ABACC

Agência Brasileiro-Argentina de Contabilidade e Controle de Materiais Nucleares

Agencia Brasileño-Argentina de Contabilidad y Control de Materiales Nucleares

Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials

RELATÓRIO ANUAL
INFORME ANUAL
ANNUAL REPORT

2017

ANNUAL REPORT 2017

MESSAGE FROM THE SECRETARY

It is with great pleasure that I present the report of the activities of the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) during the year of 2017.

ABACC works earnestly and with great force to carry out its mission to verify that Argentina and Brazil comply with the commitments assumed by the Agreement between the Argentine Republic and the Federative Republic of Brazil for the Exclusively Peaceful Use of Nuclear Energy – the Bilateral Agreement.

This mission requires that conclusions on the verification of nuclear materials at all facilities of both countries be independent and based on well-founded technical activities, ie with high credibility.

It should be noted that, after twenty six years of activities, the number of ABACC technical officials remains the same, despite the annual increase in the amount of nuclear material under verification and also approximate increase of 50% in the number of nuclear installations in both countries. Also, in the last three years, ABACC's budget remained practically unchanged. I emphasize, that in this way, the search for efficiency is a permanent priority of the Secretariat.

In order to perform effectively, ABACC should maintain a body of professionals and inspectors with extensive experience and knowledge, and use state-of-the-art and reliable measurement and control equipment. There is a new generation of inspectors, whose training set an important challenge. Besides, in order for ABACC to remain state-of-the-art, with the continued evolution of nuclear materials measurement systems and containment and surveillance systems, significant investments are necessary.

Considering the aforementioned issues, in 2017, the training of inspectors (in particular 19 new designated inspectors), the updating of nuclear material measurement equipment and surveillance and containment systems, as well as, the introduction of new verification procedures were prioritized. These matters reduce inspection effort without the loss of effectiveness.

I would like to emphasize the permanent support and commitment of Argentina and Brazil to ABACC's activities, providing the human and financial resources that enable its operation.

Finally, based on ABACC's verification activities of nuclear material, it can be said that Argentina and Brazil have complied with the basic undertaking to the exclusively peaceful use of nuclear energy, as established in the Bilateral Agreement.

I conclude by thanking Selma Therezinha Chi Barreiro Soares, Vitorio Nunes and Geraldo Renha Junior, who ended their activities in 2017, and also welcome the new staff Maria Cristina Lourenço, Fábio Cordeiro Dias and Marcos Cesar Ferreira Moreira, who joined the Agency's work team.

Marco Marzo

EXECUTIVE SUMMARY

The mission of the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) is the application of the Common System of Accounting and Control of Nuclear Materials (SCCC), established by the Agreement between the Argentine Republic and the Federative Republic of Brazil for the Use Exclusively Pacific of Nuclear Energy - Bilateral Agreement. The SCCC is a set of criteria and procedures for verification and control to ensure that nuclear materials are not diverted for the manufacture of nuclear weapons or other nuclear explosive devices.

In 2017, ABACC performed 99 inspections in nuclear facilities in both countries and 20 technical missions for installation and maintenance preventive or corrective of measurement, containment and surveillance systems.

Focusing on increasing efficiency and effectiveness in the application of the SCCC, ABACC prioritized the updating of its measurement and containment and surveillance, equipment and their related systems, as well as the introduction of new verification procedures, which reduce the effort of inspection without the loss of effectiveness.

