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**The Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials  
(ABACC) – 25 years of accomplishments and perspectives for the future**

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Summary

The Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) is a safeguards agency created by Brazil and Argentina in 1991 with the mission of verifying and providing assurances on the exclusively peaceful use of nuclear energy in these two countries. ABACC is a unique safeguards organization inserted in a nuclear weapons free zone established by the Agreement between the Republic of Argentina and the Federative Republic of Brazil for the exclusively peaceful use of nuclear energy. ABACC model and the safeguards it implements have been recognized on their added value by the international community. ABACC represents an essential component in the Argentine-Brazilian relationship that has been successfully applying safeguards in coordination and cooperation with the IAEA, the States' Authorities and Operators in two countries with a relatively advance nuclear programmes that were growing along these years in a complex international environment. A kickoff event "ABACC: 25 years of accomplishments and perspectives for the future" was the landmark of the activities for the commemoration of this anniversary of ABACC [1]. This workshop was aimed at reflecting on the main accomplishments and achievements of these first 25 years and the challenges and a vision for the future in two round tables. This paper intends to describe the experience acquired for this regional system and lessons learned that can be useful for other regions in the world by putting in a nutshell the views of some of the key contributors in the process of creation and development of ABACC.

## **1. Historical Process**

The Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) establishment was part of a long process, in which it is possible to identify six recurrent and common elements that pre-dated the formation of ABACC:

- The reaffirmation of the exclusively peaceful nature of the use of nuclear energy in Brazil and Argentina.
- The strengthening and promotion of mutual trust and transparency between Brazil and Argentina (joint projects, information exchange, reciprocal visits).
- The promotion of peaceful use of nuclear energy for the benefit of the peoples of both nations.
- The cooperation agreements with other countries in Latin America and other regions.
- A common foreign policy in the nuclear area.
- Promotion of the concepts of regional peace and security.

In fact, as of 1977, we can see these principles outlined in the first joint statement of the two Ministers of Foreign Affairs. This joint statement stresses the importance of cooperation in the nuclear field and the beginning of a systematic exchange of technology through interaction between the respective national nuclear energy organizations.

A series of subsequent presidential meetings and technical visits to nuclear facilities in both countries consolidated these ideas and produced the right environment for the presidential decision to establish a common system of safeguards inspections between the two countries.

The signature on July 18th, 1991 of the Bilateral Agreement for the Exclusively Peaceful Use of Nuclear Energy established the Common System of Accounting and Control of Nuclear Materials, the SCCC, and the bilateral agency to administer that system, ABACC. The Agreement definitively sealed the commitment to use for peaceful purposes of all material and nuclear facilities under the jurisdiction or control of both countries. The system represents a paradigm milestone of the long process of economic, political, technological and cultural integration of Argentina and Brazil.

### **1.1 Political Perspective**

To have a better understanding of the process that led the creation of ABACC, consideration should be given to the global situation during the 70ies and the economic interest in the development of the world nuclear industry. The first nuclear reactor for power production in Brazil was supplied by Westinghouse at the beginning of that decade. The first power reactor in Argentina was under operation in 1974 and resulted from the nuclear cooperation with Germany. The oil crisis of 1973 and the United States Atomic Energy Commission revision of the contracts for the supply of nuclear fuel in

July 1974 motivated an acceleration of the Brazilian nuclear and energy plans. In the case of Argentina a governmental strategic national objective towards nuclear energy production to achieve self-sufficiency in energy supply was taken and a program of various power reactors was designed.

The United States was reluctant to cooperate in the transfer of nuclear technology and the supply of new nuclear plants, so Brazil signed an important agreement with the Federal Republic of Germany after having made diplomatic overtures towards several industrialized countries. It was the largest technology transfer agreement from an industrialized to an industrializing country ever signed.

During this period, the first text proposing a joint Brazilian-Argentine safeguards system was presented on September 6, 1977 by then-U.S. Congressman Paul Findley during a press conference in Washington. This publication was soon followed by an opinion piece entitled, "Chances for a Latin Nuclear Agreement" authored by Findley in the Washington Post.

