

FROM THE DECLARATION OF FOZ DE IGUAZU TO INTEGRATED SAFEGUARDS

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Historical background

During the second half of this century, Argentina and Brazil shared a common ambition: to gain knowledge on and develop the technology required for attaining a full command of the nuclear fuel cycle.

Neither of these countries had fully adhered to the Tlatelolco Treaty, nor had they signed the Non-Proliferation Treaty (NPT), as a way to protect themselves towards the development of such technology. The discriminatory nature of the NPT was the argument used in resisting international pressures for its signature. On the other hand, the text of the Tlatelolco Treaty involved special inspections to non-declared facilities that meant a threat of industrial espionage that Argentina and Brazil wanted to avoid. This position —maintained for almost two decades— led the international community to view these countries as competing for nuclear supremacy. In practice, the argument of “distrust” was more fictitious than real and was used by the developed countries to hinder nuclear technology transfer.

As of 1985, both Argentina and Brazil, by means of joint declarations, expressed their decision to provide transparency to their nuclear programs. Consequently, they assumed several commitments concerning the exclusively peaceful purposes in their use of nuclear energy and in their respective nuclear programs. This process of joint declarations led to the signature of a Bilateral Agreement for the Exclusively Peaceful Uses of Nuclear Energy in July 1991. Through this agreement, they established formally their Common System of Accounting and Control of Nuclear Materials (SCCC) and created the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) in order to implement the established verification system. Also at that time, the decision was made to start negotiations with the International Atomic Energy Agency (IAEA) towards a joint agreement on safeguards based on the SCCC.

When the Bilateral Agreement was signed and the ABACC was created, both Argentina and Brazil had reached a significant and balanced technological development, and each of the countries aimed at profiting from the other’s experience, within a particularly favorable political process.

The “neighbor-controlling-the-neighbor” approach by itself was not enough to assure the international community that a regional system was liable to guarantee nuclear non-proliferation. There was a need to associate an international verification system to the regional scheme defined in the Bilateral Agreement. This is why both countries, the ABACC and the IAEA signed a Quadripartite Agreement (INFCIRC/435) in December 1991, which was made effective only in March 1994. This Agreement determined that the ABACC and the IAEA must perform their verification activities avoiding unnecessary duplication of efforts in safeguards and, at the same time, reach independent conclusions.

Later on, Argentina signed the NPT in December 1994, effective as of February 1995. In parallel, both countries plus Chile proposed modifications to the text of the Tlatelolco Treaty and, in 1995, after such text was modified, both Brazil and Argentina adhered fully to the same. In 1998, Brazil adhered to the NPT, which was made effective by the end of that year.

By that time, discussions were being held at the IAEA concerning the 93+2 Program, aimed at increasing efficiency and effectiveness in safeguards. As a result of these discussions, new measures and technologies were introduced to the safeguards applied until then. Also, a series of actions was outlined for the detection of non-declared nuclear materials and activities, which resulted in an Additional Protocol to the agreements between the countries and the IAEA (INFCIRC/540), which was approved by the Agency’s Board of Governors in 1997.

The SCCC and the Bilateral Agreement

The Declaration of Foz de Iguazú, dated in November 1990, approved the basis for the Common System of Accounting and Control of Nuclear Materials (SCCC) to be applied in both countries and established a schedule of activities to be performed within a 45-day term. The most relevant activities are:

- Exchange of the respective descriptive listings of all the nuclear facilities.
- Exchange of initial inventory declarations of the nuclear materials existing in each country.
- Performance of the first reciprocal inspections to the centralized registration systems; and
- Start of the negotiations with the IAEA towards reaching a Joint Safeguards Agreement on the basis of the SCCC.

In July 1991, Argentina and Brazil signed their “Bilateral Agreement for the Exclusively Peaceful Uses of Nuclear Energy”. This Bilateral Agreement established the following basic commitments by the State Parties:

- 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:
 - a) the testing, use, manufacture, production or acquisition by any means of any nuclear weapon; and
 - b) the receipt, storage, installation, deployment or any other form of possession of any nuclear weapon.