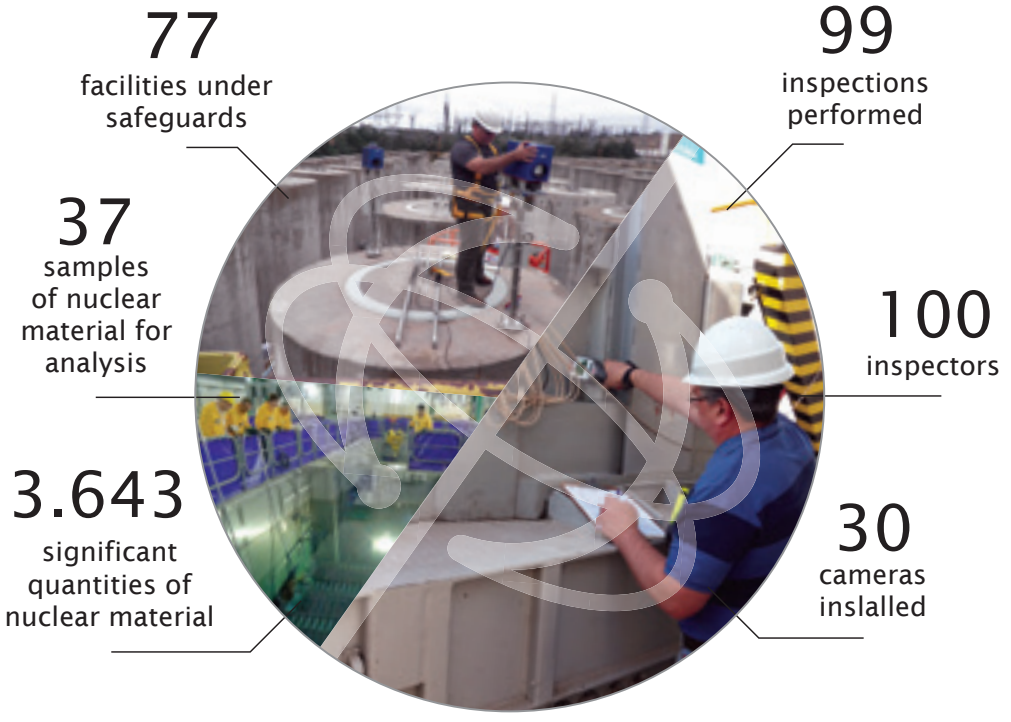
As part of the training of inspectors, essential to maintain the high level of effectiveness of the SCCC, courses related to auditing of accounting records, non-destructive measures (NDA) and safeguards introductory concepts were offered for 19 new inspectors. In addition to these courses, individual and specific training focused on inspection procedures, as well as in equipments and systems used in inspections were carried out.

A major effort was made to deploy the Unattended Monitoring Systems (UMS), which would not require the continuous presence of the inspector in the verification of transfers of spent fuel elements in nuclear reactors. Operating these systems reduces costs and increases the efficiency of such verification. The first UMS system started to be routinely used at the Embalse Nuclear Power Plant at the end of the year.

The operation of the daily transmission system of the State of Health (SoH) of the surveillance systems of Angra 2 Nuclear Power Plant and Atucha II Nuclear Power Plant was started at ABACC headquarters, allowing any faults to be immediately detected and corrected. Therefore, the probability of occurrence of anomalies, which require expensive re-verification of nuclear materials, decreases.

The quality evaluation of the laboratories carrying out the destructive analysis of the nuclear materials for ABACC was carried out through intercomparison exercises. The results obtained proved that the laboratories are internationally qualified to attend ABACC in its verification mission.

With a view to the safety and operability of the nuclear material accounting system and the facilities inventory control programs in Argentina and Brazil, the Secretariat continued the project to update the accounting database platform and the development of programs associated. The project is now 90% complete, including migration and pre-processing of accounting data.



In order to improve ABACC's management systems, the first phase of the mapping of 21 processes in the technical areas was completed. This initiative allows better management of ABACC activities and increases the quality of work.

The Secretariat proceeded to review the criteria of information security and began to draw up a security policy document. This document will define the principles and new guidelines to be adopted by ABACC.

