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SAFEGUARDS CHALLENGES FROM THE ABACC VIEW

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***Abstract*:**

As a regional organization of bi-national character, ABACC operation may be impacted in a special way by the dynamic of the international safeguards development. The situation of the present international non-proliferation regime, the changes in the safeguards system, especially with the implementation of the Additional Protocol and the relationship between the IAEA and ABACC are relevant elements to be considered in the analysis of present challenges from the ABACC perspective. Institutional and technical elements of this analysis are described in order to contribute for the discussion of the present safeguards challenges. The current situation of the coordination of activities between the IAEA and ABACC is briefly described and the importance of its improvement to allow the full use of the regional system by the international safeguards is emphasized. Some important safeguards implementation matters that include approaches for small sensitive facilities and the use of unannounced inspections are discussed. Questions related to the implementation of the IAEA new safeguards measures applicable in conversion plants processing natural uranium and the new actions for the design information verification are discussed. Finally, problems that may arise from the implementation of integrated safeguards criteria are described.

Keywords: safeguards; regional; co-operation

1. Introduction

The objective of this paper is to describe the present safeguards challenges from the ABACC view. For that purpose, it is very important that the structure of the safeguards system applied in Brazil and Argentina be well known. ABACC is a bi-national organization that was created by the Brazilian-Argentine Agreement on the Exclusively Peaceful Utilization of Nuclear Energy, which entered into force in December 1991 (Bilateral Agreement) [1]. ABACC has to apply in both countries the Common System of Accounting and Control (SCCC) that is a comprehensive safeguards system applied to all nuclear material present in all nuclear facilities of Brazil and Argentina. ABACC, as a regional organization of bi-national character, has many specificities that one can consider unique in the World and, because that the dynamic of the international safeguards development may also have impact in the application of regional safeguards application. Three pillars form the SCCC safeguards system: the Facility Operators, the National Authorities of Argentina and Brazil, and the ABACC (Secretariat and Commission). It is a very important characteristic of this system that the National Authorities maintain all responsibilities – legal and technical - for the nuclear material and facilities respectively under their jurisdiction. ABACC has the obligation of verifying in a sound basis that nuclear materials have not been diverted from the nuclear facilities and assure to the national and international community that both countries are complying with the Bilateral Agreement.

In addition to that, Argentina, Brazil, ABACC and the IAEA signed a comprehensive safeguards agreement (Quadripartite Agreement) [2], which entered into force in March 1994 and that allows the IAEA to apply its safeguards regime in both countries taking into account the findings of the SCCC. The IAEA, in its verification, shall take due account of the technical effectiveness of the SCCC. The IAEA and ABACC shall reach

independent conclusion and avoid unnecessary duplication of effort.

As result of the described development, the safeguards regime applied to both countries has then four pillars and of course any change in one pillar may have an impact on the others. The situation of the present international non-proliferation regime, the changes in the safeguards system, especially with the implementation of the Additional Protocol and the relationship between the IAEA and ABACC are relevant elements to be considered in the analysis of present challenges from the ABACC perspective. Elements of this analysis – institutional and technical – will be described in order to contribute for the discussion of the present safeguards challenges.

2. Institutional Challenges

ABACC, with the strong support of the Argentine and Brazilian National Authorities, always gave a high priority to have technical competence in order to implement a very effective and efficient verification system. Large resources were invested to constitute a high-qualified staff – officers and inspectors – and to use the best safeguards equipment and instrumentation. After ten years of ABACC operation one can conclude that this goal was successfully accomplished, although this is a permanent goal and requires continuous investment and work. The terms of the Bilateral Agreement, including privileges and immunities provisions for ABACC and its staff, the Headquarters Agreement with the Brazilian Government and the privileges and immunities agreement with the Argentinean Government provide ABACC with institutional and political independence to apply the SCCC with credibility. ABACC accomplishes the requirements of the Quadripartite Agreement especially ABACC is working with safeguards criteria fully compatible to the IAEA Criteria. Considering all this elements, in despite of the good co-operation between both agencies, an important challenge that faces both organizations is to implement fully the provisions of the Quadripartite Agreement. The need to reach independent conclusion and to avoid unnecessary duplication of ABACC safeguards, as expressed in the Quadripartite Agreement, is still a provision to be fully accomplished. Although the good will of all parties, an institutional framework that possibilities the IAEA to verify the SCCC findings is not yet envisaged and should be considered seriously. In the past several years a lot has been discussed on increased co-operation with regional system, several papers dealing with quality control of verification activities have been presented, but not much was translated in practical actions. The importance of the regional system requires a consistent political decision to be taken by the IAEA. The maintenance of the present *status quo* for long time would imply in waste of resources and loss of credibility.

The SCCC was created in an atmosphere of co-operation and confidence between Argentina and Brazil. The meaning of this sentence is not easy to be understood. Really the SCCC and ABACC creation was the last step of a very broad co-operation and rapprochement in the political, economic and technical areas of both countries. Because that one can say that this situation is unique. The fully application of the SCCC by ABACC is the best guaranty for the two countries that their nuclear programs are exclusively for peaceful purposes and this conclusion is not influenced by potential changes in the international scenario.

