IAEA Safeguards

Serving Nuclear Non-Proliferation

TABLE OF CONTENTS

IAEA Safeguards: serving nuclear non-proliferation

Rafael Mariano Grossi, Director General of the IAEA

For almost seventy years, the IAEA's independent verification work helps to deter the spread of nuclear weapons. Through the dedication and vigilance of IAEA inspectors and their colleagues, the Agency provides the international community with credible assurances that States are fulfilling their international legal obligation to use nuclear material and technology only for peaceful purposes.

Over the years, the safeguards system faced challenges, and we responded by strengthening the legal foundations that safeguards are built upon. As these lines are written, we again stand at a challenging juncture in time. Geopolitical and other developments around the world demonstrate the urgent need to recommit to the principle of non-proliferation. Wars, doubts about the peaceful nature of nuclear programmes, and the energy and climate crises make our world less secure and more unpredictable.

Every year, more countries are constructing new and novel nuclear facilities, while continuing to expand the use of nuclear science and technology in industry, medicine, agriculture, and other areas. This means that more nuclear material and facilities continuously fall under the Agency's verification mandate.

Maintaining a strong and agile safeguards regime remains essential. To do this, safeguards must be able to count on the support and active engagement of its many stakeholders, at every level. Safeguards must also be underpinned by a robust legal framework, including the rights and obligations conferred by additional protocols and modified small quantities protocols. Furthermore, it is necessary that safeguards make use of the latest scientific and technical innovations in the field of nuclear verification to ensure that no potential proliferation effort goes undetected.

"The IAEA underpins peace and security by widening access to the benefits of nuclear science and technology while safeguarding nuclear material and technology."

This brochure is designed to help explain IAEA safeguards at a time when demand for the IAEA's services is rapidly growing and becoming more complex. The international community continues to turn to the IAEA to support the peaceful benefits of the atom, while verifying that nuclear material and technology remain in peaceful use. This is how the IAEA serves nuclear non-proliferation.

Meeting the challenge of nuclear verification

Massimo Aparo,
Deputy Director General and Head of the IAEA Department of Safeguards

IAEA safeguards are an essential component of worldwide nuclear non-proliferation efforts. The Department of Safeguards deploys a core group of over 275 inspectors to verify that countries use nuclear material and technology solely for peaceful purposes.

The demand for nuclear verification continues to increase. At present, the IAEA is legally obliged to apply safeguards for 190 States. To meet this obligation to the highest standard, IAEA inspectors conduct over 3,000 in-field inspections, design information verifications, and complementary accesses - amassing more than 14,000 days in the field.

We are meeting the challenge of increased demand by maximising the collaborative contribution of our skilled workforce, streamlining our processes, strengthening our partnerships, and introducing new technologies in support of our mission.

Almost 850 people from 95 countries perform this work, each bringing their own unique skills. Our operations divisions carry out verification activities at more than 1,300 nuclear facilities and other locations, while our support divisions provide the necessary technical and analytical support. Together, they conduct a rigorous evaluation of all safeguards relevant information that enables us to draw soundly-based safeguards conclusions.

This work is highly technical. To reach its objectives, the IAEA makes use of the most modern technological capabilities. Environmental sampling, satellite imagery, remote monitoring, non-destructive assay systems, and new information technology capabilities allow our staff to work more effectively and efficiently. We will continue exploring – with the continuing support of our Member States – technological developments and innovations with the potential to support our mission.

By providing credible assurances that States are meeting their nuclear non-proliferation commitments, the IAEA promotes peace, and helps build confidence, within the international community.

"The IAEA's strong, diverse workforce is our greatest asset in ensuring that no potential nuclear proliferation effort goes undetected."

