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SAFEGUARDS IN LATIN AMERICAN COUNTRIES: THE ROLE OF ABACC

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ABSTRACT

A Agência Brasileiro-Argentina de Contabilidade e Controle de Materiais Nucleares (ABACC), desde sua criação em 1991, é responsável pela aplicação do Acordo de Uso Exclusivamente Pacífico da Energia Nuclear, assinado por Brasil e Argentina, e pela coordenação do Acordo Quadripartito entre a AIEA, ABACC, Brasil e Argentina. Ao longo dos últimos 16 anos a ABACC vem tendo uma participação importante na aplicação das salvaguardas nos dois países, criando um sistema eficaz e eficiente respeitando os limites legais previstos nos acordos assumidos. As atividades desenvolvidas pela ABACC auxiliam o Brasil e Argentina na demonstração do compromisso da não proliferação nuclear.
O trabalho apresenta as principais realizações da ABACC a partir da implantação do Acordo Quadripartito e sua participação nos sistemas de salvaguardas em uso nos países. São discutidos o papel e contribuição da ABACC na reativação dos programas nucleares de Brasil e Argentina.

The Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) was created in 1991. Since this, ABACC is responsible for the application of the Agreement for Exclusively Peaceful Uses of Atomic Energy, signed by Brazil and Argentina and to coordinate Argentina-Brazil-IAEA-ABACC Quadripartite Agreement. During the last 16 years ABACC is having an important role on the application of safeguards in both countries, creating a system that applies safeguards with efficiency and effectiveness inside the legal framework signed by the countries. This work allowed the countries to demonstrate the importance given to non-proliferation on nuclear area.
The paper presents the major goals accomplished by ABACC from the inception of the implementation of the Quadripartite Agreement and the ABACC's participation on the safeguards systems at the two countries. It also presents the role and contribution of ABACC in the renaissance of Brazil and Argentina nuclear programs.

1- INTRODUCTION

On June 18, 1991, Brazil and Argentina signed the Guadalajara Agreement for the Exclusively Peaceful Use of Nuclear Energy (Bilateral Agreement) in which, among other actions, the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) was created, aimed at the application and management of the Common System for Accounting and Control of Nuclear Materials.

Shortly afterwards, on December 13, 1991, an Agreement was signed by Brazil, Argentina, the IAEA and the ABACC - the Quadripartite Agreement- that would consolidate the system for application of safeguards that is currently in force in both countries.

The Bilateral Agreement was often viewed as a successor to the Nuclear Non-Proliferation Treaty (NPT) as the countries undertook commitments imposed by this agreement although without agreeing with what was rated as discriminatory in the NPT. In fact, the set of agreements signed may even be viewed as being more stringent than the NPT itself.

Subsequently, both countries signed the Nuclear Non-Proliferation Treaty (NPT), Argentina first and then Brazil. This indicates that the Bilateral Agreement paved the way for the acceptance of

the NPT by separating the issue of the application of safeguards (strategic and military) from the issue of discrimination among the countries (a diplomatic matter). [1]

As stated by Brigagão et al [2], in this new global administration of shared resources, one may observe that the regional convergence policy, such as the one developed by Argentina and Brazil, is a cooperative form that magnifies the global agenda in the nuclear security and non-proliferation field.

At present, the important thing is to guarantee the full functioning of the mechanisms consecrated in the agreements between Argentina and Brazil, and to examine in what ways these could be extended to the entire Latino-American region. It would be valid, therefore, to consider ABACC as a model verification and accountancy institution of all the material and nuclear installations for a future "Latinatom" agency. In that way, such an agency would complement, with the verification and accountancy tasks of all the existing nuclear material in Latin America, the regional non-proliferation system, based on the Tlateloco Treaty and its execution organism, OPANAL. This regional system acquires an effectiveness and transparency that, besides consolidating the Latin-American Nuclear Weapons Free Zone, propitiates the region with greater benefits and bargaining power vis-à-vis the non-proliferation global system.

Such a regional organization, cooperative and integrated, assumes the existence of a more homogenous social idiosyncrasy in the region; contiguity and neighborhood are useful and pragmatic factors so as to have not only a high degree of solidarity but, particularly, a common transparency, verification and confidence building policy. This regional cooperation allows for the accomplishment of a greater integration compromise and offers a tool in order to fulfill common projects in the region.

