

Nuclear Safeguards and Non-proliferation

Takashi Onishi, Nobuyasu Abe, Eric Pujol and Rafael Mariano Grossi

Introduction

Takashi Onishi

This session covers many important subjects, such as Nuclear-Test-Ban-Treaty (CTBT), IAEA Safeguards System, Control of Nuclear Materials and Trade of nuclear related products, as well as expertise for enhancing nuclear safety, security, safeguards and non-proliferation.

We, Japanese, have never wished to produce nor use nuclear weapons since World War II, because we know well cruel damages they can give as the only country where nuclear weapons were used. Therefore, Science Council of Japan has been stressing that the nuclear energy should be utilized only for peaceful purposes.

Indeed, since then, the peaceful use of nuclear energy is only way to use it in Japan. However, nuclear power plants caused the serious disasters in March, 2011, in Fukushima. Therefore, we are now wondering whether we can continue to use the nuclear power without bringing about devastated situations again, even when it is used for peaceful purposes.

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This session will discuss nuclear safeguards and non-proliferation rather than safety control of peaceful use of nuclear energy. But we all have to remind that as nuclear energy has very difficult aspects to overcome, not only avoiding the proliferation and diminishing military use of nuclear materials, but also appropriate and safe controlling of peaceful uses of nuclear energy are keys to bring a bright future to our life.

Let me introduce my personal relations with nuclear energy issues. My specialty is urban planning. So far, I have rarely been involved in them. However, now I am serving as a Government committee chair for reconstruction of communities in Fukushima where more than 100 thousand people still cannot come back to their home towns due to high radiation level. It is said that it will take many decades till finally they can move back there in the vicinity of the reactors destroyed. Whenever I meet the people who have to be away from their home towns, I cannot help thinking that peaceful uses of nuclear energy are not easy matters.

This experience gives me a strong motivation to seek for a realistic way to construct a nuclear free world, by abandoning nuclear weapons definitely and terminating nuclear power plants, hopefully in the near future, if it is not achieved immediately. From this point of view, the subjects of this session are extremely important to me, although it does not cover all of my concerns.

In the discussion, views were exchanged whether the present situation proceeds to enhancing nuclear safety, safeguards and non-proliferation. In fact, since we have local military conflicts or terrorism from time to time, our anxieties that nuclear weapons may be used, are not to calm down. On the other hand, the international institutional framework to avoid crisis of using them has been gradually developed. So, it was pointed out that the abolition of nuclear weapons, control of nuclear materials and technology should steadily be progressed.

As a Chair from the Country which experienced tragedies and disasters caused by nuclear weapons and nuclear power plants, horrible spectacles, which might be brought by the nuclear power, should be disseminated continuously to the world as a warning for the people in the world.

Lessons Learned from the Fukushima Accident

Nobuyasu Abe

The 2011 major nuclear accident at the Fukushima Daiichi nuclear power station gave a number of important lessons:

- Lesson 1: Accident happens and as far as nuclear reactors are there, it will happen again. The history tells that there have been three major nuclear accidents so far; the Three Mile Island in 1979, Chernobyl in 1986, and Fukushima in 2011. According to the IAEA International Nuclear and Radiological Event Scale (INES) the Chernobyl and the Fukushima are classified as the highest level 7 accidents. The Three Mile Island is classified as level 5 accident. Such major nuclear accidents have been taking place roughly in every 10–20 years for

different causes. As Murphey's laws say if anything can go wrong, it will. Statistically, if more reactors are built and more reactors are in operation, the probability of another major accident will increase accordingly unless safety improvements decrease the probability of major accidents. If one does not want to have any accident at all, one would have to move out of nuclear power generation. That argument led Germany, Switzerland and Italy to move out of nuclear power generation. In Japan, the debate continues with such prominent figures as former Prime Ministers Naoto Kan, Morihiro Hosokawa and Jun'ichiro Koizumi arguing to abandon nuclear power generation. Various opinion polls in Japan indicate that some 60–70 % of the public favor moving out of nuclear power generation either immediately or gradually.

