NUCLEAR REGULATORY AUTHORITY ACTIVITIES IN NUCLEAR SECURITY

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Abstract

Undoubtedly nuclear security has surfaced as a subject of concern on the international agenda and has gained attention at the highest political level in several States. Argentina has demonstrated its strong commitment towards it and has recognized the unique role of the IAEA in strengthening global nuclear security. Argentina has also come to the conclusion that a number of stakeholders must be taken into account in order to define general requirements and necessary control standards. At the regulatory level, the Nuclear Regulatory Authority (ARN) of Argentina is mandated by the Nuclear Activity National Act to carry out tasks with the objective of preventing the commission of intentional acts that may lead to severe radiological consequences or unauthorized withdrawal of nuclear material or other materials or equipment subject to regulation and control. It has federal competence to regulate the nuclear activity on physical protection and also on transport of radioactive materials, radiation and nuclear safety and non-proliferation. The paper will describe and provide an update on the activities performed by ARN in the field of nuclear security between the 2016 and 2020 Ministerial International Conferences. It is worth noting that the chosen period includes a key development: the entry into force of the CPPNM Amendment. The mentioned activities will be described in detail under three topics: the Argentine regulatory framework, capacity building and international cooperation. The first one will deal with the process to adapt and adequate Argentine physical protection standards (in terms of normative, requirements and license conditions) to the current international legal instruments. The second area will summarize the ARN's education and training activities in nuclear security and the efforts made to enhance the nuclear security culture. Finally, the third part will cover cooperation activities at the regional and international level.

1. THE NUCLEAR REGULATORY AUTHORITY

The Nuclear Regulatory Authority (Autoridad Regulatoria Nuclear, ARN) is the Argentine agency in charge of the regulation of all nuclear activities performed in the country. It was created in April 1997 by the National Nuclear Activity Act (Law No. 24.804), which establishes its mission and responsibilities, as an autarchic entity within the jurisdiction of the National Presidency. It has competence on physical protection, radiological and nuclear safety, safeguards and non-proliferation.

ARN's main purpose is to protect people and the environment from the potential harm of ionizing radiations by developing and applying a regulatory regime for all nuclear activities carried out in Argentina. It also advises the State branches on issues that are under its responsibility.

In order to perform its regulatory functions, ARN is empowered to issue mandatory regulatory standards, to grant licenses and permits to facilities and operators, to control the compliance of requirements stated in standards and license conditions and to enforce the compliance by gradual means.

ARN has to ensure that all nuclear activities are developed for purposes authorized by the law, in accordance to the international commitments and the non-proliferation policies undertaken by Argentina. It is

also the competent authority responsible for the enforcement of regulatory functions on the physical protection of nuclear material and facilities and the nuclear security of radioactive sources, and consequently it has a key role in fulfilling the terms of the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment (CPPNM/A).

ARN is involved in the execution of numerous agreements signed with local and foreign universities, hospitals, security and armed forces, groups of regulators and other national and international institutions and organizations such as the International Atomic Energy Agency (IAEA). The negotiation of local and international agreements has always been an important mission under the framework of ARN's institutional relations area.

With regard to its national and international links, ARN continuously advances in the negotiation, approval and implementation of agreements, in compliance with the institutional objectives and with the aim of arranging and providing training workshops and/or work programs for the joint and coordinated performance of technical tasks and projects in its areas of competence and of mutual interest.

ARN pays particular attention to the education and training of its staff. It makes every effort to offer a complete inner training program to its personnel, including an introductory course which covers all aspects of ARN's mission and responsibilities, two long-standing postgraduate courses and other training options administered by its Education and Training Unit.

2. THE ARGENTINE REGULATORY FRAMEWORK

With reference to physical protection, Article 8 of Law No. 24.804 states that ARN should accomplish the functions of regulation in order to "prevent intentional actions that could lead to severe radiological consequences or to unauthorized withdrawal of nuclear materials or other materials, or equipments subject to regulation and control"[1]. Consistent with these functions, ARN has the authority to require a complete system of physical protection for nuclear materials and facilities.

ARN has power and the obligation of "applying sanctions, which shall be graded according to the severity of the infringement; such as warnings, fines to be applied according to the severity of the fault and regarding the potential damage involved, suspension of a license, permit or authorization or their revocation. Said sanctions shall be appealable only for returnable effect before the National Administrative Contentious Court of Appeals"[2].