1. THE ABACC

1.1 History and Mission

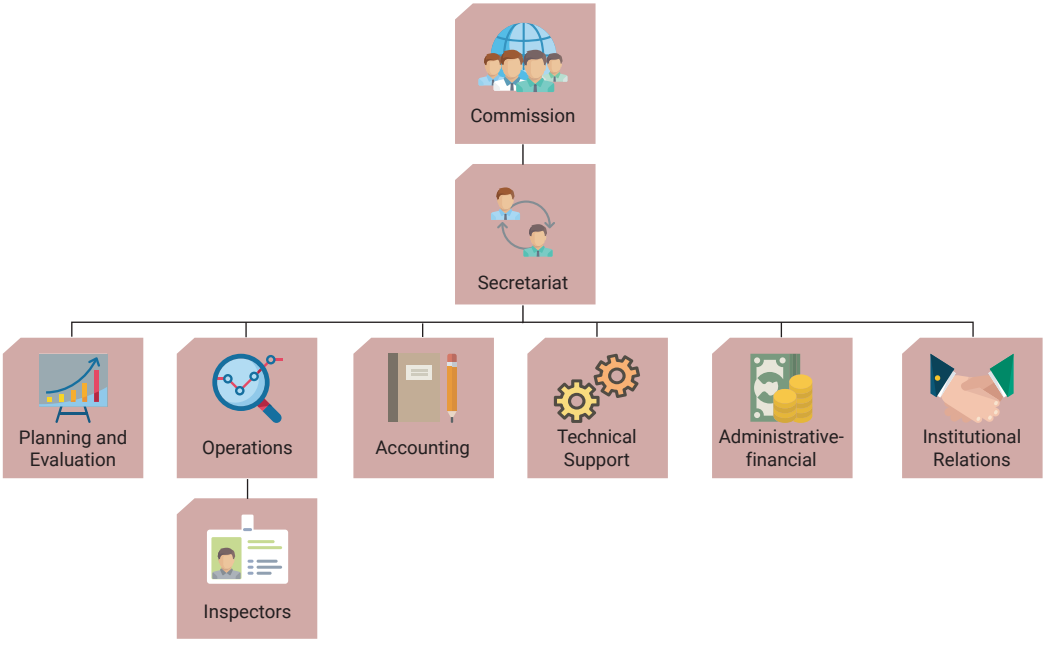
The ABACC was created on July 18, 1991, with the signing of the Agreement between the Federative Republic of Brazil and the Argentine Republic for the Exclusively Peaceful Use of Nuclear Energy (Bilateral Agreement), which entered into force on December 12, 1991, after being approved by the Congresses of both countries.

ABACC's mission is to verify that all nuclear materials in the nuclear facilities in both countries are being exclusively used for peaceful purposes.

In order to fulfill its mission, ABACC applies a bilateral safeguards system called "Common System of Accounting and Control of Nuclear Materials (SCCC)", which establishes the verification criteria and procedures to be applied to all nuclear materials in Argentina and Brazil and thereby guaranteeing the ability to detect possible diversions of these materials for the manufacture of nuclear weapons.

1.2 Organizational Chart

ABACC's organizational chart is presented in the figure below:



The Commission is the ABACC's governing body and it is composed by four members, with each country appointing two members.

The Secretariat is the ABACC's executive body, is composed by twelve members, being six of them from Argentina and six from Brazil. The Secretary and Deputy Secretary, who alternate annually in the performance of their duties, are the highest ranking officials and ensure that the SCCC control and verification activities are carried out efficiently and effectively.

Eight administrative and auxiliary staff support the routine activities necessary for the proper functioning of the Secretariat.

In 2017, ABACC counted on the work of a total of 100 inspectors from both countries. 52 inspectors were from Argentina, while 48 were from Brazil. Inspectors from Argentina perform inspections in Brazilian facilities and the inspectors from Brazil perform inspections in the Argentine facilities. Inspectors are considered to be Secretariat personnel during the safeguard missions for which they are called.

