

Nuclear co-operation in South America: The Brazilian-Argentine common system of safeguards

An overview of the joint approach being followed by Brazil and Argentina to verify the exclusively peaceful use of nuclear energy

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Argentina and Brazil together make up a South American region of more than 11 million square kilometres, with some 200 million inhabitants and mutual trade worth about US \$7 billion yearly. The combined gross domestic product (GDP) of the two countries exceeds US \$540 billion and accounts for approximately 50% of the total GDP of Latin America and the Caribbean, while the population of the two countries represents 35% of the total for this geographical region. Both countries are part of "Mercosur", a project for economic and market integration that also includes Uruguay and Paraguay.

Nuclear co-operation between Argentina and Brazil started in the 1960s. It was greatly intensified after 1980, when the political conditions created by the settling of disputes over the use of water resources made possible the signing of an agreement between the two countries on peaceful uses of nuclear energy. The implementation of this agreement involves joint efforts in a number of fields, including cyclotron production of radioisotopes; development of isotopic standards; radiation protection and nuclear safety; and recycling of fuel elements.

As a natural extension of this co-operation, Brazil and Argentina have over the past 14 years set up a variety of bilateral mechanisms for co-operation in the nuclear field. They are aimed both at promoting development and at strengthening mutual trust and conveying an assurance to the international community that neither of the countries intends to develop or produce nuclear weapons.

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In this context, a number of commitments to the exclusively peaceful uses of nuclear energy have been assumed by both countries. These commitments were expressed in a series of Joint Declarations on Nuclear Policy made by the two Presidents at Foz do Iguaçu (1985), Brasilia (1986), Viedma (1987), Iperó (1988) and Ezeiza (1988), and in the 1990 Joint Statement of Buenos Aires and Declaration of Foz do Iguaçu.

The policies set forth in these statements ultimately led to the Bilateral Agreement for the Exclusively Peaceful Use of Nuclear Energy, signed at Guadalajara, Mexico. It has been in force since 12 December 1991 following its ratification by the Brazilian and Argentine Congresses. The ratification resulted in the promulgation with force of law of the terms of the agreement, this law being equally binding on both Brazil and Argentina. The bilateral agreement sets up a system of full-scope safeguards and establishes the Common System of Accounting and Control of Nuclear Materials (SCCC) and the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC), whose function is to administer and implement the SCCC.

Both Brazil and Argentina have had safeguards agreements in force with the IAEA since the 1960s and 1970s. They derived from co-operation agreements that Brazil had signed with the United States and Germany, and Argentina with the United States, Germany, Canada, and Switzerland. These INFCIRC/66-type safeguards agreements dealt with specific cases of co-operation and did not cover the nuclear materials involved in each country's autonomous programmes, which are now under the full-scope safeguards established by the bilateral agreement, subject to the SCCC and verified and monitored by ABACC.

In addition, on the basis of the bilateral agreement, a quadripartite safeguards agreement was signed on 13 December 1991 between Argentina, Brazil, ABACC, and the IAEA. (This agreement entered into force on 4 March 1994).

The bilateral agreement

The basic undertakings of the bilateral agreement are:

- To use the nuclear material and facilities under their jurisdiction or control exclusively for peaceful purposes;
- To prohibit and prevent in their respective territories, and to abstain from carrying out, promoting or authorizing, directly or indirectly, or from participating in any way in: (1) the testing, use, manufacture, production or acquisition by any means of any nuclear weapon; and (2) the receipt, storage, installation, deployment or any other form of possession of any nuclear weapon;
- Bearing in mind that at present no technical distinction can be made between nuclear explosive devices for peaceful purposes, the Parties also undertake to prohibit and prevent in their respective territories, and to abstain from carrying out, promoting or authorizing, directly or indirectly, or from participating in any way in, the testing, use, manufacture, production, or acquisition by any means of any nuclear explosive device while the above-mentioned technical limitation exists;
- As a basic verification undertaking, the Parties undertake to submit all the nuclear materials in all nuclear activities carried out in their territories or anywhere under their jurisdiction or control to the SCCC.