INTRODUCTION

Preventing the spread of nuclear weapons is a complex task. Eighty years after the destructive power of nuclear weapons was first demonstrated, a number of international political and legal mechanisms are in place to help to achieve nuclear non-proliferation objectives. They include political commitments of States, multilateral treaties, other legally binding agreements in which States' non-proliferation commitments are embedded, and, critically, IAEA safeguards. The IAEA plays a crucial independent verification role, aimed at assuring the international community that nuclear material, facilities and other items subject to safeguards are used only for peaceful purposes.

What are IAEA safeguards?

IAEA safeguards are a set of technical measures that allow the IAEA to independently verify a State's legal commitment not to divert nuclear material from peaceful nuclear activities to nuclear weapons or other nuclear explosive devices. Pursuant to the IAEA's Statute, which authorizes the IAEA to establish and administer safeguards, States accept the application of such measures through the conclusion of safeguards agreements with the IAEA.

The implementation of IAEA safeguards comprises four fundamental processes, namely (i) the collection and evaluation of information, (ii) the development of a safeguards approach for a State, (iii) the planning, conduct and evaluation of safeguards activities, including in-the-field and at Headquarters, and (iv) the drawing of safeguards conclusions. Throughout these processes, the IAEA performs various of safeguards activities, from the measurement of nuclear material items in facilities to the analysis of safeguards relevant information at Headquarters.

The majority of safeguards agreements are concluded by the IAEA with non-nuclear-weapon States (NNWSs) party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Under the NPT, these States have committed not to produce or otherwise acquire nuclear weapons, to place all of their nuclear material and activities under IAEA safeguards and to allow the IAEA to verify their commitments.

Similar to the NPT, the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (Treaty of Tlatelolco, 1967) requires its parties to conclude a comprehensive safeguards agreement (CSA) with the IAEA – as do the other regional nuclear-weapon-free zone treaties, i.e. the South Pacific Nuclear Free Zone Treaty (Treaty of Rarotonga, 1985), the Southeast Asia Nuclear-Weapon-Free Zone Treaty (Treaty of Bangkok, 1995), the African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba, 1996) and the Central Asian Nuclear-Weapon-Free Zone Treaty (Treaty of Semipalatinsk, 2006).

Why do IAEA safeguards matter?

Though nuclear energy has the potential to contribute to the prosperity of the world, it may also be used for the development of nuclear weapons. The IAEA was established in 1957 to help reconcile the dual nature of the atom, so that nuclear energy could be placed in the service of peace and the development of humankind while protecting against its misuse. The implementation of IAEA safeguards assures the international community that nuclear material is used only for peaceful purposes.

Almost all countries use nuclear applications for a variety of peaceful purposes, including food and water security, energy, industrial applications and human health. Only a few of these activities involve the type of nuclear material that could potentially be diverted to produce nuclear weapons or other nuclear explosive devices.

General debate of the Tenth Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (1-26 August 2022). (Photo Credit: UN Photo/Manuel Elias)

Nuclear material subject to safeguards

Nuclear material subject to safeguards includes special fissionable material (e.g. plutonium-239; uranium-233; uranium enriched in the isotopes 235 or 233) and source material (e.g. natural uranium, depleted uranium or thorium). All States are likely to have some nuclear material in their territory. Radioactive sources that do not contain uranium, plutonium or thorium are not subject to safeguards and need not be reported to the IAEA under a safeguards agreement.

Uranium ore extracted by Brazil Nuclear Industries (INB) in Caetité, Brazil (Photo credit: Marcelo Corrêa/INB)

Treaty on the Non-Proliferation of Nuclear Weapons

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) is the centerpiece of global efforts to prevent the spread of nuclear weapons, to foster the peaceful uses of nuclear energy, and to further the goal of nuclear disarmament. It entered into force in 1970 and now has 191 States Parties.

While the IAEA is not a party to the Treaty, it is entrusted with key responsibilities. The IAEA has a specific verification role as the international safeguards inspectorate under Article III of the Treaty. The IAEA also serves as a multilateral channel for facilitating transfers of nuclear technology for peaceful applications to its Member States, in accordance with its Statute.