2. VERIFICATION ACTIVITIES

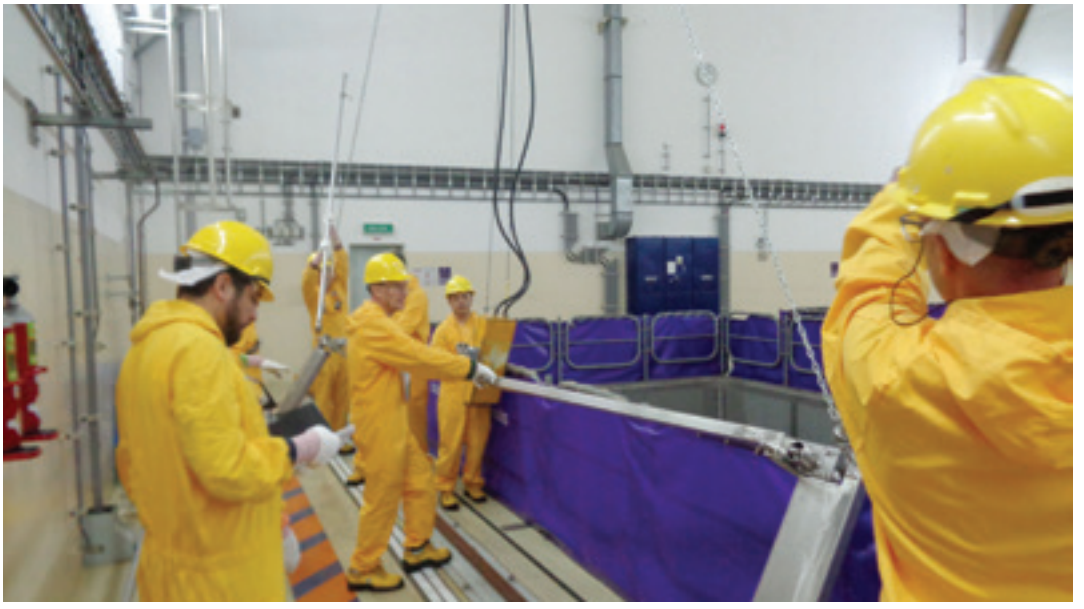
Argentina and Brazil own relevant nuclear activities and projects, such as nuclear power plants, nuclear fuel fabrication and uranium conversion plants, irradiated fuel dry storages, and reactors for research, education and production of radioisotopes. This requires ABACC to constantly develop and update effective safeguards approaches and the use of new technologies in the SCCC implementation.

The table below shows the facilities under verification by ABACC.

TYPE OF FACILITY	ARGENTINA	BRAZIL	TOTAL
Conversion and Fuel Fabrication	9*	2	**11**
Uranium Enrichment Plants	2	3	**5**
Power Reactors	5*	3*	**8**
Research Reactors/ Critical and Subcritical Units	7*	8*	**15**
Other (Research and Development Facilities, Storage, etc.)	28	10	**38**
TOTAL	**51**	**26**	**77**

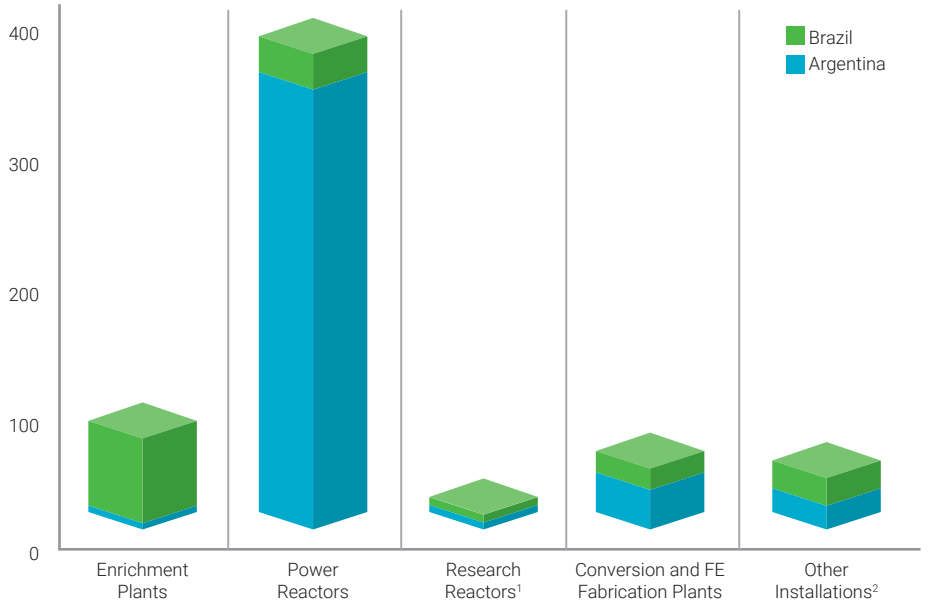
** one under construction*

In 2017, ABACC performed 99 inspections in the nuclear facilities of both countries, including the Design Information Verifications (DIV). The applied inspection effort resulted in 1.209 inspector-days in the activities of pre-, in situ and post- inspection.