- Lesson 2: Intensive international peer review helps improve the safety measures at home. Japan was a party to the 1994 Nuclear Safety Convention. But, still the major accident took place. Thus, unfortunately, being a party to the Nuclear Safety Convention is not a guarantee that the country would not suffer from major nuclear accidents. As an IAEA official once stated the Convention is an *"incentive document."* How serious a party tries to implement the provisions of the Convention and try to implement safety requirements depends primarily on each contracting party. There are as many as 23 places where word *"appropriate"* appears in the text of the Convention. In practice, what is *"appropriate"* is left primarily to each contracting party to determine. The Convention, however, requires its contracting parties to submit national reports on safety. Therefore, organizing a peer review process on the basis of such national reports on nuclear safety can contribute greatly to practically improving nuclear safety in the IAEA member states. The IAEA can be encouraged to improve the intensity and the frequency of the peer review process. The member states are encouraged to make greater contributions to this end.
- Lesson 3: Make safety regulatory agency independent of promoting agency. The principle was in the Nuclear Safety Convention and in the IAEA recommendation but Japan failed to heed the advice until the Fukushima accident took place. It was only after the Fukushima accident that Japan established a new regulatory body called *"Nuclear Regulation Authority"* (NRA) independent from the promotional branch of the government. The new authority appears to be struggling to meet the expectation of the people to be truly independent and effective in enforcing stringent safety regulations. As it tries to be independent, questions are being raised whether it should be *"independent to the extent of being isolated"* or *"where the avenue for appeal on its decision should be."*
- Lesson 4: After a major accident, interest in nuclear energy application declines precipitously. The history shows that after the Three Mile Island accident in the U.S., no new nuclear power reactor was built in the U.S. for 30 years. The Soviet Union/Russia experienced decline in nuclear research funding after the Chernobyl accident. Japan is experiencing a major shift of funding in nuclear research towards those on reactor decommissioning, environmental decontamination and nuclear safety improvements. It has become very difficult to obtain funding for new nuclear research activities while the funding for the IHTER

fusion project continues, Monju fast breeder reactor (FBR) project is struggling to survive and a hope is being laid on high-temperature Gas reactor research.

- Lesson 5: The Fukushima accident made terrorists and saboteurs realize an easy way to cause havoc, i.e. destroy water and power supply lines to nuclear power station. This has renewed the need to strengthen anti-terrorist measures around the world.

How is Fukushima Daiichi doing?

- There have been enormous efforts being made to keep the damaged reactors and fuel rods cooled and to prevent contaminated water from running into the sea. The team dealing with the Fukushima Daiichi has ended up accumulating over 400 thousand tons of contaminated water in the tanks being built every three days or so. (300 tons of contaminated water is produced every day. Radioactive contaminants are now removed by ALPS multi-radio-nuclide removal system. However, the tritium isotope of hydrogen cannot be removed and tritium tainted water keeps accumulating in tanks on the Fukushima Daiichi site.) Now, a big question is what to do with the tritium-tainted water. NRA Chairman Shun'ichi Tanaka and the IAEA experts say if sufficiently diluted, there is no serious risk releasing the tritium-tainted water into the sea. But, the local fishermen keep opposing the release. They are afraid that the day to uplift the fishing ban in the seas around Fukushima may be delayed due to the consumer concern about the contamination.
- Muddling through an uncharted territory. Workers and engineers are struggling with the decommissioning and decontamination works but going through an uncharted territory they are frequently confronted with new obstacles and challenges. For example, they will soon start building huge underground frozen earth walls surrounding the four damaged reactor houses where pumps are desperately pumping contaminated water to be transferred to the storage tanks and to stop the contaminated underground water running into the sea. It is not known yet if the frozen walls really work. Scientists have taken muon (μ) images of the reactor and container vessels to find out the location and shape of the molten nuclear fuel debris in or outside of them. They have also started inserting newly designed high radiation-resistant reconnaissance robots into the reactor vessels to learn the situation there, all in preparation for the eventual decommission/dismantlement of the damaged reactors.
- Decontamination efforts. In order to reduce the radioactivity of the surrounding communities, the contractors are engaged in an extensive shaving and scraping of the soil and buildings. The work is quite challenging because the government set the target of reducing additional aerial radiation exposure to less than 1 mSv a year. Some experts argue that such a low target is not necessary but they have not been able to persuade the local residents. (Average natural background radiation in Japan is around 2.1 mSv.)
- Another difficult problem is the radiation level of food products in circulation. After the Fukushima accident the government initially set the allowable levels at 200 Bq/kg for water and milk products and 500 Bq/kg for other food products

much in accordance with the recommendation of the International Commission on Radiological Protection (ICRP). However, under public pressure the government drastically lowered the level to 10 Bq/kg for water, 50 Bq/kg for milk products and 100 Bq/kg for other food products. Surprisingly, the farmers in Fukushima supported the lowering of the levels as they thought by clearing the lower threshold they could give better assurance to the consumers and sell their products better. Still the prices of the agricultural products from Fukushima remain depressed because the consumers still opt to the products from outside Fukushima even they know that there is no radiation risk. This is proving to be a matter of delicate consumer mentality to deal with.