In his message to ABACC secretariat for the 25 years anniversary, Mr. Findley writes:

“My concern about nuclear warheads began in 1945 when, as a U.S. Navy officer, I visited Nagasaki, Japan; just a few weeks after a relatively small nuclear bomb dropped by a U.S. Air Force plane killed at least 60,000 human beings in a single gigantic blast. The experience was shocking and deeply troubling. I vowed to help tame the nuclear beast if opportunity ever arose.

Brazil and Argentina, in taming the beast in their neighbourhood, have led the way for humankind. Their compact has helped keep the South American region free of nuclear bombs. In time, I trust, other leaders will act as resolutely. The two countries were the first--and today still the only-- countries to achieve this pinnacle of nuclear comity and cooperation in history through the establishment of a bilateral institution.”

So, the commitment and will of the presidents of Argentina and Brazil and a group of technicians, politicians and diplomats from both countries that worked hand in hand towards the establishment of a tangible example of peaceful use of nuclear energy within a confidence building architecture, a process that started more than thirty years ago. This process was marked by a vision and decisions of high level politicians and nuclear scientist and safeguards specialists who built the general lines of the confidence building and transparency mechanism in a decidedly strategic and sensitive area like the nuclear field.

## **1.2 Academic Perspective**

Many researchers, analysts, graduated and post graduate students have made in depth analysis of the case of ABACC, its origin and role; its importance in the nuclear safeguards system and more generally in the non proliferation international environment. This paper does not intend to cover the concepts and conclusions of those

authors, but to highlight that in the 25 years of ABACC existence, these studies shown the significance and the added value of ABACC model to the world.

Some of these works describe the role of the scientific and epistemic community in the decision making process of Argentina and Brazil; others pointed out other factors like the regaining of the democracy in two countries with relatively significant nuclear development; others emphasizes the impact of ABACC model in the nuclear order.

Moreover, ABACC place in the international governance in the nuclear area, the “imbalance” of the NPT, the role that nuclear technology capability implies in terms of relative power (i.e., the most powerful nations are the ones that posses nuclear technology), the motivations to develop indigenous technology substantiated in the constraints and limitations of cooperation in sensitive technologies for peaceful uses, are also factors, are considered in the different studies related with ABACC.

Examples of the role of the scientific community in the peaceful nature of the nuclear developments of the energy in Argentina and Brazil can be found for example in the joint statement of the Brazilian Society of Physics and the Argentine Society of Physics in the 70s and 80s requesting the two governments to join the nuclear effort as there would be complementary. This balance was forward when the line of reactors chosen by Argentina based on natural uranium and heavy water (e.g. on load reactors), while Brazil opted for slightly enriched uranium and cooled with normal water (e.g., light water reactors)..

## **2. ABACC integration model**

ABACC represents the first axis of integration between Argentina and Brazil in the nuclear area. Its existence and mandate clearly demonstrates the political will of both countries to give full transparency of their nuclear programs. Creating an atmosphere of common conviction which facilitates the understand between the parties and producing the conditions necessary to meet the technological challenges and at the same time promoting constructive cooperation in non-proliferation policies, nuclear disarmament and the peaceful use of energy nuclear.

Argentina and Brazil were able to establish a safeguards system that is unique in the world today and, consolidated and matured over these twenty five years, that became respected by the international community. This perception is also supported by academic thesis, books and articles released by specialized newspapers and magazines, in different parts of the world, presenting the regime of Argentine-Brazilian safeguards as a successful experience and noting that is possible to replicate this model bearing in mind the political and social characteristics of each region.

Indeed, we can say that this system has advantages compared with the comprehensive safeguards agreements. The Quadripartite Agreement goes beyond the usual safeguards regime which connects to a state-party with the IAEA. It includes two-parties neighbouring states, an independent agency created by them - ABACC - and the International Atomic Energy Agency. Therefore, it represents a much more complete

safeguards system. The concept of two countries being crossed inspected within one organization which was created as an international body under the national and international law is recognized as efficient and effective to provide assurances on the exclusively nature of the nuclear activities of the founders countries.

A guiding principle for the quadripartite agreement was the optimization of the inspection efforts avoiding duplication while independent conclusion is required from both agencies.