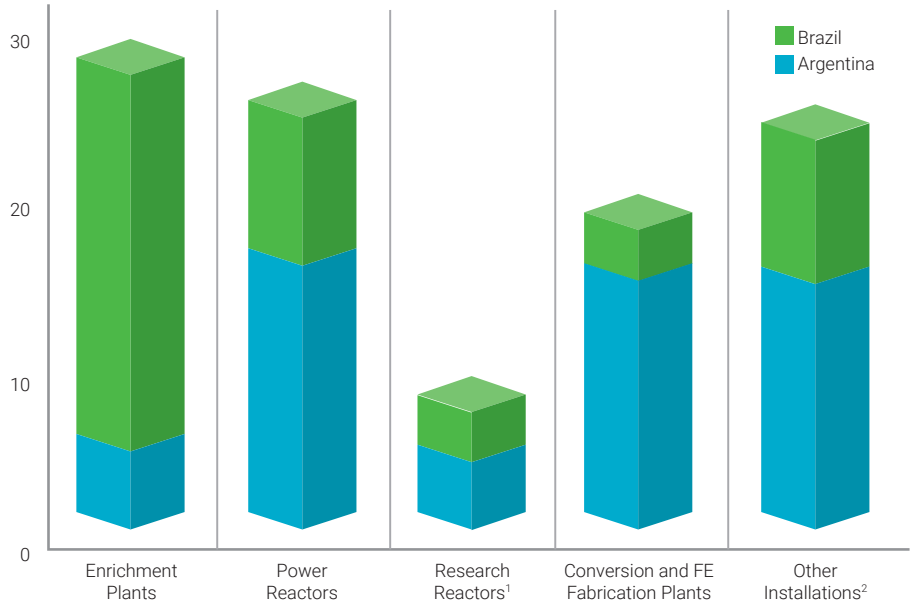
The following figures show the verification effort and the number of inspections performed by type of facility. It can be observed that the uranium enrichment plants are the ones that require most inspection effort in Brazil, while in Argentina most of the effort is applied in nuclear power plants, in particular on the verification of transfers of spent fuel elements.

Verification Effort by Type of Facility (inspectors x days)



[1] *Includes Critical and Subcritical Assemblies*
[2] *Includes Laboratories, Storages, R&D, Production of Radioisotopes, etc.*

Number of Inspections by Type of Facility



[1] *Includes Critical and Subcritical Assemblies*
[2] *Includes Laboratories, Storages, R&D, Production of Radioisotopes, etc.*

Twenty technical missions were carried out for installation and preventive or corrective maintenance of measurement, containment and surveillance systems. A total of 14 Next Generation Surveillance Systems (NGSS) were acquired for the gradual replacement of ABACC surveillance systems.

Together with the International Atomic Energy Agency (IAEA), the use of the daily transmission system for the ABACC headquarters of the State of Health (SoH) of the surveillance systems at both Angra 2 Nuclear Power Plant and Nuclear Power Plant Atucha II, started. This tool allows the immediate identification of any failure of the surveillance system and its prompt correction, avoiding costly re-verification of the inventories of nuclear material.

596 accounting reports were processed, and 82 accounting audits were carried out in 193 Accounting Books of nuclear facilities.

ABACC continued to update its nuclear material accounting database, which was created in the early 1990s. In addition, new database-driven programs are being developed to improve control inventories of nuclear facilities.