Very often, mention has been made of the possibility of applying the Argentine-Brazilian nuclear rapprochement as an example to other regions of the world. This possibility has to be treated very carefully. No two situations are alike. It is worth mentioning that Argentina and Brazil were not enemies, just competitors. But the situation in other parts of the world, as it is very well known, is completely and absolutely different [3].

A realistic approach on conflict prevention and resolution shows that it will be necessary a specific analysis of driving forces on a case-by-case basis, to act over any dimension. In cases of "benign" conflicts (or rivalries), with no major root causes present, the same directly involved players might be able to find their own model of confidence building to cope with a conflictive situation. In cases of deeper conflicts, and mostly if they involve nuclear dangers, these strategies will be a complement of other main efforts involving key external players like nuclear weapons states and multilateral organizations. To exercise a credible leadership, useful to resolve conflictive situations, they will need to build confidence and legitimacy, through visible gestures towards the global community.[4]

2- MAJOR GOALS ACCOMPLISHED BY ABACC ON APPLYING SAFEGUARDS IN ARGENTINA AND BRAZIL

a) Implementation of a full-scope safeguards system for all nuclear materials and nuclear activities in Argentina and Brazil

The Bilateral Agreement entered into force in December 1991, and ABACC's Secretariat officially started working in July 1992. Preliminary activities performed by September 1992 were aimed at verifying the design of the facilities at both countries, training ABACC's inspectors and acquiring the first equipment for inspections. From there, the next task was focused on acquiring the necessary tools for safeguards analysis, the procurement of equipment for containment and surveillance, and the implementation of internal systems to allow the safeguards evaluation of the nuclear installations in Argentina and Brazil.

In 1992, Argentina and Brazil had approximately 70 facilities and some of them reported under the INFCIRC/66 of IAEA, while the others reported according to each national authority's requirements. It was decided to start inspecting those facilities that were not under IAEA safeguards in order to have all nuclear materials and all nuclear activities safeguarded either by IAEA or by ABACC. [5]

During the initial five years period from Abaci's creation, mutual transparency was promoted and a full-scope safeguards system was implemented on all nuclear materials and all nuclear activities in both countries. ABACC was successful in accomplishing this goal, fully supported by both governments, including the foreign affairs representatives, the national nuclear organizations and the operators. [8]

b) Application of safeguards in uranium enrichment plants in South America.

ABACC has been involved in the application of safeguards to uranium enrichment facilities by gaseous ultracentrifugation and diffusion methods since the entry into force of the Bilateral Agreement, giving priority to safeguards effectiveness and to special provisions to protect sensitive information.
Safeguards approaches developed by ABACC in cooperation with IAEA, Argentina and Brazil, include innovative elements and characteristics that were then applied in other plants from different countries in the world.

These safeguards approaches were developed having into account boundary conditions such as:[6]

- plants with small enrichment capacity, compatible with R&D laboratories and cascade operation testing facilities;

- inspection access constraints, such as visual observation, due to the operator's requirement to protect sensitive information;

- Unannounced inspections in strategic points of the plant, including unannounced access to the cascade hall to detect any change in the configuration or undeclared feed and/or withdraw;

- C&S at different points to maintain the knowledge of the nuclear material.

Based on this assumption the safeguards approach applies the following safeguards measures, in order to achieve the objectives to cover misuses scenarios:

- Environmental swipe sampling taking to detect production of uranium enriched higher than declared (i.e. higher than 5%) and to demonstrate the pattern of enrichment operation, whatever enrichment technology is used.

- Non destructive measurements-NDA- (gamma plus active and passive neutrons), in order to discard the presence of undeclared nuclear material in the installations.

- Efficient surveillance on the cascade hall and on the feed and withdraw stations based on reliable surveillance system.

- The installed capacity of the facilities is constantly supervised, while the time required for the undeclared production of a significant quantity (SQ) of highly enriched uranium is controlled.

While innovative elements are used, an adequate coverage for the most credible diversion/misuse scenarios applicable is met in this safeguards approach. [6]

c) Coordination between ABACC and the IAEA while applying safeguards.