During these twenty five years ABACC has been operating with institutional policies designed for being at the state of the art in technologies, especially those that could be use jointly the IAEA and the continuous technical competence of its cadres. The implementation of such policies, are relevant factors in the success of ABACC and the independence of its findings. Likewise, the mature relationship with the IAEA, built over time, allows both agencies work in harmony and with great objectivity and developed mechanisms for joint action in resources optimization, such as the common use of equipment (Joint Use Agreement). The cooperation with the IAEA became even more intense over the time. Nowadays, ABACC is part of the IAEA General Conference and of the Board of Governors, as observer.

The strong interaction of ABACC with other international actors of the safeguards community facilitates the exchange of experiences and knowledge. Besides its cooperation with the IAEA, ABACC has benefited from technical cooperation with, EURATOM, United States Department of Energy and other foreign and international organizations.

The determining factor for the success achieved is the continued support and recognition which the ABACC has been targeted, by the two governments - Brazil and Argentina. It also appears, in a very palpable way, in the area of international technical cooperation of ABACC with the laboratories of the various bodies and institutions of the two countries, always with the full support of the two governments.

### **3. ABACC accomplishments and perspectives for the future**

A system based on reciprocal transparency within a framework of peaceful nuclear development in a nuclear weapons free zone is a singular example adjusted to the reality and characteristic of the founders' countries in a region of peace that represents a concrete contribution to the peaceful development and use of nuclear energy.

Its 25<sup>th</sup> anniversary is a good opportunity to further analyze this model in order to extract the experiences and the lessons learnt, to reinvigorate the support to this initiative and to explore its benefits for other regions.

In this topic we extract some reflections from a kick off workshop promoted by ABACC as part of its commemorative activities for its 25<sup>th</sup> Anniversary, held in December 2015, with different key personalities which participated in ABACC genesis and developments.

From a historical point of view the very first seed of ABACC was making the national safeguards systems of Brazil and Argentina fully compatible. Initial declarations of nuclear material and facilities of both countries were exchanged, and the first crossed-inspections were performed within this approach. Very soon after this stage, a decision was made by the two governments to create an independent agency from the countries, entrusted with the mission of applying bilateral safeguards and with all the power required by the international law to fulfil its mandate.

ABACC and the safeguards it implements are the outcome of the vision and interdisciplinary work and commitment of Argentineans and Brazilians safeguards and nuclear specialists and high level government decision makers.

The ABACC consolidation since 1991 was built with a competent technical staff in different areas. ABACC officials started the verification of all nuclear facilities in Brazil and Argentina as a house confidence building process. ABACC has the merit of having a well-qualified small staff and use as inspectors and technical support the personnel working in the nuclear area of both countries. ABACC administration keeps the agency with the same size as a good model for any regional organization. Another advantage for both countries is related to keep the national authority regimes robust and committed to ABACC goals.

Once ABACC was constituted, its executive secretariat started the implementation of the common safeguards system. A key step at this stage was the development of the safeguards approaches for the enrichment plants of Argentina and Brazil.

The ABACC/AIEA liaison from the beginning was based on technical discussions of safeguards approaches to be applied in each facility. One example was the advisory group for safeguards at enrichment plants, which was leading with an approach development taking into account the need of industrial technology protection.

Is everything so fine in ABACC? Certainly it is not. There are always things that could be better in an organization, but in general terms, we can say that ABACC fulfil its mandate as entrusted in the bilateral agreement. This and a relation of good cooperation with the IAEA under the framework of the Quadripartite safeguards agreement, allow us to say that ABACC has achieved its goal: There is no real concern about the non peaceful use of nuclear energy in the region among the international community and between the two countries with developed nuclear programmes.

Regarding the future, it would be useful to point out challenges and opportunities for ABACC's system.

### **3.1 Challenges**

- **Credibility:** the most valuable asset of ABACC is its credibility. The technical credibility of ABACC technical staff which selection is based on nuclear safeguards skills, knowledge and experience should be the best from both countries.