Where does Japan go?

Perhaps, no one knows. Ideally, a political leadership comes out to tell people, *“I know everybody is worried about nuclear safety. But, we have to move on. We have to move at least some of the reactors.”* In the absence of such a leadership, however, Japan will likely muddle through the thickets of regulations, local resistance and oppositions:

- *“40-year rule”*. The regulatory rule on reactors in Japan was amended after the Fukushima accident to limit the lifespan of power reactors to 40 years. It allows a one-time extension of 20 years as an exceptional case. Nuclear opponents consider this as a strict rule with very limited exceptions allowed. Proponents wish it to be just a base line on which 20-year extension can be granted as far as they can prove the structural safety- worthiness of the reactors. No extension permit has been granted so far by the NRA. If no extension is awarded, there will be a gradual attrition of existing reactors. Out of the 54 power reactors that existed before the Fukushima accident, 4 were damaged in the 2011 accident, TEPCO decided not to restart the remaining 2 at Fukushima Daiichi but to convert them to mock facilities for the coming decommissioning works, and the other power companies have decided not to seek extensions for the five reactors that are approaching 40-year limit as it would cost too much to upgrade them for new stringent safety requirements. This has already reduced the number of available power reactors to 43 in Japan.
- Even the existing reactors are taking a very long time to clear the new NRA safety requirements and, consequently, no nuclear power reactor is in operation today. If the two Sendai reactors in Kyushu start operating towards the end of July this summer, they will be the first to operate after the last reactor was shut down for safety inspections 22 months ago in Japan. While power companies are struggling to clear the new safety requirements, it seems the opponents and the general public with a serious trepidation about the restarting of nuclear reactors are feeling relieved as the reactors are being held up from operating again. This is not necessarily a healthy situation. If there is a doubt about restarting the reactors as a matter of policy, there should be a straight forward discussion on the question rather than putting all the burdens on the NRA.
- The power companies, the business circles and the ruling government in Japan seem to want to have as much as 20 % of the electricity generated by nuclear

power in 2030. This is virtually impossible if the 40-year rule is strictly applied. Either the 20-year extension has to be widely permitted or new nuclear reactors are built in time for 2030 target.

- The remaining major questions that Japan has to deal with in the coming years include (i) what to do with the Rokkasho reprocessing plant, (ii) what to do with the Monju FBR, and (iii) finding a place for high-level radioactive nuclear waste (HLW) disposal to mention a few.

IAEA Nuclear Safeguards for Deterring the Proliferation of Nuclear Weapons and for Detecting Any Misuse of Nuclear Material or Technology

Eric Pujol

Preventing the spread of nuclear weapons is a complex task. Seventy 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, multi-lateral treaties, other legally binding agreements in which States' non-proliferation commitments are embedded, and, critically, the safeguards system of the International Atomic Energy Agency (IAEA).

IAEA safeguards make a vital contribution to international peace and security. Through its technical safeguards measures that are applied on nuclear material and activities, the IAEA seeks to independently verify that nuclear facilities are not misused and nuclear material is not diverted from peaceful uses. This enables the IAEA to draw conclusions and to provide credible assurances that States are honouring their international obligations to use nuclear material only for peaceful purposes. Its independent verification work allows the IAEA to play an indispensable role in deterring the spread of nuclear weapons.

The objective of IAEA safeguards to deter the proliferation of nuclear weapons is achieved in two ways: by providing credible assurances that States are honouring their international obligations, thus helping to build international confidence, and by being able to detect, at an early stage, any misuse of nuclear material or technology, thereby alerting the world to potential proliferation.

Article III of the Treaty on the Non-proliferation of Nuclear Weapons (NPT) requires all Non-Nuclear-Weapon States (NNWSs) to accept safeguards, as set forth in an agreement to be negotiated and concluded with the IAEA in accordance with its Statute and the IAEA's safeguards system. Article III.A.5 of the IAEA Statute authorises the IAEA to establish and administer safeguards. Pursuant to this authority, the IAEA concludes agreements with States, and with regional systems of accounting for and control of nuclear material (RSAC), for the application of safeguards.

As of March 2015, the IAEA implements safeguards agreements in 180 States^{1, 2}; these agreements are of three types: (i) comprehensive safeguards agreements (CSAs)³ with 172 non-nuclear-weapon States party to the NPT (NNWSs); (ii) voluntary offer safeguards agreements (VOAs) with five nuclear-weapon States party to the NPT (NWSs); and (iii) item-specific safeguards agreements with three States non-party to the NPT. Under its CSA, each State undertakes to accept IAEA safeguards on all source or special fissionable material in all peaceful nuclear activities within the territory of the State, under its jurisdiction, or carried out under its control anywhere. For its part, the IAEA has a corresponding right and obligation to ensure that safeguards are applied on all such material for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices. The IAEA verifies that State declarations of nuclear material subject to safeguards are not only ‘correct’ (i.e., that they accurately describe the type(s) and quantity(ies) of a State’s declared nuclear material holdings in declared facilities), but also are ‘complete’ (i.e., that they include everything that is required to be declared).