The Quadripartite Agreement states that ABACC and the IAEA shall apply nuclear safeguards in a cooperative manner and states that both agencies shall avoid unnecessary duplication of safeguards activities. Up to now, significant advance was made in the coordination between both organizations. The data obtained from safeguards application shows that the safeguards are being applied in a more efficient way and manner, keeping high standards of efficiency.
Furthermore, coordination improvement has allowed that both increase the knowledge among their safeguards systems. This helps to build confidence between the IAEA and ABACC, by promoting a regenerative feedback that makes coordination and safeguards application more efficient.

d) Safeguards application under the frame of the Quadripartite Agreement (preserving technological and commercial sensitive information).

The international safeguards system is a dynamic one regarding its application and scope. Political decisions, as well as the activities in the nuclear field performed by different countries and the technological development, induce changes in the application of nuclear safeguards. Those changes, in general, tend to globalize certain measures which were applied or should be proper for countries considered as special cases. Timely both, Argentina and Brazil, decided to clearly indicate and formalize the commitment they assumed regarding the peaceful use of nuclear energy, while preserving their right to protect technological and commercial sensitive information.

Regarding this issue, ABACC has played a relevant role by properly “filtering” new safeguards measures, allowing the increase of transparency of both nuclear programs while preserving the above mentioned sensitive information under the frame of the Quadripartite Agreement.

e) Joint use of equipment.

This is one of the coordination improvements between ABACC and the IAEA already in force since the beginning. However, it is not merely a common use of equipment, since both organizations need to be able to reach its own independent conclusions while assuring the technical quality of the equipment, its necessary protection and high standards of performance.
The large number of tasks involved and complexity of the technical coordination require permanent discussions and updated procedures [7]. Some issues were fully discussed, such as:

- who is providing the equipment;
- who is operating the instruments, and when;
- how to guarantee independent conclusions based on data obtained through the other organization’s equipment;
- how to guarantee that each organization keeps its continuity of knowledge while using each other’s equipment;
- how to duplicate data;
- how to define a common seal;
- how to perform a joint authentication, and so forth.

As a result of such discussions, a set of procedures was established by ABACC and IAEA, allowing for the common use of equipment, which means to have almost all equipment in the field being shared by both Agencies and to have the inspectorates personnel trained, while also sharing efforts in the procurement and installation of equipment. Consequently, the inspection effort is reduced and the measurements are less intrusive for the operators. [7]

3- PRESENT SITUATION

In 2008, ABACC will be completing seventeen years of activities within the framework of the Agreement between Brazil, Argentina, the ABACC and the International Atomic Energy Agency (IAEA) for the application of safeguards.

The successful implementation of ABACC and its consolidation in the international safeguards arena were mainly a result of the full support given by both countries- Argentina and Brazil- providing the political, technical and financial conditions necessary for achieving such goals.

The role of ABACC and its international recognition may be attributed, among other considerations, to the following:

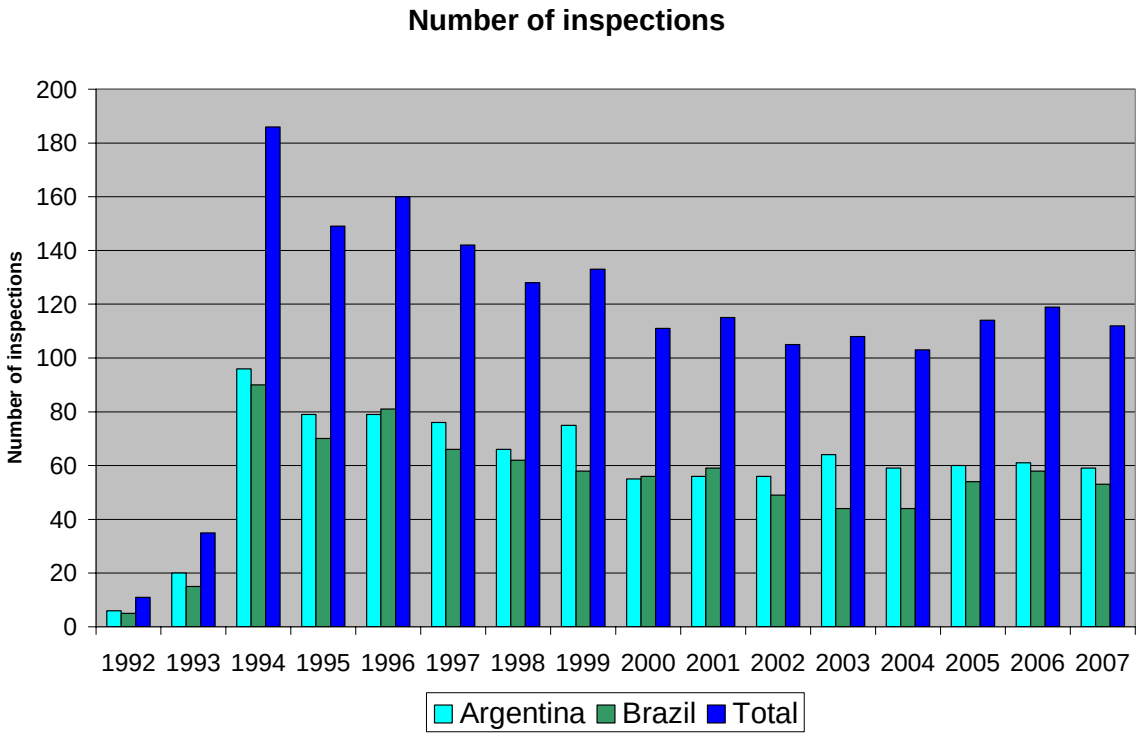
a) Technical competence of ABACC

Technical competence is a key element in order to have a credible system. ABACC always paid special attention to maintain technical competence at all levels, including staff members, inspectors, consultants, auxiliary laboratories and so on. Proper maintenance and upgrading of equipment is also necessary.

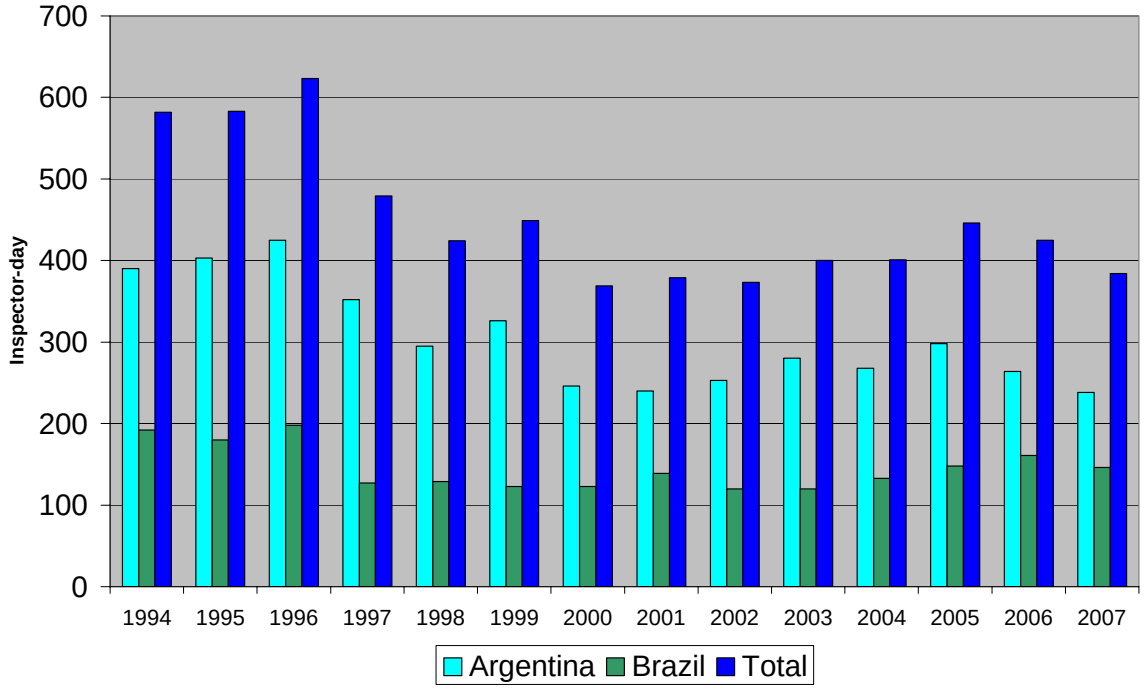
b) International credibility

ABACC is considered as a highly credible organization in the nuclear safeguards and non proliferation field.
Its professional behavior convinced the other parties in such an area, mainly the IAEA, of the independence, respectability and reliability of its managing of the Common System of Accounting and Control (in Spanish, SCCC).