- **Independence:** In its internal regulation, in the Bilateral Agreement and in the Privileges and Immunities agreements there are the necessary assurances for ABACC Secretariat to enjoy and exercise the necessary independence. The Secretariat must not receive any orders from the governments in the application of safeguards, the decisions of the Secretariat regarding inspections and their results are absolutely autonomous. The Bilateral Agreement foresees a clear procedure in case of non compliance.
- **Financial Resources:** The financial resources must be ensured so that the Secretariat can exercise its essential functions.
- **Partnership with IAEA:** Relationship with IAEA is based on confidence building and on agreed procedures in which are included clauses relative to nondisclosure by the agencies, carrying out unannounced inspections, the common use of equipment, etc. Anything affecting this confidence will damage the credibility of both ABACC and IAEA.

In the view of some thinkers, the most serious challenge to ABACC is a loss of its credibility, but there are other possible factors that require further consideration:

- The unnecessary duplication of verification between ABACC and the IAEA. There still a lot of opportunities to minimize duplication of activities without hampering the independence of the safeguards conclusions of each organization. The lack of progress in this area is a factor that sooner or later would impact on the quadripartite system as envisaged in the vision of its creation,
- A possible imbalance in the inspections privileges and in the supply of information to IAEA in detriment of ABACC;
- The role of ABACC in the case the governments of Argentina and Brazil decide to adhere to the Additional Protocol ;
- The loss of technical competence to fulfil its mandate.

ABACC was created to build and to provide confidence between Brazil and Argentina in the nuclear field and in the international community on the peaceful nature of the nuclear activities of the two countries. If its operation raises doubts or generates conflicts instead of confidence, it will probably be subject to a process where its value could be challenged. In the view of the authors, ABACC is an essential component of the bilateral relationship so it enjoys a standing support to accomplish its mission along the time.

- There are other challenges that may be worthy to further elaborate and clarify to dispel any negative impact on ABACC model. Among the views about ABACC is that is in an institution to administer the mistrust. Other is that ABACC is a mechanism of defence of the two countries against international pressure.

ABACCs credibility rests on the confidence, not in the mistrust concept. However, it should be clearly understand that the confidence that underlies ABACC mandate rests in a robust verification scheme concept. Within this basis, some viewers that a latent mistrust could make ABACC action more effective to some extent. In our view, the driving force is not a latent mistrust, but a day-by-day “confidence but verify” attitude

that serve to solve any major and many times unjustified mistrusts that could undermine the relationship of the two countries. On the other hand, ABACC could be perceived as a defence line regarding unjustified external mistrusts. ABACC carries out jointly inspections, jointly collect samples with the IAEA whose analysis can remove doubts and serve as evidence to defend the countries. In our view, this interpretation of defence line is not negative, but useful. Any negative connotations of these perceptions should be avoided. Dealing with those apparent contradictions or perceptions is part of the delicate mission of ABACC's Secretariat.

### **3.2 Opportunities**

A good opportunity of ABACC model in the next years is to consider further the value of expanding to other countries in South America its nuclear safeguards system as a means that could further contribute to the exclusively peaceful use of nuclear energy in the region and in an unprecedented way to other regions of the World.

In any case, the extrapolation of ABACC model to other regions of the world must consider their specific situations: For instance in the case of North America, Western Europe, Eastern Europe and Far-East, the coexistence of nuclear weapons and peaceful uses is an essential factor that undoubtedly would influence the type of model that could be designed. In the case of regions like the Middle East, India and Pakistan; in addition to a situation similar to the ones referred above, the more limited development of nuclear energy would be another factor to consider. In other regions, like the Sub-Saharan Africa, Central America and Caribbean and Oceania, practically there is not nuclear energy use for the time being.

### **3.3 Strengthen ABACC's Safeguards System**

ABACC's safeguards system is based on a trust but verify concept rather than a system that departs from the assumption of the existence of undeclared nuclear materials and facilities, but this does not mean that ABACC safeguards approaches and verification system do not take into account all relevant related diversion scenarios, or even more, to argue that because it does not presume the existence of undeclared activities ABACC's system is weaker than the one of the IAEA. ABACC could be further strengthening within the basis that underlines its foundation.