Each of the five NWSs has concluded a VOA with the IAEA. Under a VOA, the IAEA applies safeguards to nuclear material in those facilities or parts thereof, which have been selected by the IAEA from the State’s list of eligible facilities to safeguards implementation, in order to verify that such material is not withdrawn from safeguards except as provided for in the agreement.

In three States not party to the NPT, the IAEA implements safeguards under respective item-specific safeguards agreements. Under such agreements, safeguards are applied to specified items subject to the agreement (e.g. nuclear material, non-nuclear material, facilities, equipment or components) to verify that such items are used exclusively for peaceful purposes and not for the manufacture of any nuclear explosive device.

A State with a safeguards agreement(s) may also conclude a protocol additional to its safeguards agreement (AP). In 1997, the IAEA Board of Governors approved the Model Additional Protocol to “strengthen the effectiveness and improve the efficiency of the safeguards system as a contribution to global nuclear non-proliferation objectives”.⁴ The additional information and broader access for IAEA inspectors provided for in the AP are designed to ‘fill the gaps’ in information and access required under CSAs.

The AP is essential for the IAEA to obtain a more complete picture of the existing and planned nuclear programmes and material holdings of States with CSAs. Thus, the entry into force and implementation of an AP in a State with CSA

¹These States do not include the Democratic People’s Republic of Korea (DPRK), where the IAEA did not implement safeguards and, therefore, could not draw any conclusion.

²And Taiwan, China.

³The structure and content of Agreements between the Agency and States required in connection with the Treaty on the non-proliferation of nuclear weapons [INFCIRC/153 (Corrected)].

⁴Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards [INFCIRC/540 (Corrected)].

is of vital importance for the IAEA to be able to provide assurances about the exclusively peaceful nature of that State's nuclear programme. The measures provided for under APs significantly increase the ability of the IAEA to verify the peaceful use of all nuclear material in States with CSAs.

While a State's accession to an AP is voluntary, once it enters into force it becomes legally binding for the State. As of March 2015, 12 APs were in force and another 20 States had signed an AP but had yet to bring it into force.

As a means of minimizing the burden of safeguards implementation for those States with minimal or no nuclear activities, a small quantities protocol (SQP) was introduced by the IAEA in the early 1970s.⁵ Its practical effect was to hold in abeyance the implementation of most of the provisions in Part II⁶ of a State's CSA. In 2005, the Board of Governors approved a revision to the standard SQP text,⁷ reducing the CSA provisions held in abeyance, and modifying the eligibility criteria for an SQP,⁸ making it unavailable to a State with an existing or planned facility. Under an SQP based on the revised text, the State is required to submit to the IAEA an initial report on all nuclear material and inform the IAEA as soon as a decision to construct or authorize the construction of a nuclear facility has been taken, and the IAEA may carry out inspections in the State.

The purpose of Agency safeguards is to verify States' undertakings under their respective safeguards agreements with the Agency. The Secretariat establishes and pursues generic objectives on the basis of the State's safeguards agreement to implement effective safeguards:

- For CSA States, safeguards are to be applied to all nuclear material in all peaceful nuclear activities within the territory of the State, under its jurisdiction or carried out under its control anywhere. The safeguards generic objectives are (i) to detect diversion of declared nuclear material; (ii) to detect misuse of declared facilities; and (iii) to detect undeclared nuclear material or activities in the State as a whole.
- For States with item-specific safeguards agreements, safeguards are to be applied to items subject to such agreements. The safeguards generic objectives are (i) to detect diversion of nuclear material subject to safeguards; and (ii) to detect misuse of facilities and other items subject to safeguards.
- For a VOA State, safeguards are to be applied to nuclear material in selected facilities or parts thereof under the VOA. The safeguards generic objectives are

⁵The standard text of safeguards agreements in connection with the Treaty on the non-proliferation of nuclear weapons (GOV/INF/276—22 August 1974).

⁶Part II specifies the procedures to be applied for the implementation of the safeguards provisions of Part I of a State's CSA.

⁷The standard text of safeguards agreements in connection with the Treaty on the non-proliferation of nuclear weapons—Revision of the standardized text of the "small quantities protocol" (GOV/INF/276/Mod.1—21 February 2006).

