Safeguards Implementation by ABACC during the COVID-19 Pandemic

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ABSTRACT

The COVID-19 pandemic imposed unprecedent challenges to the health and the safety of the world. All aspects of human activities were severely affected. As many others, the activities aiming at verifying the commitment assumed by States with respect to the regime of non-proliferation of nuclear weapons had to be somehow adapted to keep accomplishing their objectives. In this context, safeguards field inspections are an important tool implemented by national, regional and international nuclear safeguards authorities around the world to deliver on their mandates and ensure that nuclear materials and activities are properly under control and in compliance with the undertakings assumed by the States. The Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) is a bilateral organization created by Argentina and Brazil in 1991 to verify that all nuclear materials in all nuclear activities conducted in the two countries are used exclusively for peaceful purposes. To comply with this objective, ABACC implements a Common System of Accounting and Control of Nuclear Materials (SCCC). The duties of ABACC include continuous interactions with the Department of Safeguards of the International Atomic Energy Agency (IAEA), State Authorities and facility Operators of Argentina and Brazil for planning and coordinating several verification activities, in particular the conduction of field inspections at nuclear facilities in the two countries. In order to achieve the verification objectives under the limitations imposed by the COVID-19 pandemic, the parties had to discuss and implement especial procedures in areas such as administration, logistics and management. As result, in 2020 and 2021 ABACC was able to successfully conduct all necessary field inspections in the two countries, with appropriate health and safety conditions of its staff, as well as personnel from all the other involved institutions. This paper describes the lessons learnt by ABACC during this unprecedent period and highlights the importance of multilateral cooperation as a fundamental mechanism to help overcoming difficult times.

1. INTRODUCTION

As result of a remarkable political synergy that emerged in the 80`s and a joint decision to make their nuclear programs more transparent and focused exclusively on peaceful applications, in July 1991 Argentina and Brazil signed and ratified the Agreement for Exclusively Peaceful Use of Nuclear Energy (Bilateral Agreement), which established a Common System for Accounting and Control of Nuclear Materials (SCCC), and created

ABACC to apply the SCCC in order to verify the peaceful use of all nuclear materials in all nuclear activities of the two countries [1]. Shortly after the bilateral agreement entered into force, the two countries decided to adhere to the international non-proliferation regime by signing a comprehensive safeguards agreement with the IAEA based on the SCCC and the model INFCIRC-153 - the so called "Quadripartite Agreement" [2]. The agreement entered into force in March 1994 and allows for the IAEA to verify all nuclear materials in all nuclear activities in the two countries. Among other relevant regional and international commitments, Argentina and Brazil ratified the Treaty of Tlatelolco [3] in 1994 and the Treaty on Non-proliferation of Nuclear Weapons (NPT) [4] in February 1995 and September 1998, respectively. The Quadripartite Agreement was recognized as being fully consistent with the obligations stipulated in both Treaties.

The SCCC comprises a set of procedures to ensure that all nuclear materials used in all nuclear activities in both countries are not diverted to nuclear weapons or other nuclear explosive devices. ABACC has the mission of overseeing the implementation of the SCCC based on the terms established in the Bilateral Agreement. Therefore, the role of the State Authorities and the Facility Operators is of fundamental importance for the successful implementation of the system.

In order to fulfil its mission, ABACC operates with the support of approximately 45 inspectors from each country. The inspectors are indicated by the respective country and approved by the Commission, the policy-making organ of ABACC. They are not permanent staff of ABACC. Instead, they are professionals who perform activities in the nuclear area in their respective countries as employees of government organizations or nuclear facilities. Therefore, they work for ABACC in a temporary basis, upon request of the Secretariat and formal authorization granted by the corresponding employer. During the period they work for ABACC, privileges and immunities apply, similarly to ABACC staff members. Inspections carried out in Brazil are performed by inspectors from Argentina and vice versa. This scheme assigns a unique feature to the SCCC in comparison with other regional and international organizations.

The scheduling of the inspections conducted by ABACC has to be carefully coordinated with the IAEA and the State Authorities of Argentina and Brazil, as appropriate. Also, their frequency and intensity have to fulfil well established criteria stated both in the Bilateral and Quadripartite Agreements that depend mainly on the facility type, flow and inventory of the existing nuclear materials. Under normal conditions, a high level of coordination and cooperation between all parties involved is required to successfully implement an annual inspection plan and achieve effective and efficient safeguards verification. The formal announcement of the COVID-19 pandemic by the World Health Organization in March 2020, and all subsequent preventive and protective measures globally implemented, made the planning and carrying out ABACC inspections more challenging.

2. ABACC's SAFEGUARDS IMPLEMENTATION UNDER IMPACT OF COVID-19

Overall, despite the reduction of the activities carried out in person in the ABACC Headquarters, the tools for secure remote working implemented by the IT personnel have demonstrated appropriate effectiveness. Several improvements in relevant safeguards databases and systems, including hardware upgrades, have been implement to ensure secure, reliable and stable communication channels. ABACC staff is currently able to remotely access some of the relevant reporting databases while working at home or performing in-field activities. It was necessary to count on enough administrative flexibility in regards to the work arrangements to facilitate the adaptation of staff members and minimize the risk of contamination. Statements on the conclusion of verification activities continue to be submitted by ABACC to the States in a timely manner.

