Appendix -

Papers Delivered by Speakers

Intentionally Blank

Potential Application of the ABACC Model to Other Regions

Presentation Notes

Carlos Feu Alvim (Secretary of ABACC), Olga Mafra, Lilia Palhares, and Ana Claudia Raffo
Brazil-Argentine Agency for the Accounting and Control of Nuclear Material (ABACC)

Brazil and Argentina General Figures

Argentina and Brazil are, respectively, the 8th and 5th largest countries by landmass in the world:

- Together, 11,300 million square kilometers.
- Population of 190 million inhabitants.
- Two thirds of South America's surface, population and Gross National Product (GNP).
- Industrializing countries with a medium size industrial capability.
- Military intervention in the Government of these two nations in some periods of the 1960s and 1970s. In the mid nineteen eighties there was a process of re-democratization of the two countries.
- Slow GNP evolution in the last decades.
- Present economic crisis (mainly in Argentina but also in Brazil) and electric energy supply (Brazil).
- Together with Uruguay and Paraguay, Brazil and Argentina have set up a commercially integrated area, the Mercosul, which has increased trade in the region in 300% in five years.
- More than a century without war (since their independence, only one non-declared conflict which dates back to the territorial frontier settlements of the newly created countries).
- Controversy regarding the use of the Prata Basin was diplomatically solved in the late nineteen seventies.

However, such long and peaceful companionship was not enough to generate the desirable trust. In the field of nuclear energy applications, some potential tension remained:

- Prior to 1991, neither Brazil nor Argentina had adhered to an internationally recognized instrument for the verification of the uses of nuclear energy.
- Concerns of the international community about the possibility of these two countries becoming engaged in the development of a nuclear device.
- With regard to neighbor relationship, the uncertainty generated by the fact that Brazil and Argentina could domestically nourish the desire to assemble a nuclear device represented a hazard to their peaceful relationship.
- Brazil and Argentina have been engaged in development efforts in the nuclear field, counting primarily on international cooperation and on some self developed technology to achieve their goals.
- There was some information about "parallel nuclear programs," not under safeguards, in the two countries with participation of military people and/or military institutions.
- Both countries used their own technology to develop activities related to the nuclear fuel cycle.
- Brazil and Argentina successfully achieved control over the uranium enrichment process and built ultra centrifuge (Brazil) and gaseous diffusion (Argentina) type enrichment facilities on a demonstration scale (presently stopped in Argentina).
- At that time there was no official declaration about those activities.

- Argentina also developed on a small scale some activity in the reprocessing field, which has been deactivated.

Technological achievements at the Bilateral Level

- **Argentina** (Natural Uranium Fuel-Cycle Option)
  - o Mining and Yellow Cake production
  - o Purification (UO_2 nuclear grade)
  - o Conversion (UF_6)
  - o Gaseous diffusion enrichment in demonstration scale
  - o Heavy Water production in laboratory scale (indigenous technology) and industrial scale (with international cooperation and under INFCIRC/66 type safeguards agreements)
  - o Research Reactors building including fuel elements (with external enrichment)
  - o Power Reactors Natural Uranium Fuel Elements Production
  - o Active Participation in Power Reactor Building and Conception (Atucha I under German Agreement)
  - o Reprocessing activities at small scale and reprocessing plant on a demonstration level under construction (presently interrupted with no construction restart foreseen)
  - o Development of some special material for reactors
  - o Metallic Uranium Production at laboratory level
  - o Medium Size Industrial and Technological Capacity

- **Brazil** (Enriched Uranium Fuel-Cycle Option)
  - o Mining and Yellow Cake production
  - o Purification (UO_2 nuclear grade)
  - o Conversion (UF_6)
  - o Ultra centrifuge plant in demonstration scale
  - o Research Reactors (zero power) building including fuel elements (with external enrichment)
  - o Development of some special material and equipment for reactors (in some cases this production has reached industrial scale)
  - o Power Reactors Enriched Uranium Fuel Elements Assembling
  - o Nuclear submarine project under development
  - o Participation in Power Reactor Building (Angra II under German Agreement)
  - o Reprocessing Laboratory (no real reprocessing)
  - o Metallic Uranium production at demonstration scale
  - o Construction of under critical assembly (graphite and Metallic Uranium) including fuel elements
  - o Medium Size Industrial and Technological Capacity

Situation of Safeguards in Both Countries Before the Bilateral Agreement

- Both countries had some safeguards agreements under INFCIRC/66 (involving the verification by the IAEA, ruled cooperation activities carried out in the two countries).