⁸GOV/INF/276, Annex B.

to detect undeclared withdrawal of safeguarded nuclear material in selected facilities.

Generic objectives are established on the basis of the scope of the State's agreement, and are common to all States with the same type of safeguards agreement.

In order to address these generic objectives, technical objectives are established to guide the planning, conduct and evaluation of safeguards activities. They will form the basis on which safeguards measures will be identified and safeguards activities will be conducted for a State.

The in-field verification of nuclear material accountancy reports provided by the State System of Accounting for and Control of Nuclear Material (SSAC) to the IAEA is key to provide assurances on the non-diversion of declared nuclear material. Containment and surveillance measures (C&S) are applied to nuclear material and facilities as a measure supplementary to nuclear material accountancy. It assures continuity of knowledge on already verified nuclear material. C&S measures also provide assurances on the absence of misuse of a facility. Containment measures are implemented by the IAEA through the application of seals to nuclear material containers for instance. Surveillance is performed using cameras and other sensors to monitor strategic areas at nuclear facilities. Data from C&S systems are remotely transmitted from certain facilities to the IAEA Headquarters in Vienna.

Periodic verification by the IAEA of facility design information, which is regularly provided by a State, is another important measure to assure the absence of misuse of facilities and to ensure that the relevant safeguards approach continues to be fit for purpose.

The analysis of nuclear material samples and environmental samples are also important means to respectively contribute to close material balances at facilities therefore assuring the absence of diversion of nuclear material and, assuring the absence of undeclared activities or/and misuse of facilities.

Satellite imagery and the use of information from open sources are other measures enhancing the IAEA's ability to assess the extent and status of nuclear activities in State. It further contributes to inspections and visits planning.

The analysis of safeguards relevant information available to the IAEA is an essential part of evaluating a State's nuclear activities and, ultimately, to drawing safeguards conclusions. In drawing its safeguards conclusions, the IAEA processes, evaluates and conducts consistency analysis of (i) State declarations, (ii) the results of IAEA verification activities, (iii) other safeguards relevant information. In support of this process, the IAEA draws on an increasing amount of data from verification activities performed in the field and at Headquarters.

For a State that has a comprehensive safeguards agreement but not an additional protocol in force, the IAEA draws a conclusion only with respect to whether declared nuclear material remained in peaceful activities, as the IAEA does not have sufficient means to provide credible assurances regarding the absence of undeclared nuclear material and activities in the State as a whole.

For States with comprehensive safeguards agreements and additional protocols in force, on the basis of the extended State declaration and relevant access for verification provided by the additional protocol, the IAEA is able to provide assurances regarding not only the non-diversion of declared nuclear material from peaceful use but also the absence of undeclared nuclear material and activities in the State. This enables the IAEA to draw the ‘broader conclusion’ that all nuclear material remained in peaceful activities.

The IAEA Secretariat’s findings and safeguards conclusions are reported annually by the Director General to the IAEA Board of Governors through the Safeguards Implementation Report (SIR). The SIR also provides a description and analysis of the IAEA’s safeguards activities, and summarizes the challenges encountered in the past year.

The IAEA has been working to resolve outstanding safeguards implementation issues in three States, namely the Democratic People’s Republic of Korea, the Islamic Republic of Iran and the Syrian Arab Republic.

Since 1994, the IAEA has not been able to conduct all necessary safeguards activities provided for in the DPRK’s NPT Safeguards Agreement, and therefore has not been able to draw any conclusion since that date. Since April 2009, the IAEA has not been able to implement any safeguards measures in the DPRK. However, the IAEA maintains readiness to play an essential role in verifying the DPRK’s nuclear programme.

Since 2010, the IAEA Board of Governors has adopted two resolutions on the implementation of safeguards in Iran.⁹ In June 2010, the United Nations Security Council also adopted an additional resolution related to Iran’s nuclear programme in which it, *inter alia*, requested Iran to cooperate fully with the IAEA on all outstanding issues, particularly those which give rise to concerns about the possible military dimensions of Iran’s nuclear programme.¹⁰ In November 2011, the Director General set out in more detail the basis for the IAEA’s concerns about possible military dimensions to Iran’s nuclear programme.

In November 2013, the IAEA and Iran signed a ‘Joint Statement on a Framework for Cooperation’, in which they agreed to strengthen their cooperation and dialogue aimed at ensuring the exclusively peaceful nature of Iran’s nuclear programme through the resolution of all outstanding issues, and to proceed with IAEA verification activities in a step by step manner.