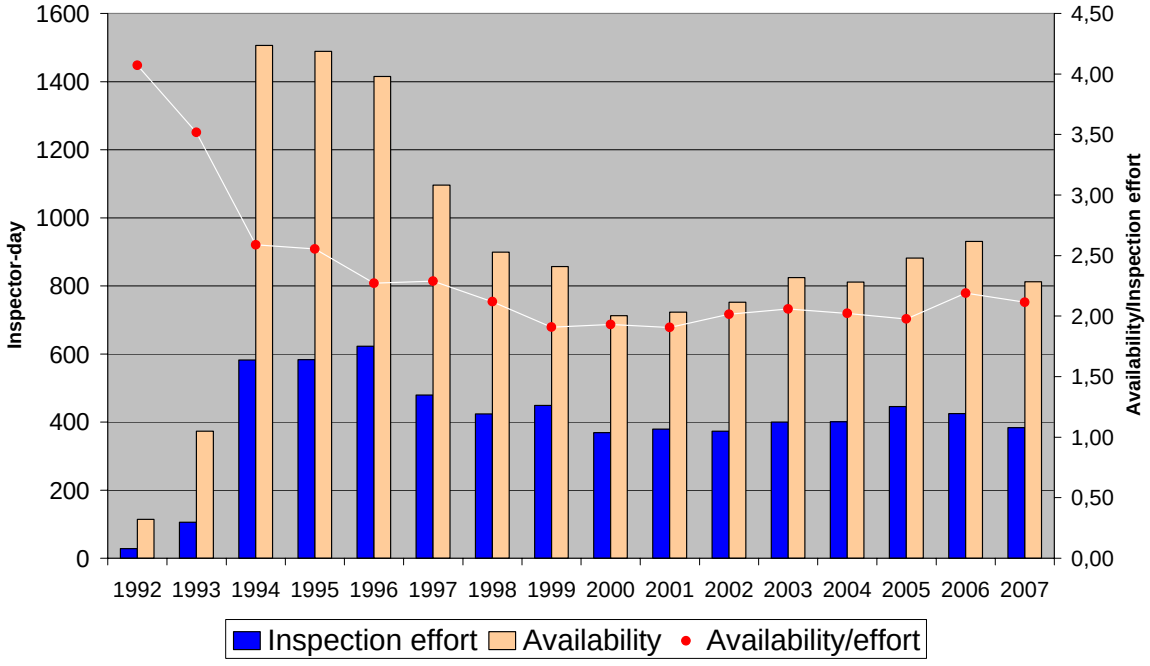
c) The efficient and effective way of performing its duties, as reflected in the following graphics:



Inspection effort



Inspection effort x Availability



4- HOW TO ASSIST ARGENTINA AND BRAZIL IN THE RENAISSANCE OF THEIR NUCLEAR PROGRAMS

A summary of the nuclear development in both countries is presented by Arguello [4].

While Argentina started its nuclear activities with the creation of CNEA (National Atomic Energy Commission) in 1950, Brazil started only a few years after. Both countries had an early stage where the United States' aid played a key role, mostly in the fifties and sixties. In 1968, Argentina made the strategic choice of natural uranium and PHWRs, and started its nuclear power plants program closing a contract with West Germany. As a result of it, the first power plant, Atucha I, outside Buenos Aires, began to operate in 1974. Brazil, in the mean time, adopted the enriched uranium line and LWRs, and got its first power plant, Angra I, from a cession agreement with the United States, in 1971. Shortly after, in 1975, the country signed a wide scope agreement with West Germany, never fully accomplished, which included several reactors, development of uranium enrichment through jet-nozzle technology, and a cession of a finished reprocessing plant. This agreement became for years the basis of the official master plan of Brazilian nuclear development for peaceful uses. In 1977 Argentina, launched its National Nuclear Plan, with the goal of mastering the whole fuel cycle. In order to pursue this goal, one year after, in 1978 started an own development of a plutonium separation plant, the LPR project, near Buenos Aires and, in 1983, announced the production of enriched uranium in Pilcaniyeu, using the gas diffusion technology. In 1987, Brazil announced uranium enrichment by ultracentrifugation at the Navy Aramar Research Center, while went on advancing with the idea of nuclear propulsion reactor together with the development of a nuclear submarine.