The National Nuclear Activity Act establishes that the responsibility for nuclear and radiological safety, physical protection, and safeguards rests inexcusably with the responsible entity, i.e., the holder of the license, permission or authorization granted by ARN. The compliance with the aforementioned provisions, as well as with the standards and requirements derived from them, does not exempt the Responsible Entity from this responsibility, nor from complying with mandatory requirements that may be set by other competent authorities (such as Ministry of Health, Transport Authority and others). This is of particular significance in relation with the governmental agencies that are relevant stakeholders on national security issues.

As it was mentioned in the paper entitled "The Role of the Nuclear Regulatory Authority of Argentina in the Implementation of the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment"[3], it is important to clarify that the regulatory standards in Argentina have a performance basis, which means that they are not prescriptive in nature, but they define the completion of safety objectives. The responsible entity must prove to the Regulatory Authority that the technical means it proposes in fact achieve the objectives set in the standards. How such objectives are accomplished depends on the decisions by the organization in charge of the design, construction, commissioning, operation and decommissioning of the facility.

Furthermore, ARN has the authority to enforce regulatory standards by applying sanctions in accordance with their violation. In this way, both the "Sanctions Regime for Relevant Installations", approved by Resolution of the Board of ARN No. 24 (11/11/99), and the "Sanctions Regime for Nuclear Power Plants", approved by Resolution of the Board of ARN No. 63 (5/5/99), are the instruments currently in force.

[1] National Nuclear Activity Act (Law No. 24,804), Chapter I, Article 8, (unofficial translation of the text).
[2] National Nuclear Activity Act (Law No. 24,804), Chapter II, Article 16, (unofficial translation of the text).
[3] Third International Regulator's Conference on Nuclear Security, October 2019, Agence Marocaine de Sûreté et de Sécurité Nucléaires et Radiologiques (AMSSNuR).

Consistent with Argentina's commitments to the Convention on the Physical Protection of Nuclear Material (CPPNM), the "Standard of Physical Protection of Nuclear Materials and Installations" (Standard AR 10.13.1)[4] was issued in August 1992. With the same spirit, its first revision took place in March 2002.

The Standard establishes the general criteria for the physical protection of nuclear materials and installations applicable to protected materials, within relevant installations, in storage and during transport. The Standard outlines "physical protection" as a set of procedures to prevent, avoid and respond, with a reasonable level of assurance, intentional acts aimed at: a) the theft, robbery, unlawful taking and/or dispersion of protected material; b) the sabotage or even the solely intrusion into a relevant installation when it could be viable to cause accidents with severe radiological consequences.

Moreover, it defines a physical protection system as a set of people and means available with the capacity to prevent, delay, or avoid malevolent acts on a permanent basis and focuses on prevention and deterrence through the use of passive measures. Accordingly, the assessment of the physical protection system design should consider the adequacy regarding the objectives of detection, delay and response to a possible intrusion. Besides, the Standard stipulates that all information specific to the physical protection system must be classified.

The Standard also considers desirable characteristics such as the adaptability to situations, minimal interference with the work routine of the operating personnel, complementarity between technical and operational means. According to it, physical protection measures should have priority over those of surveillance. The implementation of these measures must not, however, interfere with those required for radiological and nuclear safety.

In addition to its objective and scope, it has different sections detailing definitions of terms, criteria, levels of physical protection and responsibilities. The materials to which it applies are Uranium 233 (U-233), Uranium 235 (U-235), Plutonium 239 (Pu-239), Plutonium 241 (Pu-241) and combinations of these nuclides, but it also extends its scope to heavy water and contains the provision "or any other material that the Nuclear Regulatory Authority decides to include". Regarding the physical protection of nuclear materials during international transport, the Standard AR 10.13.1 establishes that recommendations, levels and procedures shall be in accordance with Annexes I and II of the CPPNM. Thus, it considers and requires some measures, for example, the physical protection according to the category of material to be transported, minimization of the total time of conveyance, avoidance of regular roads, use of escort vehicles, permanent communication, satellite tracking, confidentiality of information and cross-checks on reliability of personnel.

Therefore, according to this Standard, the categorization of nuclear material provided by the CPPNM in its Annex II determines the levels of physical protection to be applied to the materials protected during transport and these levels are corresponding to those in Annex I. In the case of category I materials, transport should be carried out in accordance with the special precautions, such as an assurance of effective communication with appropriate response forces at any moment and constant surveillance by armed personnel. On the other hand, while it is not necessary for transport of categories II and III materials to be supported by escorts, it may nevertheless need an effectively means of communication with the response forces in the case of an eventuality.