Considering the last developments in the international safeguards, especially the strengthening of safeguards with the implementation of the Additional Protocol, the role of ABACC in the future implementation of the Additional Protocol in both countries was intensively discussed. Clearly it is impossible and undesirable to transplant the new safeguards measures to the bilateral regime. This would be inconsistent with the own origin of the bilateral safeguards system, which as said above is based on the mutual confidence. On the other side, the future implementation of the Additional Protocol will surely have impact on the current safeguards activities. It is still a challenge for ABACC and both countries to define a reasonable and coherent role to ABACC in this new development.

The past years occurrence increased the importance of protecting sensitive fissile and fissionable nuclear material from falling into the hands of terrorists. Thus physical protection became an instant challenge for national and international authorities to prevent the use of such materials in terrorist actions. The prevention of illicit trafficking of radioactive and nuclear materials is now in the priority list of these authorities. Although safeguards and physical protection have different scope, the two areas are

historically responsibility of the same National Authority in Argentina and Brazil, respectively. ABACC Secretariat considers that the States are the ultimate responsible for the physical protection of nuclear materials and facilities. The work of ABACC, which verifies domestic and international transfers to/from both countries and between the two countries helps intrinsically the actions of both States in the area of physical protection. In addition to that, ABACC has a consolidated data system on nuclear material that can be used by both States and the IAEA, as necessary, contributing to the regional and international security.

3. Technical Challenges

A considerable number of anomalies have resulted from surveillance failures at nuclear reactor facilities, although the improvement on surveillance systems over the last years. Two problems arise as consequence. Firstly, especially for on-load reactors, where access to the core is not allowed, there is no technical means to fully resolve the anomaly with respect to the possibility of unreported plutonium production. Secondly, independent on the operator not having any role in the anomaly, he is penalized then the spent fuel has to be re-verified. The continuous improvement of surveillance systems is highly recommended and required in order to avoid such anomalies.

Unannounced inspections can also be applied to substitute or complement the application of surveillance in specific cases, as a cost-effective means to detect and deter diversion of nuclear material and facility misuse. Conditions for implementation of unannounced inspections exist in several States and, in particular, in Argentina and Brazil. Currently unannounced inspections are not extensively used, in general due to resistance from the Operator/State and in some cases from the IAEA. Practical arrangements should be made with Operator/States to avoid difficulties and allow a broader application of unannounced inspections.

The new IAEA safeguards measures applicable in conversion plants processing natural mean basically a change of the start point of safeguards. From ABACC point of view the policy paper is beyond the framework established by the Quadripartite Agreement and is necessary approval of all the parties involved for its practical implementation. However, some measures like the DIV procedures can be improved under the INFCIRC/153 framework on a case-by-case basis to allow a better verification of the declared capacity and to confirm the facility design.

Since ABACC started its operation one of the main problems faced was the application of safeguards to a small centrifuge enrichment plant for testing centrifuges in cascade mode. This plant consist of a few fully independent cascades, does not operate in a routine basis and panels prevent visual access to the centrifuges and their surroundings for preserving sensitive information. The safeguards' objectives for enrichment facilities encompass the detection of the diversion of declared nuclear material as well as the detection of facility misuse. For small centrifuge plants misuse scenarios seems to dominate, particularly those associated with feeding the plant with undeclared LEU. The safeguard's approach for commercial facilities, based on the Hexapartite Project and the evolution thereof, seems not to be directly applicable to these cases. A safeguards approach based on transitory perimeter control to increase the effectiveness of unannounced inspection was approved by ABACC and the IAEA. The next step is the negotiation of a safeguards approach for a future commercial plant that is under construction in Brazil. Although this facility does not have a large capacity, a safeguards approach similar to those of small facility seems to be not practicable. As presently only the first two cascades of the first Module are under construction, ABACC approved a safeguards approach based on permanent perimeter control and random closing of mass and SWU balance during announced and unannounced inspections for the two first cascades, while negotiate with the Brazilian authorities new boundary conditions for the application of safeguards in the whole facility.

The implementation of integrated safeguards criteria should impact strongly the current safeguards activities. Several points are to be defined to allow the smooth implementation of the integrated safeguards approaches. One important point is the follow-up of anomalies and inconsistencies, especially considering the provision of recoverability that is currently being requested. Another important point is the definition of anomalies and inconsistencies under integrated safeguards, especially taking into account the randomization of inspections that is foreseen. For ABACC and its requirement of

having criteria compatible with the IAEA the impact of changing some IAEA safeguards parameters like timeliness, defect level and detection probability is relevant. It may cause that different safeguard activities should be performed by both agencies to reach a conclusion. A good example of this situation is the application of surveillance in Light Water Reactors. The integrated safeguards approach establishes that for this type of facility the IAEA does not need to apply permanent surveillance to the spent fuel pond. However ABACC should continue to apply such measure. The identification of such situations and their solutions will be a challenge to face.

4. References

[1] *Agreement between the Republic of Argentina and the Federative Republic of Brazil for the Exclusively Peaceful Use of Nuclear Energy;* INFCIRC/395; IAEA; Vienna; November 1991.

[2] *Agreement between the Republic of Argentina, the Federative Republic of Brazil, The Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials and the International Atomic Energy Agency for the Application of Safeguards*; INFCIRC/435; IAEA; Vienna; March 1994.