The Agreement also establishes that any serious non-compliance by either of the Parties enables the other party to abrogate the Agreement or to discontinue its application, either completely or partially, with the obligation to notify this fact to the Secretary General of the United Nations and to the Secretary General of the Organization of American States.

This agreement did also include the creation of the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) for the implementation and management of the SCCC.

The SCCC was conceived as a full-scope safeguards system based on the verification of the physical inventory of nuclear materials and of the variations reported by the operator, as well as a systematic re-verification of the design information. Additionally, the possibilities of using non-declared materials and of misuse of the facilities are taken into account. The implementation and application of the SCCC requires the joint effort of the operators, the National Authorities and the ABACC.

The SCCC consists of the General Procedures and Implementation Manuals for each category of installation. The General Procedures contain the directions provided in the SCCC. The Implementation Manuals are negotiated between the ABACC and the respective country for each installation. In these manuals, the adequate accounting and control level is defined for each installation, taking into account parameters such as:

- category of the nuclear materials;
- conversion time;
- inventory/flow of nuclear materials.

The facilities under safeguards by ABACC in Argentina and Brazil are shown in Table I.

TABLE I
FACILITIES UNDER SAFEGUARDS BY ABACC

TYPE	ARGENTINA	BRAZIL	TOTAL
Conversion/Manufacturing Plants	11	1	12
Enrichment Plants	1	2	3
Power Reactors	2	2	4
Research Reactors	6	3	9
Research and Development Facilities	1	9	10
Critical and Sub-Critical Units	–	3	3
Warehouses	3	2	5
LOFs(*)	15	9	24
TOTAL	39	31	70

(*) LOCATION OUTSIDE FACILITIES – Any location where nuclear materials are used or stored in amounts equal to or smaller than 1 kg effective.

ABACC

The structure of ABACC includes a managing body and an executive body. The managing body is called Commission and includes four members, two of them appointed by each Party. The executive body, called Secretariat, includes 10 technical professionals, 2 administrative professionals and 5 clerical staff members. The professionals from each one of the countries with the highest hierarchy fill the Secretary and Deputy Secretary positions and alternate their positions yearly.

Additionally, each one of the countries makes available to ABACC a listing with approximately 35 inspectors; such listing must be approved by the Commission. Inspections in Argentina are performed by Brazilian inspectors and vice versa. Inspectors enroll in ABACC only for the periods associated with their inspection work and, once the latter is finished, they return to their original activities. The fact that some inspectors work for the national safeguards systems and other for the facilities allows the Secretariat to assemble inspector teams with a high technical level. In fact, this is one of the major advantages of the system: the possibility of using inspectors specialized in the processes to be inspected. ABACC has its own training programs, considering the different backgrounds of its inspectors. Such programs are revised every year.

Also, the countries make available to the ABACC several specialized laboratories. The samples obtained in the Brazilian facilities are analyzed in Argentine laboratories and vice versa. Annually, the ABACC coordinates diverse inter-comparison tests between its network of laboratories and the main safeguards laboratories recognized internationally. This allows guaranteeing an acceptable level of confidence in the results obtained by the laboratories involved in the system managed by the ABACC.

Additionally, the countries support the ABACC with their specialists and technical teams when required for representing the Agency in technical-scientific meetings or for the development of specific topics related to the implementation of other approaches to safeguards.

ABACC and the IAEA applying safeguards

The agreement among Brazil, Argentina, ABACC and the IAEA for the application of safeguards, known as Quadripartite Agreement (INFCIRC/435), was signed in December 1991 and made effective in March 1994, upon ratification by the Congresses of both countries.

The basic commitments involved in the Quadripartite Agreement are:

- The State Parties shall apply safeguards to all the nuclear materials and to all the nuclear activities performed within their territories, under their jurisdiction or carried out under their control, regardless their location, so as to verify that such materials are not diverted to the manufacture of nuclear weapons or of other explosive nuclear devices.
- In its verifications, the IAEA shall take due account of the technical effectiveness of the SCCC.
- The State Parties, ABACC and the IAEA shall cooperate in order to facilitate the implementation of the safeguards provided for in the agreement.
- ABACC and the IAEA shall reach independent conclusions and avoid unnecessary duplication of safeguard's activities.