The NPT involves a balance of rights and obligations for States, differentiating between non-nuclear-weapon States (NNWSs) and nuclear-weapon States (NWSs) – States that manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967 (i.e. China, France, the Russian Federation, the United Kingdom and the United States of America).

Under the NPT, the NWSs committed, inter alia, not to transfer to any recipient nuclear weapons or other nuclear explosive devices and not in any way to assist, encourage or induce any NNWSs to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices. Each NNWS is required to conclude a comprehensive safeguards agreement with the IAEA to enable the IAEA to verify the fulfilment of the State's obligations under the Treaty. Four NNWSs that are party to the NPT have yet to conclude a comprehensive safeguards agreement with the IAEA. Three States that are not party to the NPT have concluded item-specific agreements with the IAEA.

Agreements and protocols

Comprehensive safeguards agreements (CSAs): all non-nuclear-weapon States (NNWSs) party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), as well as States party to the regional nuclear-weapon-free zone treaties (NWFZ Treaties), are required to conclude CSAs with the IAEA. Such agreements are concluded on the basis of INFCIRC/153 (Corrected). A State undertakes to accept IAEA safeguards on all nuclear material in all peaceful nuclear activities within its territory, under its jurisdiction or carried out under its control anywhere. Under these agreements, the IAEA has the right and obligation to ensure that safeguards are applied on all such nuclear material for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices.

Small quantities protocols (SQPs): as a means to minimize the burden of safeguards activities in CSA States with little or no nuclear activities, the SQP was introduced by the IAEA in the early 1970s. In 2005, the IAEA Board of Governors, as a safeguards strengthening measure, approved a modified text of the SQP. In 2020, IAEA Director General, Rafael Mariano Grossi, asked the 31 countries with old-style SQPs to amend or rescind them. As of 30 June 2024, 18 countries still have SQPs based on the original standard text.

Item-specific safeguards agreements: agreements of this type cover only nuclear material, facilities and other items specified in the safeguards agreements. They are based on the safeguards procedures established in INFCIRC/66/Rev.2 and its earlier versions. States parties to such agreements undertake not to use nuclear material, facilities or other items subject to the agreement for the manufacture of any nuclear weapon or to further any military purpose. The IAEA implements safeguards pursuant to such agreements in three States that are not party to the NPT.

Voluntary offer agreements (VOAs): the five NPT nuclear-weapon States have concluded safeguards agreements covering some or all of their peaceful nuclear activities. Under the VOAs, facilities are notified to the IAEA by the State concerned and offered for the application of safeguards. The IAEA applies safeguards under VOAs to nuclear material in selected facilities.

Additional protocols (APs): these are designed for States with any type of safeguards agreement with the IAEA. States with CSAs which decide to conclude additional protocols must accept all provisions of the Model Protocol Additional to Agreement(s) between State(s) and the IAEA for the Application of Safeguards (published in INFCIRC/540 (Corrected)), which was approved by the IAEA Board of Governors in 1997. States with item-specific or voluntary offer agreements may accept and implement those measures of the Model Additional Protocol that they choose.

How are IAEA safeguards applied in practice?

Safeguards processes

Collecting and evaluating information

The IAEA collects and processes safeguards relevant information about a State from three sources: information provided by the State itself (e.g. reports and declarations); safeguards activities conducted by the IAEA in the field and at Headquarters (e.g. in-field verification, evaluation of nuclear material accounting information); and other relevant information (e.g. from open sources and third parties). The IAEA conducts ongoing reviews of such information to assess internal consistency of State-declared information, and its consistency with the information generated and collected by the IAEA. Any anomalies, questions or inconsistencies are identified and addressed in a timely manner through consultations with the State and further action taken, as necessary.

Information provided by a State regarding its nuclear material and activities represents the majority of information used by the IAEA for safeguards implementation. For States with CSAs and APs in force, information is provided to the IAEA in the form of nuclear material accounting reports, advance notifications of transfers of nuclear material and facility design information, and information about the State's other nuclear and nuclear-related activities.