On 24 November 2013, China, France, Germany, the Russian Federation, the United Kingdom and the United States of America agreed on a Joint Plan of Action (JPA) with Iran in Geneva. The preamble to the JPA states that “the goal for these negotiations is to reach a mutually-agreed long-term comprehensive solution that would ensure Iran’s nuclear programme will be exclusively peaceful”. Since 20 January 2014, the IAEA has undertaken monitoring and verification activities in relation to the nuclear-related measures set out in the JPA. The initial duration of

⁹GOV/2011/69 (18 November 2011) and GOV/2012/50 (13 September 2012).

¹⁰Resolution 1929 (2010).

the JPA was six months. On 24 July 2014, the JPA was extended until 24 November 2014, when it was further extended until 30 June 2015.

In his May 2011 report to the Board of Governors, the Director General provided the IAEA's assessment that it was very likely that the building destroyed at the Dair Alzour site in the Syrian Arab Republic (Syria) was a nuclear reactor which should have been declared to the IAEA. In June 2011, the Board of Governors adopted, by a vote, a resolution in which it, *inter alia*, found that Syria's undeclared construction of a nuclear reactor at Dair Alzour and failure to provide design information for the facility constituted non-compliance by Syria with its obligations under its NPT Safeguards Agreement with the IAEA. In September 2014, the Director General informed the Board of Governors that no new information had come to the knowledge of the IAEA that would have an impact on the IAEA's 2011 assessment about the building destroyed at the Dair Alzour site, and renewed his call on Syria to cooperate fully with the IAEA in connection with unresolved issues related to the Dair Alzour site and other locations. Syria has yet to respond to these calls.

The global nuclear landscape is changing rapidly and will likely continue to do so. Across the world, every day 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 in their energy mix. Over the past five years alone, the number of nuclear facilities under safeguards has risen by 12 % and the quantity of nuclear material under safeguards by some 14 %. 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 additional protocols entering into force is steadily 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 making progress. Many older nuclear plants are being modernized and becoming more technologically sophisticated. The geographical focus of these expanding programs 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.

For the foreseeable future, the IAEA's regular budget is not likely to grow to meet these increasing demands. Indeed, it has been nearly static for some time already. The IAEA depends on the financial contributions of its Member States, many of which are under pressure to reduce public expenditures. At the same time, the IAEA has the legal obligation under safeguards agreements to perform verification, which results in a steadily increasing workload.

As long as the nuclear world continues to change, IAEA safeguards will have to adapt and change with it. Without further improvements and optimization, it will be increasingly difficult to guarantee an effective, reliable and credible safeguards system. In this context, it is essential that the IAEA Department of Safeguards improves its productivity by striving for greater efficiency without compromising the effectiveness of its work and its ability to continue drawing independent and soundly-based conclusions.

There are three main ways in which this challenge can be addressed: (i) by optimizing safeguards processes for a smarter implementation of safeguards at Headquarters and in the field, which can bring improvements in effectiveness as well as cost savings; (ii) by enhancing the use of modern technology to support implementing safeguards in a more cost-effective manner; and (iii) by helping States to improve the effectiveness of their Systems for Accounting for and Control of Nuclear Material, as well as enhancing cooperation between the IAEA and its Member States.

In seeking to optimise safeguards implementation for a State, the relationship between the IAEA and the national or regional authority responsible for safeguards implementation can be a critical factor. Building cooperative and trusting relationships often brings tangible mutual benefits. The IAEA Department of Safeguards makes a conscious effort to foster more cooperative partnerships with national and regional authorities. Real progress is being made, but there is further to go.

IAEA safeguards comprise a fundamental component of nuclear non-proliferation. They promote greater confidence among the international community by providing assurances that States are complying with their obligations under relevant safeguards agreements. IAEA safeguards also contribute to strengthening collective security and help to create an environment conducive to international nuclear cooperation.

The IAEA must 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 in the common interests of all humankind. However, success can only be achieved with the political, technical and financial support IAEA Member States.

Export Control Regime

Rafael Mariano Grossi

In my capacity as the current Chairman of the Nuclear Suppliers Group (NSG), comprising 48 Participating Governments, I would like to update you on the activities of the Group. Before I elaborate on recent developments, let me begin by reminding you of the important role the NSG plays in the international nuclear non-proliferation regime.

Article III.2 of the NPT requires its parties to apply safeguards on exports of nuclear equipment or material “*specially designed or prepared*” for the processing, use or production of special fissionable material to any non-nuclear-weapon states. Together with Articles I and II, it establishes the principle that nuclear exports should contribute to peaceful nuclear cooperation. While this article covers the exports of, for example, nuclear reactors, it does not cover technology, such as the design information explaining how to build a reactor. Nor does the article cover the exports of nuclear-related dual-use equipment and technology which can also be used to develop a nuclear weapon.

