

The Study on the analysis of the revised regulation on the special nuclear materials

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1. Introduction

Since the additional protocol were implemented in the ROK, the IAEA has drawn the broader conclusion for the ROK on the premise that there are no indications of diversion of nuclear material and activities on the results of the Agency's comprehensive evaluation of safeguards relevant information and additional verification activities. As a result of the broader conclusion, the IS(Integrated Safeguards) were started in 2008. In accordance with successful implementation of the IS in the ROK, the IAEA request the enhanced partnership between the ROK and the IAEA to increase the role of the SSAC(State System of Accounting for and Control of nuclear material) in the ROK. For this reason, the ROK and the IAEA signed the EC(Enhanced Cooperation) arrangement to expand the cooperation area beyond existing LWR enhanced cooperation.

The IAEA set up it the one of the EC's objectives to increase the practical use and enhancement of the SSAC. In 2013, the NSSC(Nuclear Safety and Security Committee) formed task force team which included the TSO(Technical Support Organization) staffs and operators to establish scope, object and role of the SSAC for improving it. As a result of 4th TFT meetings in 2014, TFT completed the revised "the regulation on guideline to formulate the safeguards rule on special nuclear materials" and "the regulation on the national inspection rule on special nuclear materials"

This study shows that the problems of the former regulations are analyzed and the changes of national safeguards implementation are predicted under the revised regulation. Through this analysis, the efficiency and effectiveness of national safeguards system under the environmental change of implementation are reconfirmed.

2. Improvement of the State Safeguards System

2.1 Analyzing the former regulation on guideline to formulate the safeguards rule on special nuclear materials

The former regulation on guideline to formulate the safeguards rule on special nuclear materials applies the form of the radioactive safety report mutatis mutandis as it is. This regulation describes facility design information pertaining to safeguards rather than providing for statutory requirements that facilities must comply with, which is not suitable for facility operators

who actually have obligations for the accounting and control of specific nuclear facilities. In addition, its content overlaps with the DIQ(Design Information Questionnaire) to be submitted in accordance with the ROK-IAEA Safeguards Agreement, which adds to administrative workload as the accounting and control regulation should be specified when the design information is revised. Hence, the TFT developed an amendment of the regulation which would delete design information from the accounting and control regulation, stipulate provisions requiring compliance of facilities in content and form, add obligations pertaining to the Additional Protocols and internationally regulated materials, and reflect agreements reached with the IAEA.^[1]

The former regulation on the national inspection rule on special nuclear materials was modeled after the inspection system of the IAEA and complicated in form when compared with inspection systems of other areas (safety, physical protection, etc.). Specifically speaking, the types of IAEA inspections were reflected in the regulation by applying PIV(Physical Inventory Verification), DIV(Design Information Verification), RII(Random Interim Inspection) all defined in terms of the purposes of their implementation by the IAEA in addition to the ad-hoc, routine, and special inspections provided for under the safeguards agreement. In some facilities, the PIV inspection and interim inspection whose inspection forms were almost identical were conducted in accordance with such classification of inspection, which resulted in some issues of implementation efficiency for duplication of verification. Therefore, the task force on the improvement of the state safeguards system introduced a classification of inspections in consideration of consistency with other areas pertaining to nuclear energy regulation and prepared the amendment to the regulation that would align the inspection system with the purpose of state-level inspection rather than the IAEA safeguards.^[2]

2.2 Features and effects of the regulation on guideline to formulate the safeguards rule on special nuclear materials

In 2014, the task force on the improvement of the state safeguards system amended the regulation on guideline to formulate the safeguards rule on special nuclear materials from the existing format based on design information from a more effective format

underscoring compliance requirements for facilities. Features of the amendment are as follows: first, the preparation guideline pertaining to design information for clearing administrative duplication was deleted; bilateral agreement and additional protocol, etc. were allowed to be incorporated in connection with the reporting obligations of facilities; in addition, the due date for initial approval request submission was stipulated at 5 months prior to the commencement of the use of special nuclear material as the regulation for accounting and control inspection was amended to add "Inspection before receiving;" lastly, provisions for mutatis mutandis application and discussion were added to incorporate in the regulation items identified in international agreements and supplementary arrangements, bilateral agreements and the meeting result with the IAEA.