One of the questions that the evaluation of safeguards activities seeks to answer is whether a State's declarations about its nuclear programme and plans are consistent with other safeguards relevant information available to the IAEA. Such information includes information from open sources (e.g. public government and operator publications, scientific and technical literature, etc.) as well as third party information (i.e. parties other than the State itself). The latter, which constitutes a very small part of information available to the IAEA, is made available to the IAEA by a State or an organization on a voluntary basis. This information, once validated, is thoroughly analysed by the IAEA and corroborated with other safeguards relevant information available to it. During this process the IAEA engages with States and takes follow-up actions to address the correctness and completeness of their declarations.

One example of a valuable open source of information is commercially available satellite imagery. Satellite imagery is used to routinely evaluate information provided by States regarding their nuclear activities, to assist in planning inspections and visits to facilities to verify design information, and to help in relation to complementary access under the Additional Protocol (AP).

Developing safeguards approaches

The IAEA develops State-level safeguards approaches (SLAs) for States using a structured, technical method to analyse the plausible paths by which nuclear material suitable for use in a nuclear weapon or other nuclear explosive device could be either acquired (for States with a CSA) or diverted from safeguarded facilities (for States with item-specific safeguards agreements or voluntary offer agreements (VOAs)). On this basis, technical objectives associated with the steps along such a path are established and serve to guide planning, conducting and evaluating safeguards activities for that State. To address the technical objectives, specific safeguards measures are identified in accordance with a State's safeguards agreement.

Planning, conducting and evaluating safeguards activities

Based on an SLA, the IAEA prepares an annual implementation plan which specifies the safeguards activities, both in the field and at Headquarters, which the IAEA plans to conduct in a given year for the State. Once an activity has been conducted, the IAEA evaluates the extent to which that activity has attained the technical objective(s) and identifies any questions, inconsistencies or anomalies necessitating further follow-up activities, which may then be incorporated into an updated plan.

In-field safeguards activities are complemented by activities at Headquarters. These include processing, reviewing and validating information from States, results from in-field safeguards activities and data from open and other sources. Headquarters activities generate safeguards relevant information as a result of the review of data remotely transmitted from safeguards equipment and cameras installed at nuclear facilities around the world, verification of seals, evaluation of analytical results from safeguards samples collected in the field and material balance evaluation. Great effort is made to ensure consistency in the evaluation of safeguards relevant information.

In the conduct of its safeguards activities in the field and at Headquarters, the IAEA utilizes instrumentation, technical measures and various techniques to verify information provided by States. New and improved technologies continue to provide an important basis for more effective and efficient safeguards implementation.

Safeguards implementation requires the availability of appropriately prepared, calibrated, tested and well-maintained equipment. The IAEA has accumulated considerable experience in the management of safeguards equipment and this is highlighted by its large equipment inventory and list of equipment authorized for inspection use. For example, unattended monitoring systems may work with a remote transmission capability and are used in nuclear facilities to reduce in-field inspection activities. These systems have the ability to transmit authenticated real-time verification data from the field in a cost effective manner.

A very powerful verification technique used by the IAEA is environmental sampling. Environmental sampling is effective in detecting undeclared nuclear material and activities. It involves collecting swipe samples of dust in order to analyse them for traces of materials that can reveal information about the presence of nuclear material or nuclear activities conducted.

The nuclear material and environmental samples taken by IAEA inspectors during in-field verification activities are analysed at the IAEA Safeguards laboratories in Seibersdorf, Austria. The laboratories provide the IAEA with a set of independent verification capabilities in areas such as the analysis of uranium and plutonium. These laboratories are responsible for processing, screening, distributing, analyzing, and archiving samples. This work is critical for the evaluation of safeguards verification activities. The IAEA's analytical capabilities are further enhanced through coordination and cooperation with a wider Network of Analytical Laboratories (NWAL), comprising an additional 25 laboratories of IAEA Member States and the European Commission.

