

Implementation of IAEA's Unannounced Inspection at LWR in the ROK

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1. Introduction

Unannounced inspections (hereinafter referred to as "UI") is a potentially cost-effective mean to detect and deter diversion of declared nuclear material and facility misuse [1]. Due to difficulties in implementing practical and logistical arrangements and considering the status of many State-specific legal frameworks, UI have been implemented only in a limited number of States.

According to the agreement between the government of the ROK and the IAEA for the application of safeguards in connection with the NPT (hereinafter referred to as "Agreement"), the IAEA may carry out without advance notification a portion of the routine inspections [2]. The use of UI at LWR in the ROK was enabled by the enhanced cooperation between the ROK and the IAEA.

With the introduction of the UI, several IAEA activities were changed. Random interim inspection (RII) is now a part of UI, and remote monitoring (RM) surveillance system has been removed and no longer applicable. And the state inspectors have been dispatched to each LWR sites to respond to the UI.

This paper reviews the implementation of the UI at LWR in the ROK and discusses how to improve it.

2. Adoption of UI

The IAEA has tried to improve the efficiency and effectiveness of safeguards because of limitation of inspection resources. Therefore, the IAEA proposed a new safeguards concept, State Level Approach, in the early 2000s, and UI is considered as a new inspection measures to improve the efficiency and effectiveness of safeguards.

Without advanced notification inspection measures could be conducted by the IAEA based on the Agreement article 84 [2]. However, practically implementing UI is hard to implement without cooperation of the state. Therefore, the IAEA has consistently insisted that the ROK introduce the UI. Meanwhile, the UI is recognized as one of the most transparency inspection measures to show the ROK's nuclear nonproliferation will. Therefore, the ROK has introduced UI since 2016.

At the 4th meeting of Coordination Group for Enhanced Cooperation (CGEC) in April 2014, the ROK and the IAEA discussed the use of the UI in LWR and agreed to have rehearsals and preparation period. Between June and August of 2014, seven rehearsals had

been conducted, and they were divided into two phases. First phase, first 4 rehearsals, was informed to the state and carried out without notification to the operator. And the second phase, 3 rehearsals, was performed without notification to both the state and the operator. Through the rehearsals, several facts were drawn and reviewed. It was confirmed that the time for accessing facility strategic point (hereinafter referred to as "FSP") was within 2 hours. And also logistical support and access arrangement to support IAEA inspection were reviewed. They were arrangement for whole body counting, organizing operator to support for bridge/crane in the spent fuel building, initiating security access protocols including provision of necessary radiation work permits, etc.

At the 5th meeting of CGEC in October 2014, a pilot implementation of the UI was discussed and decided. And the demonstration UI was implemented in place of the random interim inspections (RII).

RII is IAEA inspections for a randomly selected facility with a notice of 24 hours in advance. The facility is covered by the IAEA surveillance cameras. On the other hand, the demonstration UI was conducted with the IAEA surveillance cameras, and advance notice was not provided. Therefore, the demonstration UI is also called as a RII without notice.

Six demonstration UIs had been conducted between April 2015 and January 2016 as shown in Table 1.

Table 1. Inspection results based on FSP access time

Date	MBA code	FSP access time (IAEA inspector)	FSP access time (KINAC inspector)
2015.4.28	KOO	1h 42m	6h 10m
2015.7.23	KOM	1h 47m	4h 20m
2015.11.26	KOC	1h 48m	2h 13m
2015.12.9	KOF	1h 53m	1h 53m
2016.1.25	KOO	1h 40m	1h 40m
2016.1.26	KOC	1h 58m	2h 59m

All six demonstrations allowed access of the IAEA inspectors to the FSP within two hours, and the inspections ended in business hours. The readiness condition of the facility for the UI inspection was checked and there would be no problems in the UI introduction. And there was a plan to dispatch national inspector, KINAC inspector, to each nuclear site. Therefore, at the 8th meeting of CGEC in February 2016, an introduction of the UI was decided.

3. Implementation of UI

UI is conducted without any notification in advance, and the facility is not covered with IAEA surveillance cameras. The preparations of facility records and access procedures are conducted at the inspection day, and it needs changes in systems of preparation for inspection of facilities.

3.1 Procedure of UI

The inspection procedure is as follows;

On arrival at the main security gate, the IAEA inspector should present his/her ID (so called UNLP) and ask to contact with the facility operator's designated contact person. The inspection at the selected facility should be announced by handing over the UI announcement and inspection assignment letters to the facility operator's point of contact or alternate and KINAC's resident inspector of the facility.