The agreement also provides that any serious breach by one of the Parties entitles the other Party to terminate the agreement or to suspend its application as a whole or in part, notification thereof to be made by that Party to the Secretary General of the United Nations and the Secretary General of the Organization of American States.

The design and role of the SCCC

The agreement establishes the SCCC in accordance with the guidelines set out in Annex I, the objective of which is to verify that the nuclear materials used in all nuclear activities of the Parties are not diverted to uses not authorized under the terms of the agreement.

Design of the system. The SCCC was designed as a system of full-scope safeguards to be implemented by a central executive body (the permanent staff of ABACC), which receives



financial and technical support from the Parties in carrying out its activities. The system requires a combination of efforts by operators, national authorities, and ABACC.

National authorities have an important and special role to play in implementing the SCCC. In addition to carrying out the usual activities at State level, they serve as the natural channel through which ABACC requests the services it needs to conduct verification activities in the other country. Being designed in this way, the SCCC calls for well-developed national authorities, capable not only of fulfilling their obligations at the State level but also of providing all the support required for the activities of

Geographical distribution of safeguards activities in Argentina and Brazil

ABACC. This unusual dual role of the national authorities is completely new in the area of safeguards and is the cause of continuous discussions and adjustments. The technical support available in both countries comprises inspectors, consultants, working groups, special studies, training, maintenance and calibration of equipment, preparation of standards, laboratory services, and any other service or study related to safeguards.

Basic documents for the SCCC. In addition to the bilateral agreement, the principal documents defining the SCCC are the General Procedures and Implementation Manuals for each category of installation, the latter being analogous to facility attachments.

The General Procedures set out the basic criteria and requirement of the SCCC. Chapter 1 contains the criteria and conditions for the starting point of, exemptions from, and termination of safeguards. It also includes general rules for establishing an appropriate level of accountability and control of nuclear materials — later to be defined in detail in the Implementation Manual for each installation or other location — taking into account the usual parameters (category of nuclear material, conversion time, inventory, or annual throughput). Chapter 2 lays down the requirements at the State level for the licensing of nuclear facilities or other locations and the requirements regarding information of relevance to the SCCC (records, physical inventory, and traceability of measurement systems). Chapter 3 describes procedures for implementation of the SCCC at the State level.

The provisions relating to the implementation of the SCCC by ABACC are contained in Chapter 4. This includes specifications for relevant information to be provided to ABACC (design information questionnaires, or DIQs; inventory change reports, or ICRs; material balance reports, or MBRs; physical inventory listing, or PIL; and notification of transfers out of or between States Parties). Chapter 4 also describes in general terms the purposes of inspections by ABACC and the scope of such inspections and discusses access for inspection and notification about inspections. The general provisions for evaluation of shipper-receiver differences and of material unaccounted for (MUF) are also included in this chapter.

The remaining chapters contain provisions relating to the following: Chapter 5, ABACC Inspectors; Chapter 6, Routine Communications; Chapter 7, Document Revision; Chapter 8, Transitional Arrangements; and Chapter 9, Definitions. There are also two annexes: Annex 1, containing accounting report forms and instructions for their use; and Annex II, containing the Basic System of Routine Communications.

The role of ABACC

To implement the SCCC in both countries, the agreement establishes ABACC, which has its headquarters in Rio de Janeiro. The agreement gives ABACC the status of an international organization, and its officials that of international civil servants. Their privileges and immunities are set out in an additional protocol to the agreement, in the relevant headquarters agreement signed with the Government of Brazil, and in a special agreement signed with the Government of Argentina.

The organs of ABACC are as follows: the Commission, a governing body empowered to issue the necessary regulations and consisting of four members, two being designated by each government; and the Secretariat, its executive body.

The principal functions of the Commission are to:

- monitor the functioning of the SCCC;
- supervise the functioning of the Secretariat;
- appoint the professional staff of the Secretariat;
- prepare a list of qualified inspectors from among those proposed by the Parties;
- inform the Party concerned of any anomalies which may arise in the implementation of the SCCC;
- inform the Parties of any non-compliance with the agreement.

Any discrepancy or potential anomaly detected through inspections or evaluation of reports and records must be reported by the Secretariat to the Commission, which must call upon the Party concerned to correct the situation. Under the Commission's rules of procedure, its decisions are adopted unanimously.