Drawing safeguards conclusions

The products of IAEA safeguards implementation activities are annual safeguards conclusions drawn and reported to the Board of Governors in the Safeguards Implementation Report (SIR). In order to draw a safeguards conclusion for each State with a safeguards agreement in force, the IAEA needs to have conducted a sufficient level of safeguards activities and performed a comprehensive evaluation of all safeguards relevant information available to it about a State. It also needs to have addressed anomalies, questions or inconsistencies identified in the course of its safeguards activities, and assessed whether there are any indications that, in its judgement, would constitute a safeguards concern. The type of conclusion varies according to the type of safeguards agreement in force.

In-field safeguards activities

IAEA inspectors perform a variety of verification activities in the field.

Nuclear material accountancy is analogous to an audit of a bank: the inspector compares what is on the nuclear material accounting records, books and reports of a facility with what has been reported by the State to the IAEA and, crucially, that the nuclear material is present at the facility as declared.

During the **design information verification**, inspectors compare the design information that the State has submitted to the IAEA with in-field observations to confirm that the information provided by the State is correct and complete, and the facility has not been misused.

IAEA safeguards inspectors taking environmental swipe samples.

An IAEA safeguards inspector applying a Field Verifiable Passive Seal (FVPS).

Environmental samples may be taken for analysis in order to verify that the facility is used as declared. These samples allow an analysis of traces of materials that can reveal information about nuclear material or activities (e.g. separated plutonium or highly enriched uranium at a facility) that have not been declared to the IAEA.

Inspectors verify the inventory of nuclear material using a range of **measurement techniques**. These techniques include item counting, weighing, non-destructive assay with radiation detectors and sample taking for detailed, destructive analysis at IAEA laboratories. **Non-destructive assay** can be used to determine the presence of nuclear material in an item, or the amount of nuclear material in an item, without physically changing the item. **Destructive analysis** produces a very accurate determination of the concentration of nuclear material in a small sample of material taken from a facility. The sample material is destroyed in the measurement process.

Containment and surveillance techniques, such as the application of **seals** and the use of **cameras and detectors** installed at the facility, may be used to provide continuity of knowledge over nuclear material and facilities between inspections through the detection of access to nuclear material or undeclared operation of the facility. Unattended systems, some of which remotely transmit data to Headquarters in Vienna, further support continuity of knowledge.

Strengthening measures under the Additional Protocol

Additional Protocols (APs) concluded with States with comprehensive safeguards agreements (CSAs) equip the IAEA with important additional verification measures that provide for broader access to information about a State's nuclear programme, increased physical access by the IAEA and improved administrative arrangements.

These additional measures include: (i) State provision of information about, and IAEA access to, all parts of a State's nuclear fuel cycle, from uranium mines to nuclear waste and other locations where nuclear material intended for non-nuclear uses is present; (ii) State provision of information on, and IAEA short-notice access to, all buildings on a site; (iii) State provision of information about, and IAEA access to, a State's nuclear fuel cycle research and development activities not involving nuclear material; (iv) State provision of information on the manufacture and export of sensitive nuclear-related equipment and material, and IAEA access to manufacturing and import locations in the State; (v) IAEA collection of environmental samples beyond declared locations, when deemed necessary by the IAEA; and (vi) a simplified procedure for designation of IAEA inspectors, the issuance of multiple entry/exit visas and IAEA use of internationally established systems of communications.

Under an AP, the IAEA may carry out **complementary access** to resolve a question or an inconsistency relating to correctness and completeness of the information provided by a State, and to confirm the decommissioned status of a facility or locations outside of facilities (LOFs), such as in hospitals, where nuclear materials are used.