As a group of responsible nuclear supplier countries that seeks to contribute to the non-proliferation of nuclear weapons, the NSG's raison d'être is to reinforce the objective of Article III.2, by implementing and promoting its guidelines. The NSG Guidelines were first published in 1978, when the NSG agreed to incorporate a Trigger List elaborated by the Zangger Committee to clarify the "*equipment or material especially designed or prepared for*" covered under Article III.2. The NSG also decided to incorporate in its scope not only equipment or material but also technology. The NSG later added dual-use items and technology, including non-fuel cycle items related to nuclear weapon development and testing, following the revelation of clandestine nuclear procurement efforts undertaken by a non-nuclear-weapon State to acquire dual-use items not covered by the Trigger List.

The NSG Guidelines are in constant evolution to reflect developments in technology, in order to ensure that nuclear trade for peaceful purposes does not contribute to the proliferation of nuclear weapons or other nuclear explosive devices. The effective and comprehensive implementation of the NSG Guidelines and control lists constitute the core of the Group's credibility. The Guidelines and their Annexes are published as IAEA Information Circular 254 Part 1 and Part 2 have been revised 21 times since their initial publication.

The NSG Guidelines are recognized not only in the area of export control, but also in a variety of other non-proliferation areas. For example, the Guidelines have been used in bilateral nuclear agreements by many countries to identify the scope of these agreements and have been referenced in the IAEA's Model Additional Protocol to broaden the scope of IAEA Safeguards. I welcome the wider application of our Guidelines to strengthen the nuclear non-proliferation regime globally.

Facilitating legitimate international trade and cooperation in the nuclear field, in a manner consistent with the nuclear non-proliferation norms, is particularly important to the NSG. While stressing that effective export controls have become ever more important for non-proliferation causes, I would like equally to emphasize that robust export controls have a positive effect in promoting and enabling legitimate trade and investment. In our experience of outreach to countries outside the NSG, we have witnessed a change in the conversation that we have been having. Whereas some countries asked "*why*" export controls are necessary several decades ago, the question now is "*how*" to implement, improve and maintain effective export controls and non-proliferation policy. This shift of focus is a source of great encouragement for the Group.

Over the last few decades, the NSG has made concerted efforts to promote openness and transparency to dispel the misperception that the NSG is a nuclear cartel or a closed group based on parameters of exclusion or exclusivity. Back in 1996, when the NSG's Plenary meeting was also chaired in Buenos Aires by Argentina, the Group decided to respond substantively and positively to the call at the 1995 NPT Review and Extension Conference for greater transparency in nuclear related export controls within a framework of dialogue and cooperation. One of the initiatives coming out of the Buenos Aires Plenary in 1996 was the creation of a Transparency Working Group, which led to the development of the Group's outreach programme, outreach seminars, the NSG website and our recently

updated public information document “*The Nuclear Suppliers Group: Its Origins, Role and Activities*”, circulated by the IAEA as INFCIRC 539 Revision 6 on 22 January 2015. The Group also issues a public statement after each Plenary meeting which is posted on the NSG website.

Since 2010, we have welcomed Mexico and Serbia as new Participating Governments of the NSG, reinforcing the globality of the Group.

From 2010 to 2013, the Group undertook a fundamental review of its Control Lists (the technical annexes to the Part 1 and Part 2 Guidelines). The Fundamental Review was an exercise of exceptional magnitude in terms of the time, effort and resources expended by Participating Governments in this three-year process, to update our lists to address technological developments. In the interest of transparency, the results of our technical discussions were posted on the NSG’s website for public use in advance of their publication in November 2013. Recognizing that the positive momentum of the Fundamental Review needed to be carried forward, the Prague Plenary in 2013 established the Technical Experts Group (TEG). The TEG has been tasked with ensuring, upon the request of the Group’s policy making body, the Consultative Group, that the NSG’s control lists remain up-to-date with technical advancements.