Local travel restrictions, including the closing of borders, have been the most important logistical complicators for ABACC to continue implementing in-field verification activities, in particular in Argentina. To overcome these difficulties, it has been of fundamental importance the support provided by State Authorities, including the Ministries of Foreign Affairs. Chartered flights were used to allow inspectors to travel between the two countries during the time commercial flights were not available due to temporary closing of borders. Since this solution involved high travel expenses, ABACC and the IAEA have worked together to share costs and other logistical responsibilities. Despite that, it is important to highlight that no extra-budgetary support has been needed for ABACC to accomplish its mission.

ABACC inspectors have played a central role by accepting to fulfill their duties under unusual circumstances. In the beginning of the pandemic, with no vaccines available, some of them were not authorized to attend official missions as inspectors of ABACC, thus reducing the amount of effectively available inspectors. Despite these restrictions, appropriate replacements could be successfully implemented. Inspectors have to comply with safety protocols and follow strict physical distancing and personal protective measures during inspections. During approximately six months in 2020, mandatory quarantine for 14 days prior to the start of the inspections was required in Argentina. As result, in 2020 a total of 154 person-days was spent by inspectors in quarantine. At the end of that year, the mandatory quarantine was suspended and waived on submission of negative COVID-19 test results upon arrival in the country. In addition, the duration of some missions had to be extended to minimize the need for overlapping's and travels across borders. As result, the total number of temporary inspectors sent to official missions in 2020 was reduced to about 50% in comparison with previous years, with no reduction in the number of inspections and visits performed. In 2021, with vaccines already available, this number returned to levels close to normal. No inspectors have contracted COVID-19 while conducting in-field verification activities in 2020 and 2021. This clearly proves the effectiveness of all health and safety precautions that have been implemented by the States and ABACC.

In regards to the implementation of the annual inspection plan, efforts have been made to ensure that all time-critical and time-bound verification activities could be properly conducted. The most challenging situations were related to the ability to conduct short

notice random inspections at fuel fabrication and conversion plants located in Argentina. To address this limitation, ABACC agreed with the IAEA and the Argentinean State Authority a temporary inspection scheme to maintain appropriate verification levels for transfers of nuclear materials. The maintaining of inspectors on stand-by in the countries for covering unannounced and short notice random inspections has been implemented under specific arrangements. As result, in 2020 all planned inspections and visits in Argentina and Brazil were performed, being the only exception a visit for design information verification in a facility under initial construction stage located in a region with limited access conditions. Even so, it was possible to reduce the inspection effort due to the optimization of human resources and carefully inspection scheduling. In 2021, all planned inspections and visits were conducted, including the high demanding activities associated with spent fuel transfers in both countries, which resulted in enlarged inspection effort. During these years, ABACC conducted the number of inspections and visits as detailed in the Table 1 [5, 6], noting that minor differences between subsequent years are normal mainly due to location outside facilities (LOF's) that are not inspected every year, DIV visits at facilities under construction and inspections in power reactors to verify spent fuels transfers to dry storages. On the other hand, technical activities for equipment maintenance, installation and upgrade had to be significantly reduced to the minimum necessary, focusing on the instrumentation needed for unattended monitoring of spent fuel transfers from storage ponds to dry storages in power reactors.

Table 1: Summary of the Verification Activities Performed by ABACC in 2019, 2020 and 2021.

	2021	**2020**	**2019**
Nuclear Facilities under Control	75	75	77
Inspections and Visits	122	184	167
Verification Effort (pdi)	484	342	383
Quarantine (pdi)	0	154	Not applicable.

The activities related to the collection, transportation and analysis of environmental and nuclear material samples continued, albeit with some delays. In 2020, 34 nuclear material and 38 environmental samples were collected in the two countries. Since ABACC relies on the support and analytical services provided by external laboratories, some impact on the process was observed in 2020, mainly due to transportation issues. However, as the closing of the material balance periods for the most relevant bulk facilities were concentrated in the last quarter of the year, all results have been obtained at a still reasonable time frame. In mid-2021, laboratory operations and transportation processes were almost back to a normal status and the closing of material balance periods did not suffer any delay.

Other relevant figures related to the verification activities performed by ABACC in 2021:

- Approximately 4.500 Significant Quantities (SQ) of nuclear materials under control
- 1545 NDA measurements performed in the field

- 39 samples collected and analyzed by DA methods for U-total and ^{235}U enrichment
- 1043 seals attached
- 509 accounting reports audited, corresponding to a total of 15.426 lines

Training of inspectors has been severely affected. In 2020, only courses on the use of a nuclear material accountancy software have been delivered with support of remote learning tools, as part of the preparatory activities prior to missions in the field. In 2021, significant efforts were employed towards re-designing and creating new training tools that allowed for the resuming of virtual and presential courses.

3. CONCLUSIONS

The COVID-19 pandemic heavily impacted the logistical aspects associated with the organization and conduction of ABACC in-field verification activities. A number of actions have been and continue to be taken to mitigate this impact. However, the pandemic is not yet over and then a continuous review of the situation is important to support new remediation strategies and implement them in a timely manner. Mutual collaboration and efficient communication have been key elements for all safeguards players to jointly overcome these difficult times. The safety of all involved parties has been a common and high-level priority in carrying out safeguards verifications. As result, both in 2020 and 2021 ABACC was able to draw soundly-based conclusions about the exclusively peaceful use of all declared nuclear facilities and materials in Argentina and Brazil.

REFERENCES

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