It is worth highlighting the implementation, in coordination with the IAEA, of the Short-Notice Random Inspections (SNRI) at the UO_2 Conversion Plant in Córdoba. The main conversion and manufacturing plants under the SCCC are now under the SNRI regime, which allows verifying a larger amount of nuclear material involved in transfers with a lower frequency of inspections.

The implementation of the Unattended Monitoring System (UMS), to verify transfers of irradiated fuel elements to the dry storage silos, was sucesfully accomplished at the Embalse Nuclear Power Plant. With the routine application of this system, a marked reduction in the inspection effort is expected. In addition, a new sealing system to contain these silos has been under development.

The modernization process of the technology of non-destructive measures applied in Aramar Experimental Center's Isotopic Enrichment Laboratory was started. These NDA measurements are an essential component of the safeguards approach to that facility.

ABACC continued to review the information security criteria and procedures for electronic document management. The goal is to prepare a document on the new information security policy, which will define the principles and guidelines to be adopted by ABACC.

The first phase of the internal process mapping project was ended. A total of 21 processes from the technical areas were mapped. This project contributes to a better management of the activities, with consequent improvement in the efficiency and quality of the work carried out.

3. COORDINATION OF ACTIVITIES WITH THE IAEA

In line with the provisions of the Agreement between the Argentine Republic, the Federative Republic of Brazil, ABACC and IAEA for the Application of Safeguards - Quadripartite Agreement - ABACC coordinates to the maximum its verification activities with those of the IAEA in order to minimize duplication of effort. To this end, ABACC and the IAEA held six technical meetings to discuss specific issues on the application of safeguards in the facilities of both countries.

It is also worth noting the cooperation between both agencies in the elaboration of joint inspection procedures and in the use of measurement and control equipment for common use.

During the year, five technical and coordination meetings were held with the national authorities. Coordination of activities between ABACC and the national authorities, as well as with the IAEA, is essential to ensure effective verification. In this context, it is important to emphasise the performance of tests to evaluate new potential technologies that could contribute to increase the efficiency and effectiveness of verification. The following tests were performed: 2D Laser system test for containment of nuclear material in storage; prototype testing of a Fast Neutron Collar (FNCL) for the measurement of fresh fuel elements; and testing of ultrasonic seals for the containment of irradiated fuel elements in a reactor pond.

Meetings of the Liaison Subcommittee (March 31, in Buenos Aires) and the Liaison Committee (September 25, in Vienna) as foreseen in the Quadripartite Agreement, were held. These meetings take place annually, in order to assess safeguards implementation state and improve verification activities for nuclear materials and facilities.

4. TECHNICAL COOPERATION

Cooperation with institutions which work in the area of nuclear safeguards is relevant for the exchange of information on safeguards concepts and techniques and also for the development of projects of interest to ABACC, contributing to increase the efficiency and effectiveness of its activities.

ABACC maintains technical cooperation agreements with institutions in Argentina, Brazil, the European Commission, the United States and the IAEA, among others. In the year of 2017, the following activities are worth to highlight:

Technical Cooperation with the IAEA: ABACC's network laboratories participated in the intercomparison exercise of destructive analyzes of the IAEA Nuclear Material Round Robin (NMRORO2017). Thechnical experts from ABACC´s laboratories participated in a meeting with the IAEA to discuss the results of this exercise, which were very satisfactory. In addition, these experts evaluated, together with the IAEA, the progress achieved in the development of the ABACC-Cristallini Sampling Method of UF_6

Cooperation with the United States Department of Energy (DoE): certification process for the ABACC-Cristallini UF_6 Sampling Method was initiated with the American Society for Testing and Materials (ASTM). ABACC considers that the method can be applied in safeguards based on the presentation of the statistical results of eight international laboratories, invited to qualify the method;

Cooperation with the European Commission's Joint Research Center (JRC): the project to test the use of ultrasonic seals for the containment of irradiated fuel elements in the pond of the Atucha I Nuclear Power Plant was completed. The transferring Project to ABACC of the 3D Laser system for the design information verification of nuclear installations was also concluded.

5. TRAINING

Courses and training of inspectors are essential for ABACC to maintain the high level of effectiveness of its inspections.