Currently this Standard is under a revision process, taking into consideration the CPPNM/A, the Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev5) and other relevant elements such as the outcomes of exercises, the reviews of external experts and the expertise provided by daily physical protection inspections. Some of the concepts being considered for future addition are the design basis threat, threat assessment, nuclear security culture, graded approach and the definition of the insider.

This review is taking place as a part of a broader process which has been identified by the ARN Board of Directors as a priority in the Strategic Plan 2018-2022. At the same time, ARN is also working on an Implementation Guide that will provide more details of this Standard, with the aim of supporting the Responsible Entities in its implementation.

3. CAPACITY BUILDING

With the purpose of better integrating an appropriate mix of skills and combining different kinds of expertise; particularly, the Nuclear Security Policies together with the in-field experience of the Physical

[4] AR 10.13.1. Standard of Physical Protection of Nuclear Materials and Installations" (AR 10.13.1), Revision 1, Approved by Resolution of the Board of Directors of the Nuclear Regulatory Authority No. 03/02 (Official Bulletin 5/3/02).

Protection and Nuclear Security Inspections Section, two areas in ARN, the Non-Proliferation Policies and Institutional Affairs Department and the Radiological Safety, Security and Safeguards Department, carry out most of the nuclear security training activities.

Particularly, in 2016, ARN hosted a 5-day “Regional Training Course (RTC) on Security of Radioactive Material in Transport”, which was implemented by the IAEA Division of Nuclear Security. Around 25 experts from the region, including Bahamas, Bolivia, Brazil, Cuba, Dominican Republic, Honduras, Mexico, Panama, Paraguay, Uruguay, attended the RTC, together with representatives of Argentine institutions and governmental agencies (ARN, Undersecretariat of Nuclear Energy, National Atomic Energy Commission, National Gendarmerie) and companies involved in the production or commercialization of nuclear and/or radioactive materials (INVAP, DIOXITEK, CONUAR, Polytec, Tecnonuclear, Bacon). Its objective was to promote awareness on the need for security during transport of radioactive material and to provide participants with the necessary knowledge to develop and implement national transport security requirements. It was expected that the participants would benefit from learning about specific security measures and technologies that may be used as part of their respective national nuclear security regimes and they were encouraged to present how transport security was or would be addressed in their countries. According to the participant’s feedback, an important outcome of the RTC was the possibility of establishing contacts to enhance international cooperation on transport security issues.

In the framework of the cooperation agreement with the United States Department of Energy (DOE), and carried out by the National Nuclear Security Administration (NNSA), ARN hosted a training activity on “Security of Nuclear and Radiological Material during Transport”, from May 8 to 12, 2017. It was designed to help participants understand the need to ensure security in transport of nuclear and other radioactive materials by providing new perspectives on material characterization, security functions, management and security and safety interfaces. This program was composed of a full-day intensive course for managers and supervisors and a 4-day workshop for a broader audience, such as site security and operations personnel, guard and response force team leaders, local and national forces, ARN staff and companies responsible for transportation of nuclear and other radiological materials.

In 2018, ARN was invited by the Undersecretariat of Nuclear Energy (SSEN) to participate actively in the 3-day "Regional Workshop on Mitigation of Threats Insider: An exchange of good practices", held in Bariloche, Argentina. With the aim of taking part in case studies and roundtables to facilitate discussions and information sharing on practical ways to mitigate the insider threat, managers and senior officials in charge of nuclear security, human resources and regulations from the region were invited.

In the same year, 10 ARN officials were trained and 3 ARN experts delivered presentations on Regulator Controls, Licensing and Permitting, Overview of Category 1 and 2 Carrier Operations in Argentina, under the framework of the “Engagement and Transport Assessment Collaboration Workshop”, held in Buenos Aires from October 16 to 19.

Furthermore, the IAEA selected the Regional Training Center managed by ARN to organize the Pilot Regional Training Course for new regulators in Latin America on “National Regulatory Infrastructure for the Safety of Radiation Sources and Security of Radioactive Material”. The course was held from April 16 to June 8, 2018, within the framework of the Regulatory Infrastructure Development Project (RIDP). It was delivered by specialists and experts from ARN, SSEN and IAEA and 14 participants were trained from Argentina, Chile, Costa Rica, Cuba, Ecuador and Guatemala. The pilot activity was split into two comprehensive modules, one specific on safety and the other on security. Among the security issues developed during the course, it is worth to underline: legal and regulatory framework, physical protection of nuclear facilities and materials, functions of a physical protection system, general considerations on the design and evaluation process and analysis and evaluation of the system, security in transport and security inspections. Its objective was to provide the knowledge for the application of international standards (IAEA safety standards, recommendations and Code of Conduct on the Safety and Security of Radioactive Sources) and the practical fundamentals of the safety of radiation sources and the security of radioactive materials.