- Argentina held trilateral safeguards agreements with the USA and the IAEA for facilities and specific materials, and bilateral agreements with the IAEA for the application of safeguards to materials and equipment, which resulted from its technical cooperation with Germany, Canada and Switzerland.
- Brazil also held trilateral safeguards agreements involving the IAEA, the USA and Germany.
- The Brazilian Agreement with Germany included safeguards on non-nuclear material and equipment and "relevant technological information."

International Concern About the Two Countries Before the Quadripartite Agreement

- No full scope safeguard agreement in force in the two countries.
- Tlatelolco Agreement (nuclear weapon free zone in Latin America and the Caribbean) was not in force.
- No compromise about "peaceful explosions."

Bilateral Initiatives

- Bilateral Declarations at Head of State level of Brazil and Argentina reaffirming their intention to use nuclear energy exclusively for peaceful purposes during the period 1985 – 1990.
- Presidential and technical level visits to sensitive facilities not under international safeguards.
- Common System of Accountancy and Control of Nuclear Material (SCCC) established with prevision of mutual inspections.
- Permanent Group on Nuclear Cooperation.

(In Brazil "Nuclear Program Investigation Commission" at Legislative level and Nuclear Policy groups at Executive level opened information about "Parallel Program.")

- Bilateral Agreement for the Exclusively Peaceful Uses of Nuclear Energy in Guadalajara, Mexico (July 1991). This agreement was ratified and came into force in December 1991.
- Negotiations, together with Chile, aimed at proposing amendments to the Tlatelolco Treaty so that the three countries could be able to fully adhere to the Treaty (inspections only by IAEA, no challenge inspections triggered by other Agreement's member state).
- Common proposal of full scope safeguards Agreement to AIEA (Quadripartite Agreement same type as INFCIRC/153 agreements).

International Initiatives

- In December 1991, Brazil, Argentina, the IAEA and ABACC signed the Quadripartite Agreement, which entered into force in March 1994, after long discussions, mainly on its approval by the Brazilian Congress (nuclear propulsion was clearly preserved).
- Side letters preserving enrichment plants.
- After acceptance by the OPANAL Council of the amendments to the Tlatelolco Treaty proposed by Argentina, Brazil and Chile, and having fulfilled all legal requirements in both countries, the Treaty came into force for Argentina and Brazil in January and May 1994, respectively.

- In December 1994, the Congress of the Republic of Argentina authorized the country's adherence to the Non-Proliferation Treaty, and Argentine authorities presented the legal instruments for the country's adherence in February 1995.
- In July 1998 Brazil also adhered to the Non-Proliferation Treaty, and in September 1998 Brazilian authorities presented the legal instruments to the depositary Governments.

Motivation and Barriers in Nuclear Nonproliferation

Nonproliferation policy will not be effective if only these barrier aspects are considered and the motivation aspect, which may lead a country to arm itself with nuclear devices, is disregarded.

- We must consider, on one hand, the motivations (or the overlap of motivations) that can induce a country to build-up a nuclear device.
- On the other hand, we must consider the barriers opposing this intent.
- The relative importance of motivation factors and de-motivation barriers varies from case to case.
- A nonproliferation policy must also consider other barriers.
- There are natural barriers represented by technological know-how and the necessary economic resources to build-up a nuclear device.
- There are external barriers represented by international restrictions to trade or exchange of nuclear materials, equipment and know-how.
- The application of safeguards – at a regional or international level – should be seen as one of the barriers.
- The importance of external barriers to non-proliferation (in my opinion) is often over-estimated.
- To some extent, barriers (for non proliferation) can be motivation (to develop technologies considered as proliferating).(*)
- Finally, we also need to take into consideration the domestic and regional forces that contribute in each country or region to the decision to use nuclear energy only for peaceful purposes.
- Democracy (conventional) is an important factor that makes possible to those forces to be effective.
- In the motivation side we must first consider the existence of a important external menace.
- Nowadays, regional stress is the principal proliferation motivation.
- The world status, which in practical terms is attached to the owner of a nuclear arsenal, and also the economic advantages that owner has, could be an important motivation.
- Finally, there are direct and indirect benefits from the mastery of technological knowledge related to the construction of a nuclear device (**).
- Those motivations must be reduced.

