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Unannounced Safeguards Inspection and its Efficiency Assessment

Ickhyun Shin

KINAC
KOREA INSTITUTE OF NUCLEAR NONPROLIFERATION AND CONTROL

1. Background

- **IAEA needed to improve safeguards efficiency under limited resources while effectively achieving safeguards objectives. To do this, the State-Level-Concept (SLC) was developed**
- **The SLC is a concept in which safeguards are effectively and efficiently implemented by considering a State's nuclear and nuclear-related activities and capabilities as a whole**
- **The State-level approaches (SLA) is an IAEA's internal document describing the safeguards objectives for a certain State**
- **The IAEA's updated SLA was officially applied in September 2015 in Korea. In this paper, it is considered whether three organizations directly affected by the updated SLA, the IAEA, ROK's regulatory body and nuclear licensees, were able to achieve safeguards efficiency in their respective aspects.**

2. Major changes in the updated SLA_Facility

- **The major change in the updated SLA was the UI for light-water reactor plants.**
- **The existing remote monitoring equipments were uninstalled right after the application of the UI. However, those equipments are temporarily installed only during the open-core period**
- **Only the PIV was carried out during the open-core condition**
- **There were no changes to the nuclear fuel fabrication company and heavy water reactor plants.**
- **In case of HANARO research reactor, the IAEA surveillance cameras, which usually a stand-alone mode, has newly reconfigured to remotely send real-time monitoring data to the IAEA**

3. Major changes in the updated SLA_IAEA

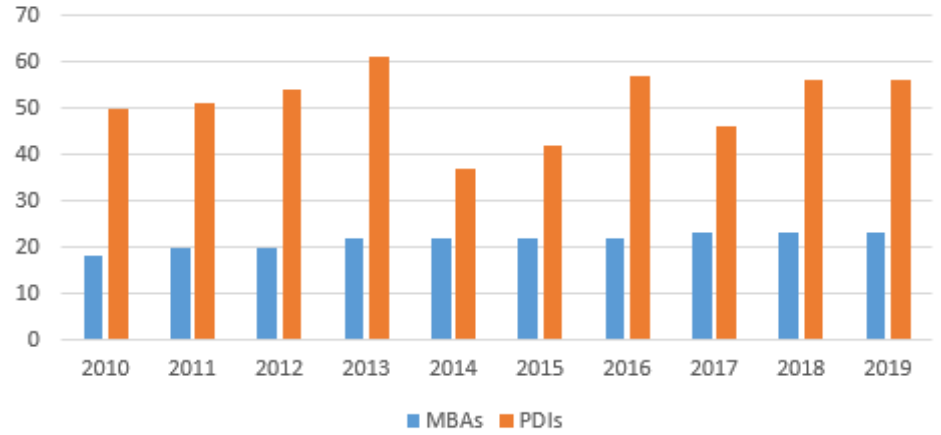
- **The inspection frequency for the random interim inspection (RII) on the LWR was previously written in the procedures that an inspection target is selected at an annual probability of 20%**
- **However the updated SLA excluded it from the procedures and reflected it in the annual inspection plan.**
- **Advance reporting requirements were also changed. Only the category I facilities in KAERI are subject to the advance monthly and quarterly report, but after the updated SLA, category III facilities were also included for the report.**

4. Major changes in the updated SLA_KINAC

- **To better respond to the IAEA's updated SLA, the domestic inspection system was reformed so that domestic inspectors conduct inspections at a different time from IAEA inspections**
- **Domestic inspection is also to verify whether licensees abide by the safeguards relevant regulations approved by the NSSC.**
- **In the case of LWR licensees, the facility entry control related regulations needed to be amended to let UI inspectors quickly get access to strategic points within two hours after the UI notification.**
- **Also a new system had to be established for immediate availability of inspection equipment, documents, and technical support personnel**

5. Efficiency Assessment of Updated SLA

- **The IAEA's inspection frequency, which can be represented as Person Day Inspection (PDI), was used to assess the efficiency.**
- **Contrary to initial expectations, the following Figure shows that no significant decrease on the PDIs of the LWR have been made before and after the 2016's update of the SLA.**
- **Rather, the average yearly PDIs slightly increased after the updated SLA from 49 to 53 while Material Balance Areas (MBAs) are quite stable.**



6. Efficiency Assessment of Updated SLA

- **This is due to the small increase in the UI which is the replacement of the RII for light-water reactor plants after the updated SLA.**

- **Although the frequency of the UI is not known, below table clearly indicates that the UIs are carried out more often than the RIIs which were usually happened 20% annual frequency.**

	RII				UI			
Year	’12	’13	’14	’15	’16	’17	’18	’19
PDIs	4	3	3	3	5	5	7	6

7. Efficiency Assessment of Updated SLA

- **From the IAEA's point of view, it is difficult to state that safeguards efficiency has been achieved after updating the ROK's SLA in 2016**
- **At the ROK's regulatory perspective, the transparency of nuclear nonproliferation has been further enhanced through reform of the domestic independent inspection system and by dispatching inspectors to each LWR site's regional office to respond to the updated SLA**
- **However, it should be further assessed whether the degree of resources and efforts taken by the ROK's regulatory body was appropriate**
- **With respect to the licensee's perspective, it is clear that the workload has been increased after the SLA's update**

8. Conclusions

- It describes how the IAEA's inspection activities changed under the updated SLA and what efforts ROK regulator and nuclear licensees made.
- In addition, it reviews whether the SLA enabled the IAEA and ROK to achieve the desired efficiency.
- In conclusion, it is difficult to say that the original goal of reducing the frequency of inspections has been achieved due to the increased frequency of inspections in the IAEA aspect
- It is clear that transparency in nuclear nonproliferation has increased due to the application of updated SLAs from the perspective of ROK’s regulator and nuclear power operators
- This study only focused on the safeguards efficiency using the PDIs, so more various aspects need to be further studied to assess the updated SLA as a broader perspective.

Thank you

KINAC
KOREA INSTITUTE OF NUCLEAR NONPROLIFERATION AND CONTROL
한국원자력통제기술원