In 2018, ARN also hosted another pilot project: the 3-day "School of Nuclear and Radiological Leadership for Safety". It was attended by 24 ARN officers and delivered by IAEA facilitators from the Programme and Strategy Coordination Section of the Department of Nuclear Safety and Security. The School provided ARN officers devoted to physical protection, valuable tools for leading their teams and facing the challenges of the field. The goal of the course was to help mid-career professionals to develop their management potential through a better understanding of what leadership in nuclear and radiological working environments means in practice, given the complexities and the often contradictory considerations they may raise.

In 2019, the SSEN invited ARN to actively participate in different courses and workshops, it is important highlighting: the “Regional Training Course to Raise Information and Computer Security Awareness for Nuclear Security Regimes”, from August 26 to 30, developed by IAEA; the "National Training Course on Physical Protection of Nuclear Material and Facilities", from September 16 to 27, developed by the NNSA; and the "Regional Workshop on Nuclear Security Culture in Practice", from November 4 to 7, developed by IAEA.

Also during 2019, several ARN agents participated in different courses, schools and workshops focused on nuclear security. Some of the most noteworthy are: the International School on Nuclear Security, held in Trieste, Italy, from March 23 to April 5 and developed by the International Centre for Theoretical Physics (ICTP) and the IAEA; the International Training Course on the Use of Nuclear Material Accounting and Control for Nuclear Security Purposes at Facilities, held in the Republic of Korea, from August 19 to 23 and organized by the IAEA, and the International Training Course on Physical Protection of Nuclear Material and Facilities, held in New México, United States, from October 27 to November 15, organized by the Sandia National Laboratory with the sponsorship of the IAEA.

Before closing this section, it is necessary to emphasize the use of on-the-job training (OJT), a tool for the development of expertise and aptitudes of physical protection and security inspectors. OJT gives ARN staff a greater understanding of their responsibilities at the time it allows new employees to learn their role to successfully perform their everyday tasks. The ARN promotes the application of OJT as a continuous learning process. In this way, all personnel could benefit from the training received through it and from the attendance of the cycle of conferences and seminars coordinated by the ARN Education and Training Unit, which covers cross-sectional regulatory concerns. In this regard, it is worth mentioning that two different types of seminars were organized on the licensing process of personnel, facilities type I, II and III, and fuel cycle facilities; and on the sanctions regime of ARN, with particular focus on the Sanctions Regime for Relevant Facilities for non-compliance with nuclear and radiological safety standards, physical protection, safeguards and nuclear non-proliferation.

4. INTERNATIONAL COOPERATION

ARN places a strong emphasis on cooperation with other regional and international regulatory agencies. In this regard, in 2010, 2012 and 2014, ARN officers integrated the Argentine delegation which participated in the “Sherpas” meetings and in the Nuclear Security Summits, a high-level forum to draw attention to the threats posed by “nuclear terrorism” and to establish a common approach to globally strengthening nuclear security. In addition, in 2016 ARN collaborated in the preparation of the Argentine National Report that was presented to the Summit.

Within the framework of the Global Initiative to Combat Nuclear Terrorism (GICNT)[5], in 2015 ARN made presentations in Morocco and Finland about the Exercise of Radiological Emergency Management (REMEX) “Paihuen”, a table-top exercise co-organized with Chile that was carried out in Argentina in 2014. As a continuation of this activity, Argentina hosted “Paihuen II” in Bariloche in September 2017. This second exercise included a stage on the field in which the ARN specialists played an active role.

Argentina also held the Plenary of the GICNT in Buenos Aires from June 6 to 9, 2019. In this context, the Division of Intervention in Radiological and Nuclear Emergencies (SIERN) of the ARN carried out a "Nuclear Security Demonstration" in collaboration with several security forces and other organizations.