Type of safeguards conclusions per legal agreement

For States with a CSA and an Additional Protocol in force, if the IAEA's Secretariat has completed all evaluations and found no indication of the diversion of declared nuclear material from peaceful nuclear activities, no indication of undeclared production or processing of nuclear material at declared facilities and LOFs, and no indication of undeclared nuclear material or activities, the Secretariat concludes that all nuclear material remained in peaceful nuclear activities.

For States with a CSA but without an Additional Protocol in force, if the IAEA's Secretariat found no indication of the diversion of declared nuclear material from peaceful nuclear activities and no indication of undeclared production or processing nuclear material at declared facilities and LOFs, the Secretariat concludes that declared nuclear material remained in peaceful nuclear activities.

Under item specific safeguards agreements, if the IAEA's Secretariat found no indication of the diversion of nuclear material or of the misuse of the facilities or other items to which safeguards had been applied, the Secretariat concludes that nuclear material, facilities or other items to which safeguards had been applied remained in peaceful activities.

For States with voluntary offer safeguards agreements, if the IAEA's Secretariat found no indication of the undeclared withdrawal from safeguards of nuclear material to which safeguards had been applied, the Secretariat concludes that nuclear material in selected facilities to which safeguards had been applied remained in peaceful activities or had been withdrawn from safeguards as provided for in the agreements.

For States with no safeguards agreements in force, the IAEA's Secretariat cannot draw any safeguards conclusions.

How have IAEA safeguards evolved?

IAEA safeguards have evolved as a result of technological change, practical experience and the need to strengthen effectiveness and improve efficiency. Events that have had a profound impact on IAEA safeguards include: the introduction of comprehensive safeguards pursuant to the NPT and the Treaty of Tlatelolco in the early 1970s; the discovery of a clandestine nuclear weapons development effort in Iraq in 1991 (part of which had been concealed by Iraq within its declared nuclear programme); and the IAEA's experience in relation to the Democratic People's Republic of Korea (DPRK). In particular, the Iraq experience highlighted the shortcomings of the implementation of safeguards for States with CSAs which provided the catalyst for strengthening IAEA safeguards.

Formative years

The IAEA concluded its first safeguards agreement in 1959 with Canada, but it was not until 1961 that the IAEA Board of Governors approved a first safeguards document containing the principles and procedures for the application of safeguards (INFCIRC/26).

Throughout the 1960s, more and more countries began to request that the IAEA apply safeguards to nuclear material and facilities which they received under bilateral nuclear cooperation agreements. These countries concluded item-specific safeguards agreements with the IAEA (based on INFCIRC/26 and its subsequent revisions), also known as INFCIRC/66-type agreements, under which the IAEA applies safeguards to specific items subject to the agreements to verify that such items are used only for peaceful purposes.

It was not until 1971, following the entry into force of the NPT and the Treaty of Tlatelolco, that the IAEA started to conclude CSAs with States party to those treaties. Those agreements were concluded on the basis of another safeguards document (INFCIRC/153 (Corrected)) that laid the basis for negotiating CSAs and which was approved by the IAEA Board of Governors in 1971.

Changing expectations

The IAEA's experience in Iraq and the DPRK demonstrated that, although IAEA safeguards had worked well with regard to verification activities on *declared* nuclear material and facilities, the IAEA was not well-equipped to detect *undeclared* nuclear material and activities in States with CSAs. This set the stage and provided the catalyst for far-reaching efforts to strengthen the safeguards system.

At the end of 1993, the IAEA embarked on a broad programme ('Programme 93+2') to further strengthen safeguards implementation under CSAs by enhancing the IAEA's ability to consider a State as a whole. As part of Programme 93+2, measures designed to strengthen the IAEA's ability to detect undeclared nuclear material and activities in States with CSAs were presented

to the IAEA Board of Governors. Some of these measures – such as the early provision of design information, environmental sampling and the use of satellite imagery – could be implemented under the existing legal authority provided for in the CSAs ('Part 1 measures'), while others – such as access to other buildings on the site of a facility and additional declarations from the State regarding nuclear-related research and development – required complementary legal authority in order to be implemented ('Part 2 measures'). In 1997, the IAEA Board of Governors approved the Model Additional Protocol designed to provide for additional measures to strengthen the IAEA's ability to detect undeclared nuclear activities in a State.