During the years following the enforcement of the Quadripartite Agreement, the biggest efforts were devoted to the coordination of activities with the IAEA. Such coordination was not easy and both Agencies had to make big efforts in order to solve various problems ranging from discrepancies among inspectors in the field to hard discussions on the interpretation of criteria.

The fundamental milestones in the coordination of safeguards activities with the IAEA were: the decision of upgrading the level of the Liaison Committee among the State Parties, ABACC and the IAEA, made in 1996, and the approval of the “Guidelines for the coordination of routine and ad-hoc inspection activities between the IAEA and ABACC” in 1997.

During the last two years, a high priority was applied to the negotiation of procedures for the common use of equipment; this meant an important step forward in avoiding unnecessary duplication of efforts. At present, practically all the equipment used for inspections, both for containment and surveillance and for measurements, is under procedures for common use approved by both organizations.

Besides, ABACC and the IAEA have coordinated their activities for a better use of the inspectors in the field without impairing the execution of the forecasted tasks. The inspection efforts as established in the Common System of Accounting and Control of Nuclear Materials (SCCC) and in the IAEA's criteria were reduced for the facilities labeled as "Other Sites". Previously, all of these facilities were inspected once a year and, now, only 30% of them are inspected annually. Also, an agreement was made —concerning both these facilities and other simple ones— to send one inspector from each agency instead of two of them as it had been done formerly. The results are reflected in Figures 1 through 3.

Another activity that deserved special care was the transfer of spent fuel to dry storage facilities at the Embalse Nuclear Power Plant in Argentina. This facility accounted for 47% of the inspection efforts made by ABACC; that is, practically the same efforts as the rest of all the other facilities in Argentina and Brazil. In order to reduce the required inspection efforts, several studies were performed and procedures were negotiated. Finally, an agreement was made with the IAEA, the Argentine Regulatory Authority and the Operator by which a single inspector from each agency visits the field, instead of two of them which was the current practice before, thus preserving the principle of allowing both agencies to reach independent conclusions.

However, it must be noted that there is still a long way to run before reaching the objective expressed in the Quadripartite Agreement: "avoiding the unnecessary duplication of efforts". The performance of inspections by a single inspector from each agency is just being started. The experience is highly positive and, certainly, involves an open door to apply the same approach to practically all the inspections performed by the IAEA and ABACC. The next step forward shall be aimed at convincing the IAEA to perform inspections on the basis of the "one-man-one-job" concept. This is a hard task that will require some time before it is actually implemented; however, fulfilling this goal is definitely essential.

The introduction of new technologies in the near future, including remote monitoring of the facilities, will allow for future reductions in inspection efforts, thus increasing both the efficiency and the effectiveness of safeguards.

Strengthening safeguards

The confirmation of non-declared nuclear activities in Iraq and the problems related to the verification of the inventory of nuclear materials in the Democratic Republic of Korea —both countries have signed the NPT— has demonstrated the weakness of the international safeguards system applied by the IAEA. As a result of this, in 1992, the Agency's Board of Governors asked the Director General to present a concrete proposal for strengthening safeguards while improving its cost-benefit ratio.

Basically, the strengthening of international safeguards could be attained by increasing the capacity to detect the diversion of declared nuclear materials, as well as non-declared nuclear activities, especially those related to the production of plutonium (Pu) and of highly-enriched uranium (HEU). It must be noted that, until such time, international safeguards did only deal with detecting diversion of nuclear materials and of declared nuclear activities.

As a result of such request, in 1993, the Secretariat presented the so-called Program 93+2, in which provisions were made for evaluating —within a 2-year term— the techniques, financing and legal issues involved in a set of actions aimed at a strengthened and more efficient safeguards system.

After long discussions with the member countries, in 1993, the Secretariat presented a wide range of measures for the strengthening of safeguards. This was split into two parts: Part I, including the measures that, in principle, could be introduced under the current legal system and, therefore, could be implemented right away; Part II was aimed at the detection of non-declared nuclear activities and, thus, requiring additional legal measures.