ABACC-IAEA JOINT AUDITING OF ACCOUNTING RECORDS (SJAR)		**DATE** March 28 - 31 **LOCATION** Rio de Janeiro - Brazil **ATTENDEES** 10
		**DATE** April 18 - 21 **LOCATION** Buenos Aires - Argentina **ATTENDEES** 10
SAFEGUARDS FOR ABACC INSPECTORS		**DATE** August 28 -September 01 **LOCATION** Rio de Janeiro - Brazil **ATTENDEES** 15* ** two IAEA´s inspectors as observers.*
INSPECTION PROCEDURES APPLIED IN FABRICATION PLANTS		**DATE** September 13 - 15 **LOCATION** Resende - Brazil **ATTENDEES** 7
		**DATE** September 18 - 20 **LOCATION** Ezeiza - Argentina **ATTENDEES** 8

6. INSTITUTIONAL ACTIVITIES

The participation of ABACC in international forums contributes to the dissemination of its activities and facilitates the participation of its officials in international technical groups.

ABACC participated in conferences, courses and seminars, and the following papers were presented:

- "Use of Ultrasonic Seals System as a Containment at Spent Fuel Storage", 39th Annual Meeting of the European Research and Development Association (ESARDA), May, Germany;
- "Qualification for Safeguards Purposes of UF_6 Sampling using Alumina - Results of the Evaluation Campaign of ABACC-Cristallini Method", 58th Annual Meeting of the Institute of Nuclear Materials Management (INMM), July, USA;
- "Experience in Unattended Monitoring Systems Applied to PHWR Reactors in Argentina: Progress Achieved", 58th Annual Meeting of INMM, July, USA.

ABACC's Secretary was invited to deliver two lectures "Regional Safeguards Arrangement: ABACC" and "Game-Changers for Nuclear Non-Proliferation and Safeguards", in the course "Nuclear Non-Proliferation, Safeguards, and Security in the 21st Century" of Brookhaven National Laboratory, June, USA;

The Deputy Secretary delivered the lecture: "Regional Safeguards: ABACC" at the Summer School: Nuclear Disarmament and Non-Proliferation, July, Mexico;

The Secretary participated in the panel "Celebrating 50 Years of Nuclear Safeguards" at the "50th Anniversary Symposium: Nuclear Safeguards in Los Alamos", July, USA;

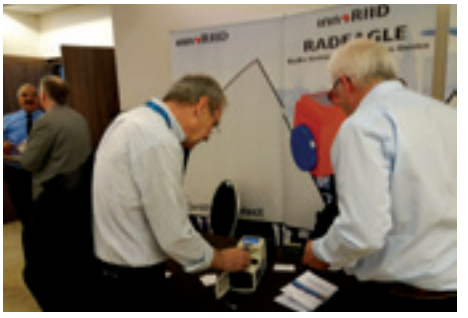
ABACC officials participated in the "International Nuclear Atlantic Conference (INAC 2017)", with the participation of the roundtable "Safety, Security and Safeguards"; presentation of the lecture "Nuclear Safeguards Framework" and participation with a booth at EXPO INAC 2017, October, Brazil;

ABACC officials participated in the Seminar "The Role of Nuclear Safeguards in Brazil", organized by COPPE / UFRJ. The following papers were presented: "ABACC - 25 Years Applying Safeguards in Brazil" and "Technologies for Physical Verification of Installation and Nuclear Materials on Safeguards", October, Brazil;

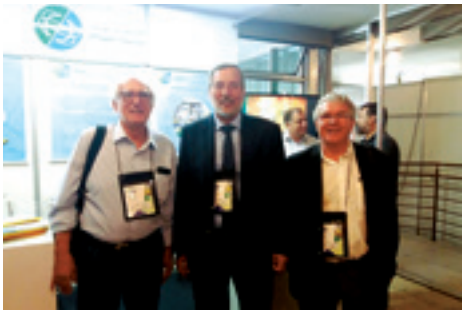
The Secretary delivered the lecture "NPT and Nuclear Safeguards" at the Seminar "Treaty on the Non Proliferation of Nuclear Weapons: Implications for the Brazilian State", organized by the Superior School of War, October, Brazil;