The operator POC should organize the IAEA inspector's access to the FSP of the selected facility. The access time is the time between arrival of the IAEA inspectors at a facility security gate and the actual start of inspections activities at a FSP. Based on the objectives of UI, the IAEA and ROK have agreed to a maximum access time of two hours.

Before access to the FSP, the IAEA inspector should brief the facility operator about the planned inspection activities to be conducted during the inspection. During this briefing, the facility operator should inform the IAEA inspector on the operational activities being conducted/to be conducted during the day of inspection and any unexpected matters of force majeure. The IAEA inspector should obtain information about the reasons of limitations placed on inspection activities and communicate relevant information to IAEA HQ as soon as practical.

The facility operator should organize the necessary logistical support and access arrangements to support the IAEA inspection activities.

Verification activities at the FSP are almost same with RII. And prior to the arrival of the state inspector, KINAC inspector, the IAEA inspector waits at the FSP without performing any verification activities.

At the conclusion of the inspection activities, the IAEA inspector should brief the KINAC inspector/operator concerning the inspection activities which were conducted during the inspection, noting any specific difficulties and/or follow-up actions which are needed.

3.2 Improvements from the implementing experience of the UI

Almost twenty UIs have been conducted in the ROK since 2016, and all the UIs were performed with acceptable results. Although the results of IAEA inspections are satisfactory, there are still shortcomings, and improvements can be drawn from them.

Following chart shows access time to the FSP of twelve UI cases. The access time is divided into three parts according to time sequence; ① from security gate to whole body office, ② from whole body office to operator's office, ③ from operator's office to FSP.

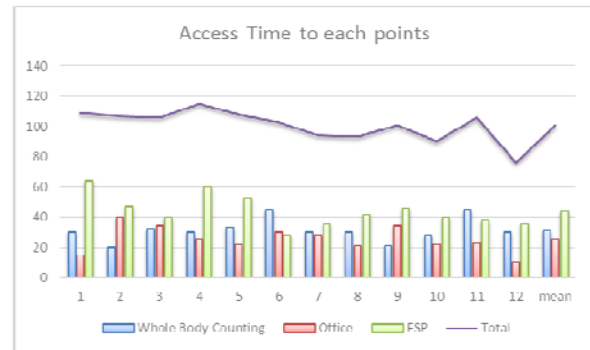


Fig 1. Access Time to each points

The average time spent from security gate to whole body office (blue block) is about 31 minutes, from the whole body office to operator's office is about 25 minutes, and from the operator's office to FSP is about 44 minutes. Overall it takes 1 hour 41 minutes on average.

It usually took a lot of time from the operator's office to the FSP. At the operator's office, IAEA inspector brief about the planned inspection activities, and the operator starts the procedures for entering radiation controlled area. It takes some time for several reasons, but the biggest reason is that the operator's procedure is not clear for IAEA inspections. From the security gate to whole body office, it also takes time to make round trip due to physical distance. The UI procedures could be reduced with the IAEA discussion, and it could save the time.

Another change in the UI adoption is operator's preparing facility records. Under the RII, it was possible to prepare the facility records a day before. On the other hand, under the UI, the facility records should be prepared at the inspection day during conducting the access procedure for the IAEA inspector. To reduce the burden of the operator, it is important to prioritize the document preparation. Some document such as nuclear material location map is needed during inspection, and the other document such as advance operational information needs after inspection. Therefore, documents to be submitted before and after the inspection can be distinguished.

4. Conclusions

The UI was introduced in 2016 to show the ROK's nuclear transparency. And with the introduction of the UI, there have been many changes in the IAEA inspection system including removing RM surveillance system, dispatching state inspectors to nuclear sites, etc.

Despite the success of the UI in the meantime, several improvements could be drawn through the review of the previous UIs. They include amendments to the operator's procedures and the revision of the UI procedures. And more specific amendments will be materialized as more UIs progress. Therefore, further study and improvement efforts on the UI are needed. And these improvements can be discussed through cooperation with the IAEA and reflected in the IAEA's UI procedures.

REFERENCES

- [1] Implementation Procedure for Unannounced Inspection at LWRs in the ROK, IAEA Procedure, 2015.
- [2] Agreement Between The Government Of The Republic Of Korea And The International Atomic Energy Agency For The Application Of Safeguards In Connection With The Treat On The Non-proliferation Of Nuclear Weapons (INFCIRC/236), 1975.