Presently*, both countries go forward with their nuclear programs, including the maintenance of current capacities and the addition of new projects.*
Argentina's strategy is focused on completing its third power plant, Atucha II, and positioning the country as a relevant nuclear exporter of radioisotopes and of specialties like the OPAL (Open Pool Australian Light-water reactor) a multipurpose nuclear facility, for advanced nuclear and material-science research and radioisotopes production.
Brazil, increasingly involved on the production of enriched uranium, mostly through its first industrial ultracentrifugation plant located in Resende, near Rio de Janeiro, is also reactivating the Angra III project, in order to complete its third nuclear power plant, and goes ahead with its developments intended to the nuclear submarine as well.

Furthermore, a set of very relevant joint projects has been launched in February, 2008 with the signature of a bilateral agreement to enhance the strategic and economic partnership. It includes the development of a joint uranium commercial enrichment plant, a power reactor, and some other nuclear ventures.

In this context, the experience of ABACC in building a common safeguards system can be quite useful in the implementation of this new joint venture, having into account the fact that ABACC was the first and likely the only one- fully operational binational organization created between Argentina and Brazil. Any joint venture involves plenty of interfaces, each one representing a potential problem. As stated by Biaggio et al [5], when dealing with interfaces, three essential tools are needed: exchange of personnel, meetings and frequent communications. And ABACC has been successfully dealing with interfaces since its inception. A chemist might compare the role of ABACC in this process with the role of a catalyzer in a chemical reaction. Let's work on it.

5- CONCLUSIONS

In 2008, ABACC will be completing seventeen years of activities within the framework of the Agreement between Brazil, Argentina, the ABACC and the International Atomic Energy Agency (IAEA) for the application of safeguards. During such a period, ABACC has become an essential instrument for transparency and rapprochement throughout the long way involved in the implementation of safeguards and in complying with the active and permanent commitment by both countries in favour of non-proliferation, nuclear disarmament and the promotion of the peaceful use of atomic energy.

While recognizing the sovereign right of every nation to have access to nuclear technology for the scientific, technological, economic and social development of their inhabitants, in 1991 both countries created their Common System for Accounting and Control of Nuclear Materials (SCCC). Today, it represents a paradigmatic framework of the long process of economic, political, technological and cultural integration by both countries.
It was within this context that they created the Brazilian Argentine Agency of Accounting and Control of Nuclear Materials —ABACC—, in order to manage and apply the SCCC.

Currently, ABACC applies the Common System to all the nuclear materials existing in the approximately 70 nuclear facilities available in Argentina and Brazil. In order to verify the nuclear inventory, ABACC performs approximately 110 inspections in those facilities every year.

At present, ABACC can show the world a considerable experience in the compliance with the mission assigned to it. In doing so, ABACC has become a bi-national agency for the application of safeguards enjoying a great credibility in the international arena, as well as one of the main contributors to the international non-proliferation system.

It is worth noting that maintaining the nuclear facilities in both countries under safeguards implies moving permanently throughout a long path that is crowded with challenges. For this purpose, we have done with the essential support provided by both countries, which supply both human and economic resources and offer the scientific and technical infrastructure in the hands of their national authorities and other agencies in the nuclear field, as required by the ABACC's Secretariat.

Both the Argentine and the Brazilian authorities have repeatedly stressed the relevance of the co-operation between the ABACC and the IAEA. Both organizations have also been asked to coordinate their tasks with a permanent goal: an efficient management of the cost of safeguards activities, avoiding any unnecessary duplication of efforts.

The good results attained in the joint safeguards activities and procedures, with regard to the development of innovative approaches for safeguarding uranium enrichment installations, performing unannounced inspections and the joint use of safeguards equipment units, reflect the high level of understanding and co-operation reached by both Agencies.

As expressed by both Governments, Argentina and Brazil have decided to reactivate their nuclear programs. In this context, early in 2008, both counties have signed an agreement on cooperation in the nuclear field, including in areas such as nuclear power reactors and uranium enrichment, which would allow them to continue to work together to satisfy the energy necessities of their countries in an open and transparent manner and with guarantees that such materials would be used for peaceful purposes.

This context implies an even more significant role of ABACC, involving an increase in its activities of inspection, accounting and control for the years to come. It also means that ABACC 's experience, being the only bi-national organization between Argentina and Brazil fully integrated, may be used as a catalyzer in the managing of the interfaces that such a joint venture necessarily creates.

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