Successive Plenaries have worked to strengthen and clarify the NSG’s Guidelines. At the 2011 Noordwijk Plenary, Participating Governments concluded a multi-year effort and agreed to clarify the NSG Guidelines on the transfer of enrichment and reprocessing equipment, material and technologies, which is the most sensitive area in terms of nuclear weapon development. The 2012 Seattle Plenary agreed to include in the Guidelines a reference to facilitate access to nuclear material for peaceful uses by taking the fullest possible advantage of the international commercial market for nuclear fuel services. Likewise, it approved a guidance paper to streamline and strengthen the NSG’s outreach activities. The 2013 Prague Plenary agreed to amend to reference recognized IAEA recommendations for physical protection in the Guidelines and also agreed to launch the new, revised NSG public website in multiple languages. Last June, Buenos Aires was the host city for the 2014 NSG Plenary and the issue of how the Group can best promulgate its Guidelines, as part of efforts to strengthen the non-proliferation regime, was addressed. Against the backdrop of an increasing number of countries outside the NSG developing the industrial base to export NSG-controlled items, Participating Governments discussed at the Buenos Aires Plenary possible options for engaging these countries as part of efforts to universalize the NSG Guidelines.

Successive NSG Chairs have also organized a series of outreach information exchange seminars, in Amman, San Francisco and Vienna, with the broad participation of licensing and enforcement experts from both NSG Participating Governments and outreach partners. Successive NSG Chairs have made presentations on behalf of the NSG at the Asia Export Control Seminar in Tokyo, and at an International Conference on Export Control in Slovenia.

Action 18 of United Nations Security Council Resolution 1977, which extended the UNSCR 1540 Committee mandate by 10 years to 2021, stipulates that the 1540 Committee should encourage international organizations such as the NSG to

enhance cooperation and information sharing with the 1540 Committee on technical assistance and all other issues of relevance for the implementation of resolution 1540 (2004). Successive NSG Chairs have conducted outreach with the UNSCR 1540 Committee Chair, and have shared requests for assistance by UNSCR 1540 Member States wishing to avail of the expertise of NSG Participating Governments to fulfil their obligations in implementing resolution 1540. NSG Participating Governments can provide models for strict and effective national export control systems as well as expertise and a vast experience of practical implementation of such systems. As mandated by the Buenos Aires Plenary, I recently informed the UNSCR 1540 Committee Chair of a new document on the NSG website, authored by Germany and supported by a number of Participating Governments, which lists good practices of brokering and transit/transshipment.

To conclude, allow me to say a few brief words about the importance that Argentina places on nuclear cooperation and on the NSG. Argentina believes that promoting and fostering a safe and secure nuclear energy market requires cooperation, especially in the area of nuclear export controls, and that the NSG has an essential role to play in this regard. Through responsible actions and international cooperation, Argentina has carved out a place for itself in the nuclear export market. No one can make it alone. That presupposes a joint effort and a levelled playing field. Argentina views the NSG as an enabler of nuclear trade in the sense that it allows countries wanting to develop a peaceful nuclear power programme to acquire best nuclear technologies available without undermining nuclear non-proliferation. Argentina is an example of a country that has benefitted in this regard through responsible nuclear cooperation. Argentina has a well-developed nuclear sector with three nuclear power plants in operation, a strong industry base for nuclear research, an impeccable safety record, and a nuclear legacy of more than half a century. Our nuclear exports are growing, a new power plant, Atucha 2, recently went into operation and there is a general feeling in Argentina that nuclear energy is making a tangible contribution to the welfare of our people. Nuclear technology is constantly evolving and improving and the NSG has to keep pace with its developments as well as market trends and security challenges. Through our chairmanship, I have and will continue to effectively address proliferation challenges by ensuring that the focus of the NSG and its Guidelines is based on a technically sound and up-to-date assessment of current trends in the nuclear industry. The NSG is not a treaty and in order to stay relevant and operative it has to adapt itself to changing technologies and environments.

According to the IAEA's Nuclear Technology Review for 2015, thirty countries currently use nuclear power and another thirty countries are considering, planning or actively working to include it as part of their energy mix. Rapid developments in technology are leading to more countries capable of exporting NSG-controlled items. Argentina welcomes the increasing employment of nuclear science and technology for peaceful purposes worldwide, especially in developing countries. Nevertheless, the dissemination of uranium enrichment and spent fuel reprocessing technologies present obvious proliferation risks, as these technologies can produce fissile materials that are directly usable in nuclear weapons. Argentina views the

NSG as an indispensable tool for ensuring that trade, cooperation and transfers of nuclear materials, equipment and technologies can proceed with confidence, unhindered by undue obstacles, and protected through the information exchanges and the policy harmonization that the NSG engenders.

In light of the nature and increasing importance of civil nuclear cooperation and international cooperation in the peaceful uses of nuclear technology the NSG remains committed to strengthening the global nuclear non-proliferation regime as well as promoting peaceful uses of nuclear energy to supplement efforts under the NPT regime. Likewise, the NSG is committed to enhancing the level of transparency of our activities and to promote dialogue especially with NPT Member States.

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