Regarding the CPPNM, and after the entry into force of its Amendment, on May 8, 2016, ARN experts attended the Second Technical Meeting of the Representatives of State Parties to the CPPNM and the CPPNM Amendment held from November 30 to December 2, 2016 in Vienna. As a continuity of this, during the Third Technical Meeting held in Vienna, in November 2017, ARN experts prepared and distributed to the participants a presentation regarding the implementation of the CPPNM and its Amendment in Argentina from the regulatory perspective. It should be noted that through 2018, ARN was part of the meeting of the Contact Points to the CPPNM and the CPPNM/A and took part in the first informal meeting to discuss the preparation of the 2021 Conference to Review the amended CPPNM.

With the aim of raising awareness and promoting adherence to the CPPNM and its amendment at the regional level, ARN experts have participated in the “Regional Workshop to Promote the Universalization of the Amendment to the Convention on the Physical Protection of Nuclear Material” held in San José, Costa

[5] Argentina joined in 2010 the GICNT, an eighty-six-country association, aimed at strengthening the global capacity to prevent, detect and respond to nuclear terrorism through partner nations' plans, policies, procedures and interoperability

Rica, from October 7 to 10, 2019, developed by IAEA, with representatives of 13 countries. Some of the topics discussed during the workshop were the international legal framework for nuclear security, the status of efforts to adhere to and implement the Amendment, the preparations for the 2021 Conference to review the Amendment to the CPPNM, and the technical and legislative assistance to adhering and implementing the Amendment.

In 2019, ARN senior experts attended the “Open-ended meeting of Legal and Technical Experts on IAEA Nuclear Security Series no13 and INFCIRC/225”, held in Vienna, from July 17 to 19. ARN experts also participated actively in the “Meeting of Legal and Technical Experts in Preparation for the 2021 Conference of the Parties to the Amendment to the Convention on the Physical Protection of Nuclear Material (2021 A/CPPNM Conference)”, held from July 22 to 26, in Vienna, and in the Second Meeting which took place from November 12 to 15. The purpose of those meetings was to facilitate the preparations for the 2021 Conference on the review of the implementation and adequacy of the amended Convention, according to Article 16 of the CPPNM/A.

Concerning international conferences, the presence of ARN should be highlighted. In December 2016, ARN was represented at the International Conference on Nuclear Security: Commitments and Actions, organized by the IAEA in Vienna, Austria. In 2017, various ARN experts participated in the International Conference on Physical Protection of Nuclear Material and Nuclear Facilities organized by the IAEA. During that conference, the President Board of Directors of ARN chaired the Technical Session “Nuclear Security Culture: Assessments”. Also in 2019, ARN experts elaborated papers and presentations at the Third International Regulator's Conference on Nuclear Security, held in Marrakech, Morocco, from October 1 to 4.

With reference to the 2016 and 2017 Conferences mentioned in the preceding paragraph, it is important to mention that ARN experts have been involved in their Preparatory Committees evaluating the presentations and papers submitted. Likewise, and within the framework of the "International Conference on Nuclear Security: Sustaining and Strengthening Efforts" (ICONS 2020), ARN professionals are currently taking an active part as evaluators of the different papers presented by experts from all over the world.

5. CONCLUDING REMARKS

The entry into force of the CPPNM Amendment (CPPNM/A) in May 2016 has notably triggered numerous challenges and undertakings at the national and international level. Argentina has not been the exception to it, as diverse steps were taken with the solely purpose to fully implement them. With regard to the regulatory framework, ARN is reviewing the Standard of Physical Protection of Nuclear Materials and Installations (AR 10.13.1), taking into consideration the aim and scope of the CPPNM and the CPPNM/A, and the international recommendations on the subject.

As part of the current challenges, there is still room for raising awareness of the significance of the mentioned instruments. The Fundamental Principles contained in the CPPNM/A were introduced and analyzed through education and training activities in nuclear security, with particular focus on the concept of nuclear security culture.

In the past four years, ARN was involved in numerous education and training activities concentrated on the development and improvement of the capabilities required to perform its regulatory function on nuclear security. It also helped in the training of national security forces and licensees, and contributed to the capacity building in the region.

It is relevant to note that a current challenge still needs to be faced: the universalization of the CPPNM/A. To that end, ARN dedicated human resources by contributing and attending to numerous international events that were consistent with Argentina's commitment to nuclear security. Due to its major importance, much of the efforts in the area of international cooperation were devoted to the work connected to the CCPNM and its Amendment which entered into force during the period of analysis.

The aforementioned is a clear evidence of Argentina's commitment to maintaining its dynamic participation in activities related to international nuclear security. ARN believes that it is vital to strengthen and extend international communication and cooperation and, in this regard, the IAEA holds a specific and leading role in coordinating national endeavors towards international nuclear security.