Additional Protocol

The Additional Protocol (AP) is important for the effectiveness and efficiency of safeguards. An AP is not a stand-alone legal instrument, and can only be concluded in relation to a safeguards agreement. An AP provides further measures, which include provision of information about, and inspector access to, all aspects of a State's nuclear fuel cycle. This 'fills the gaps' in the information reported under CSAs. By enabling the IAEA to obtain a fuller picture of a CSA State's nuclear programme, plans, nuclear material holdings and trade, an AP helps to provide greater assurance regarding the absence of undeclared nuclear material and activities in the State.

As of 30 June 2024, 142 States have an AP in force, or 75% of all States with safeguards agreements in force. Another 12 States have signed an AP but have yet to bring it into force.

Consideration of the State as a whole

The IAEA started to consider a 'State as a whole' in the implementation of safeguards for States with CSAs in the early 1990s. By starting to better integrate and assess all of the information available to the IAEA about a State's nuclear activities and plans, the Agency produced its first State evaluation report in 1995. In particular, the AP provided the IAEA with increased information about the State's nuclear and nuclear-related activities and capabilities, and added to the IAEA's ability to consider the State as a whole. In 1999 the IAEA drew its first so-called 'Broader Conclusion' for a State as a whole, namely that 'all nuclear material remained in peaceful activities'.

In 2001, the IAEA started developing and implementing State-level Approaches (SLAs) for States for which the IAEA had drawn a 'Broader Conclusion'. An SLA is a customized approach to implementing safeguards for an individual State. For such States, the IAEA began to implement 'integrated safeguards', integrating in an optimal way the safeguards measures available to the IAEA under a State's CSA and AP.

Over recent years, the IAEA Secretariat has further developed the consideration of a State as a whole in the implementation of safeguards in the context of the State-level Concept (SLC). This refers to the general notion of implementing safeguards in a manner that considers a State's nuclear and nuclear-related activities and capabilities as a whole, within the scope of the State's safeguards agreement. The IAEA Secretariat has updated current SLAs and is developing new SLAs for other States.

What are the current trends in IAEA safeguards?

The global nuclear landscape is changing rapidly and will likely continue to do so. Every day – across the world – more nuclear facilities and material come under IAEA safeguards. Nuclear power is expanding in countries already using it, as well as in States introducing it. Since 2010, the number of nuclear facilities and locations outside of facilities under safeguards has risen by 17 per cent and the quantity of nuclear material under safeguards by 37 per cent. Facilities undergoing decommissioning may also involve a large safeguards effort to verify nuclear material packaging, movement and disposition. In addition, the number of safeguards agreements and protocolsentering into force is increasing. These global trends look set to continue.

International nuclear cooperation between States is intensifying with an expansion of trade and services in nuclear related equipment, items and materials. Technologies are also changing. Many older nuclear plants are being modernized and new facilities are becoming more technologically sophisticated. The geographical focus of these expanding programmes also continues to change. These trends are not only a macro-level phenomenon; they are an everyday reality for the IAEA. In short, demands on IAEA safeguards are growing and becoming more complex.

To perform its work, the IAEA depends on the financial contributions of its Member States, many of which are under pressure to reduce public expenditure.

At the same time, the IAEA's and States' obligations under safeguards agreements remain the same. Their implementation cannot be relaxed – whether to save money or for any other reason.

As long as the nuclear world continues to change, IAEA safeguards will need to adapt and change with it. Managing change is not new to the IAEA. Further improvements and optimization are needed to guarantee an effective, reliable and credible safeguards system. In this context, it is essential that the IAEA continues to improve its productivity by striving for greater efficiency without compromising the effectiveness of its work and its ability to continue drawing soundly-based conclusions.