The Secretariat has the following functions:

- to implement the directives and instructions issued by the Commission;
- to perform the necessary activities for implementation and administration of the SCCC;
- to act as the representative of the ABACC;
- to designate and instruct the inspector who will carry out the inspections;
- to receive and evaluate the inspection reports;
- to inform the Commission of any discrepancy in the records of either of the Parties which emerges from the evaluation of the inspection results.

The Secretariat consists of a Secretary and a Deputy Secretary, whose nationalities alternate every year, and of the staff, currently made up of six senior technical officers (three from each country), two administrative officers, four auxiliary staff members and some 60 inspectors

provided by the Parties (approximately 30 from each country). The inspectors are under the authority of the Secretariat during the performance of their inspection duties; they must maintain an appropriate level of confidentiality and are banned from receiving instructions from any other organization or individual in connection with their inspection activities. The agreement provides that Brazilian installations shall be inspected by Argentine inspectors and vice versa.

The inspectors are experts working for the national authorities or other official institutions in the two countries and are enlisted by the ABACC Secretariat when necessary. The inspectorate staff is made up not only of individuals with extensive experience in inspections at the national level, but also of experts in various areas of relevance to safeguards (non-destructive and destructive testing, design and operation of nuclear facilities, etc.).

The Secretariat consists of a technical unit and an administrative-financial unit. The former covers the following areas: nuclear material accounting; planning and evaluation; operations; and technical support.

The annual budget of ABACC currently stands at approximately US \$2 million per year, not including salaries for inspectors and consultants (paid directly by the countries), or equipment purchases which are made under special headings.

Implementation status

During the first months of 1992, efforts were made to acquire the basic resources (premises, appointment of staff, financial support, etc.) and to prepare the regulations needed to operate ABACC. The resulting headquarters agreement between Brazil and ABACC was signed in March 1992. The Secretariat of ABACC commenced operations at its headquarters in Rio de Janeiro in July 1992.

Declarations of initial inventories by both countries were received in September 1992, and since then the inventories have been kept up to date systematically.

Since both countries have nuclear material under IAEA safeguards (INFCIRC/66-type agreements), the Secretariat decided to oversee the accounting of all nuclear material, but to give priority to verifying the design of facilities and controlling nuclear material not safeguarded by the IAEA. Activities in line with this priority were completed in December 1993, when the design information for such facilities and their total initial inventory had been verified and dis-



An ABACC inspector applying seals to nuclear material.

(Credit: ABACC)

cussions on the respective implementation manuals were well advanced. It can therefore be said that, today, all the nuclear material in Brazil and Argentina is adequately safeguarded, either by ABACC or by the IAEA.

In order to achieve objectives, the following technical activities were carried out:

Accounting. A data bank has been set up to record the initial inventory and all subsequent changes.

Inspections. The system of inspections has been successfully launched. As of December 1993, 56 inspections had been carried out in the two countries. The ABACC's inspection effort at present amounts to around 30 person-days per month.

Training of inspectors. Two seminars for inspector training were carried out in 1992, one in Brazil and the other in Argentina. With the support of ABACC, the Argentine national authority also organized a one-month course for inspectors in June 1993. Inspectors from both countries attended the course.

Equipment. An equipment purchasing programme worth approximately US \$1.5 million was drawn up. A first stage representing \$150 000 in expenditures has been completed, and the second stage, amounting to \$500 000, is now being carried out. Funding for the third stage has already been included in the 1994 budget. In addition, the necessary steps have been taken to ensure the calibration and maintenance of the equipment and preparation and registration of the ABACC seals.



The Angra nuclear power station in Brazil.
(Credit: FURNAS Centrais Eléctricas)

Chemical and isotopic analysis of samples.

Laboratories in both countries have already been pre-selected and are receiving on a regular basis samples taken during inspections; a programme has also been launched to establish a network of Brazilian and Argentine laboratories for sample analysis, with a corresponding intercomparison exercise (it is ABACC policy that samples taken in Argentine facilities should be analyzed in Brazil and vice versa).