### **3.4 Territorial Extension**

ABACC includes two countries in South America. It is not unthinkable that nuclear energy would spread in the region. In this case, it will be better to consider broadening ABACC to a regional agency, let's say the South American Agency of Accounting and Control of Nuclear Materials. However, it is not in the near horizon the need or benefit of expanding ABACC to other countries. Ultimately, if that benefit arises here is a need of a technical and administration balance that should be respected in order to take into account the relative weight of nuclear activities of other participating countries. If this is a possible evolution of ABACC, the mandate of a broader organization in South America could be expanded as well.



### **3.5 Technical and Industrial Cooperation**

The possible trust between the two countries will be consolidated when integration between their nuclear sections as well as those of other countries of the region is achieved. There are already concrete initiatives in this direction and ABACC could act more actively relative to this integration.

### **3.6 Safeguards on Nuclear Propulsion Facilities**

A challenge before ABACC is to consider and develop in due course the safeguards measures that would apply to nuclear propulsion. ABACC can use this opportunity to develop a non-intrusive safeguards approach that could effectively be implemented to this application of nuclear energy that can enjoy international consensus. .

### **3.7 Other factors**

Other factors should be considered for the ABACC's future:

- The interconnection Argentina and Brazil;
- The international context Argentina, Brazil and the world;
- The institutional strengthen of ABACC;
- The contingent factors.

The first factor is based on the connection competency and cooperation acquired for the two countries; at this point both Argentina and Brazil grow up in a solid terrain with symmetric agreements. A diplomatic point of view expressed at the workshop considers the relationship of Brazil and Argentina more than a strategic relation but the most strategic of the relations.

The second factor considers the world division in two groups nuclear and non nuclear. The group non nuclear could be also divided in other two subgroups: near nuclear and never nuclear. The world perception of the near nuclear countries should affect the development of nuclear programs and the world nuclear trade collaboration. The nuclear balance between the two countries and technical competence acquired will be fundamental in a world with more supranational organizations and ABACC possibly will have an important role and aggregating more South America countries.

The institutional strengthen of ABACC is also based on the nuclear development plans for the two countries. The future plans for both states confirm that no step back from the nuclear field development is evident.

Other challenge for international safeguards community is the dynamic process involved in the evolution of IAEA safeguards which consider the State as a whole as the concept to provide the opportunity to take State-specific factors into consideration in all stages of the safeguards implementation. The concept should be fully taken into account

the existence of ABACC and the safeguards it implements. . The reduction of the IAEA inspection effort with optimization of its resources should be carefully understood.

#### **4. Conclusions**

ABACC is considered an entity with international credibility in the safeguards and non-proliferation environments. We brought some examples of how the ABACC is being presented as a possible paradigm to be replicated in other regions of the world; of course we cannot transplant a direct system from one region to another because there are socio-political and geographical conditions to be considered.

ABACC is an example of transparency confidence and integration of the nuclear systems of two countries with relatively interesting nuclear fuel cycle technologies and constitutes a platform to deepen the bilateral cooperation and technological integration of the nuclear sectors. ABACC is a unique example in the non proliferation arena that provides assurances on the peaceful use of nuclear energy in a framework of full support to the development of this source of energy for the benefit of the people of Brazil and Argentina.

The cooperation between ABACC and the IAEA to implement both bilateral and international safeguards in a coordinated manner could also be considered unique. Joint inspections and common use of equipment procedures as well as the development and implementation of safeguards approaches are examples of the successful cooperation. This framework and how the relationship was envisaged by the decision makers of those years allow for enhancing further the cooperation between ABACC and the IAEA. The future may bring new opportunities for both organizations to cooperate more fully and in a more optimal way.

#### References:

- [1] On December 2nd, 2015 ABACC organized the event “ABACC: 25 years of accomplishments and perspectives for the future”. ABACC would like to thank the contributors for this paper the speakers Ambassador Celso Amorim, Ambassador Sérgio Duarte, Argentinean General Consul M. Marcelo Bertoldi, Lic. Julián Gadano from the Autoridad Regulatoria Nuclear Argentina Nuclear, ABACC ex-secretary Carlos Feu, ABACC ex-official Marco Marzo, Sonia Fernández Moreno, ABACC Planning and Evaluation Officer and Professor Carlo Patti da Universidade Federal de Góias.