The Secretary participated in the International Seminar on the "Use of Research Reactors", during the 60 years' commemorations of the IEA-RI / IPEN reactor operation, with presentation of the lecture "The ABACC Model for Nuclear Material Control", November, Brazil;

The Secretary attended to the Seminar "Towards a World without Nuclear Weapons: Challenges and Perspectives", organized by the Ministry of Foreign Affairs of Brazil, with participation in the roundtable "ABACC and the IAEA Verification Regime", December, Brasil.

40th ESARDA Annual Meeting

8th INAC 2017

Academics from the University of Massachusetts and from King´s College London visited ABACC

Seminar “Towards a world without nuclear weapons: challenges and perspectives”

ABACC's representatives also participated in the following events - listed in chronological order:

- Act in commemoration of the 50th anniversary of the adoption of the Treaty of Tlatelolco, held by the Organismo para la Proscripción de Armas Nucleares en América Latina y en el Caribe (OPANAL), February, Mexico;
- ;Meeting of the IAEA Board of Governors, March, Austria;
- "International Panel on Fissile Material's Energy Policy and Security" in the Middle East Program Workshop, organized by the American University of Beirut (AUB) and Princeton University, March, Lebanon;
- "Forum on Confidence and Security-Building Measures", organized by the Organization of American States (OAS), April, USA, by videoconference;
- First Preparatory Committee to the 2020 Review Conference of the Parties to the Treaty on the Non-proliferation of Nuclear Weapons, May, Austria;
- Meeting of the IAEA Board of Governors, June, Austria;
- Meeting of the IAEA Board of Governors, September, Austria;
- 61st IAEA General Conference, September, Austria;
- On the margins of the IAEA General Conference, representatives of ABACC and the Korean Institute of Nuclear Non-Proliferation and Control (KINAC) met to exchange information on the implementation of safeguards in areas of mutual interest, September, Austria;
- Third Technical Meeting on Statistical Methodologies for Safeguards, October, Austria.

VII Forum on Confidence and Security-Building Measures

61st IAEA General Conference

LIST OF ABBREVIATIONS

ABACC	Brazilian–Argentine Agency for Accounting and Control of Nuclear Materials
IAEA	International Atomic Energy Agency
ANGRA 2	Central Nuclear Almirante Álvaro Alberto Nuclear– Unidade 2
ASTM	American Society for Testing and Materials
AUB	American University of Beirut
ATUCHA I	Central Nuclear Presidente Juan Domingo Perón
ATUCHA II	Central Nuclear Presidente Dr. Néstor Carlos Kirchner
COPPE/UFRJ	Instituto Alberto Luiz Coimbra de Pós-Graduação e Pesquisa de Engenharia, da Universidade Federal do Rio de Janeiro
DA	Destructive Analysis
DIV	Design Information Verification
DoE	U.S. Department of Energy
EOSS	Electronic Optical Sealing System
ESARDA	European Safeguards Research & Development Association
FNCL	Fast Neutron Collar
IEA-R1/IPEN	Instituto de Energia Atomica-R1/Instituto de pesquisas Energeticas e Nucleares
INAC	International Nuclear Atlantic Conference
INMM	Institute of Nuclear Materials Management
JRC	Joint Research Centre
KINAC	Korea Institute of Nuclear Nonproliferation and Control
NDA	Non destructive analisys
NGSS	Next Generation Surveillance System
NMRORO	Nuclear Material Round Robin
OAS	Organization of American States
OPANAL	Organismo para la Proscripción de las Armas Nucleares en América Latina y el Caribe
SCCC	Common System of Accounting and Control of Nuclear Materials
SJAR	ABACC- IAEA Joint Auditing of Accounting Records
SNRI	Short Notice Random Inspection Procedure
SoH	State of Health
UF_6	Uranium Hexafluoride
UO_2	Uranium Dioxide
UMS	Unattended Monitoring System

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