On the basis of the practical experience obtained with the SCCC and ABACC, a number of special points seem worth mentioning:

- Since the corps of inspectors is made up not only of safeguards experts but also of specialists in facility design and operation, the Secretariat generally puts together inspection teams consisting of a safeguards specialist and a specialist in the type of facility that is to be inspected. This makes for more effective continuous verification that the facility is operating in conformity with the operator's initial declarations.
- An operation specialist carrying out an inspection in the other country gains a better understanding of the difficulties and inconvenience associated with the application of safeguards in a specific type of facility and, upon returning to his or her normal activities, will seek to improve the safeguards-related elements in similar types of facilities in his or her own country (recording and reporting systems, measurement systems, etc.), thus creating feedback that helps to improve the process of applying safeguards.
- The SCCC is part of a whole web of technical co-operation in the nuclear field between the two countries; as a result, the human resources involved in the various applications, including the

most sensitive ones, and the activities under way in each country, are known to the other Party, which helps to increase the effectiveness of the safeguarding process.

- Most of the sites under safeguards are research or development facilities, laboratories or other locations which, by the nature of their activities, frequently change the processes employed, use a variety of different nuclear materials and generally lack continuity over time in their operations. Moreover many of these sites were not designed with safeguards in mind. Consequently, the effort that initially goes into inspecting these sites is not commensurate with the inventory of nuclear material, which is generally very small.

- As the inspectors do not work full time for the ABACC Secretariat, it is crucial that inspection reports should be extremely detailed and comprehensive, so that solutions found in the event of disputes or discrepancies can be reconstructed later and to ensure continuity of understanding of the situation at each site. Consequently, a considerable portion of the inspection person-days is spent at ABACC headquarters on pre- and post-inspection activities.

The quadripartite agreement

The bilateral Brazilian-Argentine agreement was supplemented by the quadripartite safeguards agreement, signed by the two governments, ABACC and the IAEA on 13 December 1991 in Vienna, Austria. Under this agreement, the IAEA also takes on the responsibility for applying comprehensive safeguards in Brazil



The Embalse nuclear power plant in Argentina. (Credit: CNEA)

and Argentina. (The agreement entered into force on 4 March 1994 and related IAEA verification activities have been initiated.)

The agreement's basic undertakings are the acceptance by the States Parties of safeguards, in accordance with the terms of the agreement, on all nuclear material in all nuclear activities within their territories, under their jurisdiction or carried out under their control anywhere, for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices.

In addition, the agreement states that the IAEA shall have the right and the obligation to ensure that safeguards will be applied on all nuclear material in all nuclear activities within the territories of the States Parties, under their jurisdiction or carried out under their control anywhere, for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices.

ABACC undertakes, in applying its safeguards on nuclear material in all nuclear activities within the territories of the States Parties, to co-operate with the IAEA, in accordance with the terms of the agreement, with a view to ascertaining that such nuclear material is not diverted to nuclear weapons or other nuclear explosive devices.

The agreement further states that the IAEA shall apply its safeguards in such a manner as to enable it to verify, in ascertaining that there has been no diversion of nuclear material to nuclear weapons or other nuclear explosive devices, findings of the SCCC. The IAEA's verification shall include, *inter alia*, independent measurements and observations conducted by the IAEA,

in accordance with the procedures specified in the agreement. The IAEA, in its verification, shall take due account of the technical effectiveness of the SCCC. Moreover, the agreement states that the States Parties, ABACC, and the IAEA shall co-operate to facilitate the implementation of the safeguards provided for in the agreement; and that ABACC and the IAEA shall avoid unnecessary duplication of safeguards activities.

The fact that the implementation of the SCCC and the setting up of ABACC followed the signing of the quadripartite agreement has meant that, in developing them, it has been possible to take into account the future relationship and the need for complementarity between ABACC and the IAEA in applying the safeguards foreseen by the agreement.

Positive signs

The efforts made by Brazil and Argentina to establish a common system of accounting and control of nuclear materials, the development of ABACC to administer the system, and the extent to which it has been implemented in only a short period of time indicate that it is possible successfully to establish regional systems for the application of safeguards.

Furthermore, the signing of the quadripartite agreement and the progress made jointly with the IAEA in preparing for its implementation show that regional bodies can play an important role in making the international safeguards system work effectively. □