Plants," dated April 1997

23. U.S. NRC NUREG/CR-6441 (BNL-NUREG-52494), "Analysis of Spent Fuel Heatup Following Loss of Water in a Spent Fuel Pool," (ADAMS Accession No. ML021050336), dated March 2002

24. IP-CALC-20-00022, "Evaluation of Unit 2 & Unit 3 Spent Fuel Pool (SFP) per NUREG-1738 Appendix B Seismic Checklist," Revision 0

25. Letter from U.S. NRC to Dominion Nuclear Connecticut, Inc., “Millstone Power Station, Unit 1 – Exemption from Certain Requirements of 10 CFR Part 140,” dated March 30, 2004 (ADAMS Accession No. ML040890981)

26. Letter from NRC to Holtec Decommissioning International, LLC, "Pilgrim Nuclear Power Station – Exemption from the Requirements of 10 CFR 140.11(a)(4) Concerning Offsite Primary and Secondary Liability Insurance and Amendment No. 14 to Indemnity Agreement No. B-48 (EPID L-2019-LLE-0005)," (ADAMS Accession No. ML19282A192), dated January 6, 2020

27. Letter from NRC to Exelon Generation Company, LLC, "Oyster Creek Nuclear Generating Station – Exemption from the Requirements of 10 CFR 140.11(a)(4), Concerning Offsite Primary and Secondary Liability Insurance (EPID L-2018-LLE-0003)," (ADAMS Accession No. ML18229A005), dated December 19, 2018

28. NRC Exemption issuance to Southern California Edison Company, "San Onofre Nuclear Generating Station, Units 2 and 3 – Exemption from the Requirements of Section 140.11(a)(4) of Title 10 of the Code of Federal Regulations (10 CFR), Concerning Primary and Secondary Liability Insurance (CAC Nos. L53084 and L53085)," (ADAMS Accession No. ML17339A125), dated January 5, 2018

29. Letter from NRC to Entergy Nuclear Operations, Inc., "Vermont Yankee Nuclear Power Station – Exemption from the Requirements of Title 10 of the Code of Federal Regulations, Part 140, Section 140.11(a)(4), Concerning Primary and Secondary Liability Insurance (CAC No. MF3980)," (ADAMS Accession Nos. ML116012A144 and ML16012A157), dated April 15, 2016

30. Letter from NRC to Crystal River Nuclear Plant, "Crystal River Unit 3 Nuclear Generating Plant – Exemption from the Requirements of Title 10 of the Code of Federal Regulations, Part 140, Section 140.11(a)(4) Concerning Primary and Secondary Liability Insurance (TAC No. MF3588)," (ADAMS Accession Nos. ML14183B338), dated
April 27, 2015

31. Letter from NRC to Dominion Energy Kewaunee, Inc., "Kewaunee Power Station – Exemption from the Requirements of Title 10 of the Code of Federal Regulations, Part 140, Section 140.11(a)(4) Concerning Primary and Secondary Liability Insurance (TAC No. MF3916)," (ADAMS Accession No. ML15026A522), dated March 16, 2015

32. Letter from U.S. NRC to Florida Power & Light Company, “Duane Arnold Energy Center – Exemption from the Requirements of 10 CFR 140.11(a)(4) Concerning Offsite Primary and Secondary Liability Insurance and Amendment No. 15 To Indemnity Agreement No. B-68,” (ADAMS Accession No’s ML21070A092 and ML21070A093), dated May 11, 2021