With the support of its Member States, the IAEA will continue to live up to the expectation of the international community by verifying the peaceful use of nuclear energy, thereby contributing to the non-proliferation of nuclear weapons.

Key safeguards facts in 2023

- 190 States with safeguards agreements in force of which 142 States had additional protocols in force
- 235 939 significant quantities of nuclear material under safeguards*
- 1367 nuclear facilities and locations outside of facilities under safeguards
- 26 000 seals installed on nuclear material, facility critical equipment or IAEA safeguards equipment at nuclear facilities
- 600 environmental samples and 565 nuclear material samples collected
- 3136 in-field verifications conducted equating to 14 302 days in the field
- 1376 surveillance cameras maintained at nuclear facilities
- 1056 non-destructive assay systems utilized
- 165 facilities remotely monitored
- €162 million regular budget plus €28 million extra budgetary
- 848 staff from 95 countries

* *One significant quantity is the approximate amount of nuclear material for which the possibility of manufacturing a nuclear explosive device cannot be excluded.*

KEY DEVELOPMENTS IN IAEA SAFEGUARDS

NPT verification mandate
The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) enters into force, entrusting the IAEA with key verification responsibilities

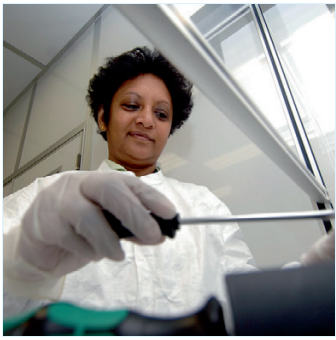
1970

First IAEA verification activity at a research reactor in Norway
The IAEA conducts its first ever in-field verification activity

1962

Establishment of the IAEA
The IAEA Statute enters into force, establishing the IAEA

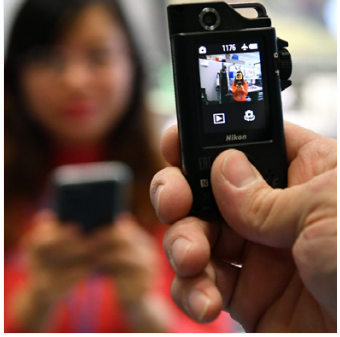
1957



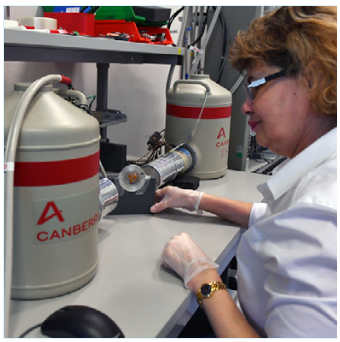
Atoms for Peace
US President Dwight D Eisenhower delivers the 'Atoms for Peace' speech

1953

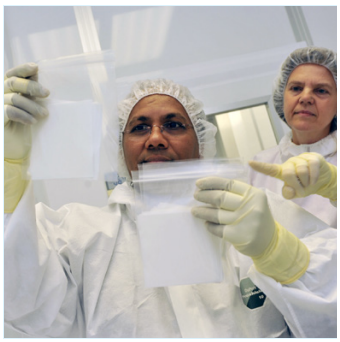
1993



Safeguards during armed conflict in Ukraine
Despite the very challenging circumstances, the IAEA continues to undertake its vital verification role



2022



2022

COVID-19 pandemic and safeguards
Despite unprecedented challenges caused by the COVID-19 pandemic, safeguards implementation continues

2005

Modified small quantities protocol
The Board of Governors addresses a weakness in the IAEA's safeguards system by approving a revised small quantities protocol (SQP) text

1997

Additional protocol
The Board of Governors approves the Model Additional Protocol (AP), providing increased IAEA access to information and locations for verification

Programme 93+2'
Following the revelations about undeclared nuclear material and activities in Iraq and the DPRK in the early 1990s, the IAEA embarks on 'Programme 93+2'

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