

Implications of the Integrated Safeguards on R&D Facility in Korea

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1. Introduction

For the first time on 'Broader Conclusion for the Republic of Korea at the June Board meeting 2008, the Integrated Safeguards System has been implemented in Korea.

The objectives of this study are to analyze the applications of the Integrated Safeguards on R&D facility in Korea and to draw, for the facility operator and manager, the implications of the future direction on the R&D facility in Korea.

2. Traditional Safeguards and Implementation Safeguards

The tradition safeguards (TS), based on the CSAs(Conventional Safeguards Agreements, INFCIRC/153), provides assurance mainly regarding the correctness, not the completeness, of State declarations. The focus of TS is on declared nuclear material at strategic points in declared facilities. The conclusion of the TS is that declared nuclear material has remained in peaceful activities, "no indication of diversion of declared nuclear material". Since the Iraq, South Africa and DPRK nuclear issues raised, it issued the loophole of the TS that there is no measures specifically applied to detect undeclared nuclear installations or activities.

After reviewing the current TS in IAEA special committee, two measures were recommended, strengthened measures under CSAs and additional protocol (AP) of the current safeguards agreement (INFCIRC/540). For the strengthened measures, it was suggested voluntary reporting, environmental sampling, remote monitoring and SSAC cooperation. For the Additional protocol measures, it is considered expanded declaration, Complementary Access, broader environmental sampling. The AP as the additional legal instrument give the IAEA to the improved its capability to draw conclusion on the absence of undeclared nuclear material and activities in a State.

The Integrated Safeguards (IS) is defined as the optimum combination of all safeguards measures available to the IAEA under CSA and AP which achieves the maximum effectiveness and efficiency in meeting the IAEA's safeguards obligations within the available resources.

The IS approach for a state are as follows ; (i) defines state-level activities and safeguard measures at facilities, (ii) takes into account features and characteristics of the State's nuclear activities and the IAEA's experience in the State, (iii) optimizes effectiveness and efficiency by adapting model IS approaches for specific facilities in a State, (iv) includes plan for complementary access in the

State, v) will evolve over time to account for experience gained and safeguards-relevant developments.

The IS for research and development facility are as follows; (i) confirms that there is no borrowing among facilities, (ii) confirms that there is no un-declared nuclear materials and nuclear activities, (iii) verifies the inventory change of nuclear materials and irradiated non-nuclear materials, (iv) verifies the correctness and completeness of supplied operational declaration. [1]

3. Implementation of Integrated Safeguards on R&D facility in Korea

With the signing of the Additional Protocol in 1999, and its entry into force in 2004, the Republic of Korea began to implement the IAEA's Strengthened Safeguards System.

In KAERI, there are approximately 50 buildings on a site associated with the MBAs (Material Balance Areas) and other activities such as waste storages, administration, etc.

The traditional safeguards approach is based on verification activities including nuclear material accountancy, non-destructive measurements (NDA), containment & surveillance (C/S) measures on nuclear material and removal routes, environmental sampling (ES) and destructive analysis (DA). The combined safeguards measures at each facility are on case-by-case basis as per the safeguards criteria and facility specific safeguards approach.

After submission of initial AP declaration in August 2004 to date, a number of Complementary Accesses (CAs) has been conducted among these facilities and other locations on this site according to the IAEA safeguards team.

The Integrated Safeguards Site Approach (ISSA) for KAERI was proposed that selection of facilities/LOF for inspections be based on sites, rather than directly on facilities/LOF. For each random interim inspection (RII), facilities/LOF will be selected randomly for inspection within the site. [2]

4. Reference cases in other nations with IS

In this section, reference cases of other nations which have implemented IS with large nuclear facilities were introduced.

4.1 Canada

The IAEA reached the Broad Conclusion for Canada in Sep, 2005. Since that time, the Canadian SSAC (CNSC: Canadian Nuclear Safety Commission) has been working with the IAEA and with Canadian

industry to transition from Strengthened Safeguards System to a State-level integrated safeguards approach. The CNSC and the IAEA have agreed to pursue the implementation of the State-level integrated safeguards approach on a “phasing-in” basis in accordance with agreed priorities and consistent with available resources. The first priority for Canadian was the development and implementation of an integrated safeguards approach for transfers of irradiated fuel to dry storage at multi-unit stations in Canada. Under the traditional safeguards system, such transfers were consuming over half of the IAEA’s PDIs(Person-Days of Inspection) at the multi-unit stations which are expected as significant increases in inspection efforts as the number of transfers per facility increased over time. For example, each transfer utilized approximately 3 PIDs. In 2006 approximately 250 PDIs were consumed in this area that level could increase to over 1,000 PDIs in the future. [3]

4-2 Australia

As the first AP signed country with large nuclear activities in the world in 1997, the Australia has been implemented Integrated Safeguards from Jan. 1. 2001. There were conditional requirements on maintain IS as like as other countries; conclusion of absence of diversion of declared nuclear material and conclusion of absence of undeclared nuclear material and activities in the State as a whole. The Short Notice Inspections (SNI) could meet the unannounced inspections objectives in Australia.

From the lessons learned from the IS, several points were recommended ; (i) quick and effective lines of communication between the national safeguards authority and the IAEA, ii) complete and accurate records, iii) competent and well trained staffs, iv) active involvement in the Agency’s programs. [4]

5. Implications

The IAEA’s Integrated Safeguards System is assumed as the essential element of the nuclear non-proliferation regime. It is also agreed that the IAEA has played a vital role in pursuit of nuclear non-proliferation goals. In this regards, the concepts, approaches and measures on the basis of the current safeguards system have been changed over time for improving the efficiency and enhancing the effectiveness. The vital essence of these changes is centered on the Agency’s effort to implement State-level approaches. It is highly requested that the more focused and adaptable safeguards system on the research and development facility be found.

While the Traditional Safeguards was the results of uniformity, the broadening of available verification measures under the Integrated Safeguards would be required greater adaptability at the implementation level by a different State-Level Approach (SLA). Therefore, it is suggested that only reducing inspections such as PDIs could not be enhance the effectiveness and the efficiency of the safeguards.

REFERENCES

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