The Role of Regional Safeguards Organizations

- The present motivation of Nuclear Proliferation is regional and it is natural that it can be easily solved in regional approach.
- Regional arrangements can be a bridge for international compromises.
- Regional approach remains better on building confidence among neighbors than internationally.
- The safeguards applied by ABACC (or other regional system) are only meaningful if they help to achieve the objectives of non-proliferation.

Questions for the Future

- Regional or Bilateral Organization?
- Role in the integrated safeguards after protocol?
- Regional is a transition or a definitive approach for applying safeguards?
- How to avoid duplications with national and international systems?

I expect that regional organizations will play an important role in non-proliferation. In order to make this possible, the regional organization must not be assigned a passive and/or intermediate role between countries and the Agency. On the contrary, it should be assigned an active role in efforts fostering non-proliferation, preserving the effectiveness of "neighbors watching neighbors".

The Quadripartite Agreement already establishes the criteria for routine inspection — characteristics of the so-called "effectiveness of ABACC's safeguards" — that should be evaluated by the Agency. The future role of the Agency should be that of increasingly assuring and verifying the quality of regional systems without prejudice to these systems' own conclusions. Even if there is, at a first stage and in some installations, 100% quality verification, in the future, it is expected that a more coherent proportion be attained, taking into account the optimum efficiency and effectiveness of the system.

While reinforcing the application of safeguards, regional organizations such as ABACC can play an important role by helping make this barrier more effective in order to considerably reduce any regional motivation for nuclear proliferation.

Could ABACC Experience be Applicable to Verification in Korean Peninsula?

Some differences and similarities existing in the approaching process of the two Korea in relation to that process in Argentina and Brazil:

Some differences:

- No armed conflict occurred between these countries for more than a century;
- No declared tension existed between these countries concerning territorial disputes;
- Economic-strategic tensions were only few and concentrated mainly in the use of Prata Basin waters, including its energetic potential;
- Brazil and Argentina have different idioms/languages (although similar) and different origins;
- Brazil and Argentina were (and are) in the same international political group;
- There were concerns between the countries with respect to the hegemonic position of the neighbor country;
- There was no weapons concentration in other countries of the region.

Some similarities:

- Previous political effort with a view to solve other disagreements;
- High potential of unexplored economical interchanges;
- Association of the economies offers better conditions for integration in the regional and international economies;

- Military installations as possible sites for safeguards application;
- Easy communication between technicians/experts (each can speak in its own idiom/language);
- Probable better acceptance of a regional approach instead of an international interference to solve problems;
- Physical proximity.

Aspects of Brazil and Argentina experience that may be useful for South Korea and North Korea:

- Previous Resolution of other political questions;
- Political and technical visits preceding the formal inspections;
- Creation of a neutral technical organization to administer the inspections, having a headquarter, a permanent staff and resources directly allocated;
- Careful elaboration of detailed procedures for application to sensitive facilities;
- Initiative and precedence of the regional organization over the international, to solve discrepancies;
- Use of technical people from safeguards and from nuclear area to perform the inspections;
- Cooperation in technical projects of the safeguards area (best area to start the cooperation between the countries and with third countries)

Final Remarks

We hope the experience of Brazil and Argentina with ABACC may contribute in some way in the process of building a regional verification system in the Korean Peninsula. We would be pleased to give our modest contribution for the peace process in this region and possibly (who knows?), in the near future, for the much desired re-unification of Korea, that has a large cultural tradition and whose people efforts for development and independence deserve our greatest admiration.

(*)We could say that they have two components with opposite directions: the "short term" furthers non-proliferation, while the "long term" could lead to proliferation. In the case of Brazil — which I know better — we could say that the main effect of the US decision in interrupting the supply of enriched uranium, under the IAEA safeguards, for power and research reactors was a strong motivation for the development of enrichment technology by that country. Additionally, the failure in the technological transfer of "nozzle" uranium enrichment process, also under IAEA control, stimulated the development of the highly successful program of ultracentrifuge enrichment by the Brazilian Nuclear Energy Commission and the Brazilian Navy. This program, although for peaceful purposes, was not under international safeguards at that time.

(**)The successful world policy on non-proliferation, whose main protagonist is the International Atomic Energy Agency, derives from the fact that the IAEA has not only known how to impose safeguards (a proliferation barrier) but also through contribution on dissemination of the peaceful uses of nuclear energy (that contributed for reducing technological and economic motivations). However, we must remember that there are now complains from many countries about the reduction of this IAEA role.