The Experience of National Safeguards Inspections under the Integrated Safeguards in Korea

Jin Kyun Yeo
Korea Institute of Nuclear Non-proliferation and Control (KINAC), 573 Expo-Ro, Yuseong, Daejeon, 305-348 Korea

1. Introduction

The agreement between the government of the Republic of Korea (ROK) and International Atomic Energy Agency (IAEA) for the application of safeguards in connection with the treaty on the non-proliferation of nuclear weapons was signed at Seoul in October and entered into force in November 1975. The IAEA has performed safeguards inspections in the ROK since accept of the Facility Attachment (FA) of Kori 1 in February 1976. The ROK signed the additional protocol with the IAEA in 1999 and entered into forced in February 2004.

During the Board of Governors meeting in June 2008, the IAEA announced the Broader Conclusion for the ROK. They stated that there was no indication of any diversion of undeclared nuclear materials or activities as outlined in the Safeguards Implementation Report (SIR). With this Agency's broader conclusion, the Integrated Safeguards (IS) was applied to the ROK on July 1, 2008. The integrated safeguards means that the optimum combination of all safeguards measures available to the IAEA under the comprehensive safeguards agreements and the additional protocols will achieve a maximum effectiveness and efficiency. The national safeguards inspection under the IS was implemented on January 1, 2009 to avoid trial an error under the IS.

2. IAEA and ROK Safeguards inspection Approach under the IS

The ROK and IAEA had been discussed for future implementation of IS in the ROK for 3 years since March 2005. Based on these meetings, the Agency prepared the State-Level Integrated Safeguards Approach (SLA) to be implemented in the ROK after drawing the Broader Conclusion. The government of the ROK made the Task Force team and established the implementation plan of the IS in the ROK.

2.1 Safeguards inspection under Traditional Safeguards

Before implementation of the IS, the IAEA and ROK had performed safeguards inspections to the nuclear facilities in ROK according to the IAEA's safeguards criteria. The type and detailed content of inspections to be performed by the ROK and IAEA inspectors are defined in Table 1. The ROK inspector performed interim inspection to the main facilities on a quarterly basis but, the IAEA did interim inspection on an unannounced basis. The Physical Inventory Verification (PIV) was performed to all facilities in the ROK once per year.

Table 1. The ROK/IAEA inspections under Traditional Safeguards

Inspection	Facility	Approach
Interim	LWRs, CANDUs, KAERI, KNFC	1 per 3 months - LWRs: Unannounced - KAERI: HANARO, PIEF
PIV	LWRs, CANDUs, KAERI, KNFC, Research Reactors & Others	1 per year
Transfer Campaign	CANDUs	Human Surveillance

2.2 IS Approach of the IAEA

The IAEA prepared the implementation procedures for inspection activities under the IS to be applied all facilities in the ROK. The IAEA's safeguards approach under the IS is shown in Table 2. The random interim inspection for LWRs, CANDUs and KAERI are performed 20% probability per year with 24 hours advanced notification. But, notification time of KAERI is 2hours and selection probability is 50% for HANARO and PIEF.

Table 2. The IAEA inspections under Integrated Safeguards

Inspection	Facility	Approach
Random Interim (RII)	LWRs, CANDUs, KAERI	• 20%/year, 24 hrs advance notice (KAERI: 2 hrs, Part:50%)
PIV	LWRs, CANDUs, KAERI, KNFC, Research Reactors & Others	•1 per year - CANDUs: 50% LWRs: CCV 50% - KAERI & Research Reactors and Others: 20%
Short Notice Random (SNRI)	KNFC	•2 per year, 2 hrs notice
Transfer Campaign	CANDUs	•Unattended Monitoring System (UMS) •SNI: 2 hrs

The PIV is performed once a year, the selection probability of CANDUs and LWRs Closed Core Verification (CCV) is 50%. The KAERI facilities except the HANARO and the Post Irradiated Examination Facility (PIEF), and the research reactor have 20% probability. The IAEA performs 2 SNRIs with 2 hours advanced notification. For the spent fuel transfer to dry storage the IAEA implements UMS, 2 hours Short Notice Inspection (SNI) and mailbox declaration at CANDUs.

2.3 National IS Approach

The government prepared the safeguards inspection system and revised related nuclear law under the IS to be applied all nuclear facilities in the ROK. The purpose of national inspections under IS are to manage nuclear materials in the ROK and to prepare IAEA inspection effectively. The KINAC is revising inspection procedures at all nuclear facilities for national inspectors.

The ROK's safeguards approach under the IS is shown in Table 3. The national inspection is performed with IAEA at the same time to save operator's burden. The RIIs for each LWRs, CANDUs and KAERI facilities are performed once per year with 24 hours advanced notification. But, notification time of KAERI is 2hours. The PIV is performed once a year for all nuclear facilities in the ROK. The KINAC performs SNRIs with IAEA simultaneously. For the spent fuel transfer to dry storage the KINAC implements human surveillance at CANDUs.

Table 3. National inspections under Integrated Safeguards

Inspection	Facility	Approach
Random Interim (RII)	**LWRs, CANDUs, KAERI**	**• 20%/year, 24 hrs advance notice (KAERI: 2 hrs, Part:50%)**
PIV	**LWRs, CANDUs, KAERI, KNFC, Research Reactors & Others**	**•1 per year - CANDUs: 50% LWRs: CCV 50% - KAERI & Research Reactors and Others: 20%**
Short Notice Random (SNRI)	**KNFC**	**•2 per year, 2 hrs notice**
Transfer Campaign	**CANDUs**	**•Unattended Monitoring System (UMS) •SNI: 2 hrs**

3. Conclusion

It is expected that the implementation of the IS to the ROK will increase nuclear transparency and satisfy its obligations as a state for the promotion of the peaceful use nuclear energy and nuclear non-proliferation.

The main purpose of IS implementation is to raise the efficiency of IAEA safeguards approach to ROK. The IAEA expected that the total reduction of inspection efforts under IS is approximately 50% in comparison to the Traditional Safeguards. The IAEA had saved about 30 Person Day of Inspections (PDIs) during last year (From 1 July to Dec. 2008) under IS in ROK. The KINAC anticipate that the national safeguards inspections will be decreased to about 50 PDIs in 2009 under the new national safeguards regime.

There are some problems to conduct safeguards inspections in the ROK since implementation of Integrated Safeguards, e.g. the handling of back up cameras at LWRs, PIV schedule at each facilities and safeguards activities during closed core periods. In order to resolve these issues, the ROK and IAEA have cooperated together by working group meeting and annual meeting. Moreover, the ROK and IAEA jointly developing arrangements for implementation of enhanced cooperation to improve cooperation between ROK and IAEA under IS.

REFERENCES

[1] IAEA, "Implementation Procedures for Inspection Activities under Integrated Safeguards at LWRs in ROK", Jun. 2008.
[2] IAEA, "Implementation Procedures for Inspection Activities under Integrated Safeguards at CANDUs in ROK", Oct. 2008.
[3] IAEA, "Implementation Procedures for Inspection Activities under Integrated Safeguards at KNF (KOR-) in ROK", Oct. 2008.
[4] MEST, "Implementation Plan under IS in ROK", Jul. 2008.