It is important to point out that the SCCC was created in 1991 and that, although designed for applying conventional safeguards, its approach has never excluded non-declared materials or installations or to the misuse of declared installations.

Part II was thoroughly discussed and became the “Additional Protocol to the agreements between the States and the IAEA for the application of safeguards (INFCIRC/540)”, approved by the Agency's Board of Governors on May 15, 1997. In such occasion, a series of actions were approved aiming at strengthening the safeguards that were being applied and, at the same time, other actions were introduced for the detection of non-declared materials and installations. A significant number of entities and countries —including the European Community, the United States and Japan— have already adhered to this Protocol. Argentina, Brazil and ABACC —simultaneously with the IAEA's General Conference being held in Vienna this week— have reported to the Director General of the Agency that they are ready to start discussions aimed at the signature of such document.

What can be extrapolated from ABACC's experience?

Primarily, the creation of a regional system implies a political decision. In fact, the creation of ABACC for managing the SCCC was a political decision made by both Argentina and Brazil in 1991 and aimed at providing transparency to their respective nuclear programs, thus creating an atmosphere of mutual confidence. At that time, the goal was attenuating international pressure over both countries in the nuclear field. As it was mentioned before, neither Argentina nor Brazil had signed the NTP, nor had they fully adhered to the Tlatelolco Treaty.

Due to the reasons mentioned above, the following years were characterized by the need to strengthen international safeguards. This was the starting point at which the international community began to value the concrete possibilities offered by a regional system for such purposes. The facts that only a small number of facilities had to be controlled and that there was no need to follow universally applied criteria and procedures were seen as advantages. Another important issue is the possibility for the inspection teams to be staffed with specialists in the processes to be controlled. Additionally, a regional system involves a series of both formal and informal channels that provide access to far more data than the one the countries are obliged to supply to the IAEA.

Nevertheless, a regional system implies internal barriers that need to be overcome in order to reach its goals. The main barrier is attaining willingness in the Party States to apply transparency to their nuclear programs, thus creating an atmosphere of mutual confidence. Another important issue is conveying such atmosphere to the international community. The third item is the technical credibility of the system, which must be acknowledged internationally.

An analysis of the possibilities to extrapolate ABACC's experience to other areas in the world needs to be very careful. In the case of Argentina and Brazil, a positive factor was the good relationship between both countries for over 100 years, where the most serious conflict was referred to the use of the River Plate basin and solved in the 1970s. This situation is highly different between India and Pakistan, in the Middle East or between both Koreas. The aforementioned atmosphere was made known to the international community through the Quadripartite Agreement and the full adherence by both countries to the Tlatelolco Treaty. Reaching the acknowledgment of the system's technical credibility requires some time. In the case of ABACC, the support obtained from both countries, in both human and financial resources, was essential in attaining such acknowledgment within a relatively short term.

Integrated safeguards

The integration of the national and regional safeguards systems with the IAEA's international system is not a new fact. The INFCIRC/153 and other comprehensive agreements —such as the Quadripartite Agreement— incorporated both the national accounting and control systems (SSAC) and the regional ones (RSAC). However, the IAEA's safeguard system has been of little help in this situation and, practically, the activities carried out by these systems were ignored in the criteria being applied.

The introduction of the Additional Protocol has meant progress in awareness about the need to perform an actual integration of all the safeguards systems. The need to relate the IAEA's activities with the SSACs and the RSACs is an imperative for increasing efficiency and effectiveness in safeguards. The international community is claiming for a comprehensive review of the international safeguards system, in view of the new measures, and the IAEA has been assembling groups of specialists in an attempt to delineate integrated safeguards.

Integrated safeguards should be based on the existence of national and regional systems for accounting and control of nuclear materials with a good degree of credibility. Such credibility should be attained on the grounds of objective elements and the participation by the SSACs and RSACs should be limited to specific areas. It appears as reasonable that conventional safeguards be delegated to the national and regional systems under adequate quality assurance procedures that would be audited by the IAEA. The Agency should concentrate in the actions included in the Additional Protocol for the detection of non-declared materials and activities, as well as to the analysis of information, environmental monitoring and access to additional information.

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