The amended regulation describes the obligations of facility operator in connection with accounting and control to expressly state their obligations in the regulation whereas the former version focused on providing information. Accordingly, it is expected that obligations of facility operators pertaining to the accounting and control of nuclear materials will be clarified along with regulatory compliance within facilities. The deletion of guideline pertaining to design information is expected to reduce administrative workload of facilities. Following table shows the amendments made to the accounting and control regulation, design information document and facility annex in 2013 and 2014. Among them, the amendment of the accounting and control regulation is done mostly by revising design information except for some minor items.

Table I: No. of revisions of the documents pertaining to the safeguards^[3]

	2013	2014
No. of revision of regulation	15	19
No. of revisions of DIQ	43	20
No. of revisions of FA	24	1

2.3 Analysis and impact of the regulation on the national inspection rule on special nuclear materials

As the former regulation applied the IAEA inspection system in terms of accounting for and control inspection type and content, it needed to be improved in a way consistent with the purpose of the state inspection. The notification was amended as follows in reflection of such direction for improvement. Inspection types were added and consolidated by applying the inspection systems in other areas. The inspection before receiving was added to check the appropriateness and integrity of facility for initial approval of the regulation on guideline to formulate the safeguards rule on special nuclear materials along with regular inspection for comprehensive inspection to

check inventory and accounting and control compliance of facilities. The existing design information, intermediate inspection, short-term pre-notice inspection, random inspection, etc. all modeled after the IAEA inspection system were consolidated into ad-hoc inspection or their notice and frequency provisions to be better aligned with their purposes. In addition, the advance notice period of ad-hoc inspection was unified to 2 hours as the minimum in preparation for the non-notice visit which was agreed with the IAEA for enforcement.

The regulation has added regular inspection to the inspection types defined for inspection purposes in consideration of consistency with the inspection systems in other areas. This regular inspection is expected to be a more effective one than the existing state inspection modeled after the IAEA inspection. The regular inspection envisioned by the NSSC now is expected to be focused on checking the appropriateness of accounting and control system of facilities, their readiness for IAEA inspection, and integrity of accounting and control data preservation as opposed to the previous focus on verification of nuclear material inventory. Accordingly, it is expected that the inspection system that usually commits one person a day to the material balance area will be changed to a system that allows three inspectors to inspect the facility for two or three days. Following table compares the actual PDIs(Person Day Inspections) statistics for 5 years(2009~2014) and estimated inspection PDIs in 2015 and 2016 to highlight changes in inspection PDIs resulting from the introduction of regular inspection.

Table II: Comparison of Avg. of 5yrs and estimated inspection

	No. of Inspection	PDIs
Avg. of the 5yrs	110	196
2015	93	266
2016	82	205

As shown above, the PDIs of facilities decreases for reduction of inspection frequency whereas the manpower committed to state inspection tends to increase.

It is expected that more manpower committed by inspection agencies will improve the effectiveness of inspection and reduce inspection workload of facilities with less frequent inspections.

Table III: Expected regular inspection's PDIs in 2015^[3]

	No. of Facility	No. of Inspection	Period	Inspector	PDIs
KHNP	26	13	3	2	78
KAERI	11	5	3	2	30
KNF	2	1	3	2	6
Other	2	2	2	2	8
Sum	41	21			122

3. Conclusion

This study examined changes in the environment surrounding the state safeguards following the amendment to the notification for accounting and control of specific nuclear materials and analyzed in part the ensuing changes in implementation. The improvement of the state safeguards system envisioned in the amendment to the notification is intended to ensure the integrity of the state safeguards with the agreement reached with the IAEA to enhance cooperation, enable facility operators to ensure compliance with their obligatory requirements without assuming unnecessarily duplicate administrative workload, and eliminate unreasonableness of the state accounting and control inspection. These improvements are expected to contribute to establishing more effective state safeguards system and helping with compliance with international non-proliferation standards.

REFERENCES

1. [1] The regulation on guideline to formulate the safeguards rule on special nuclear materials(2014-5), NSSC, November 10, 2014
2. [2] The regulation on the national inspection rule on special nuclear materials(2014-6), NSSC, November 10, 2014
3. [3] The 2014 annual report for the safeguards implementation in the ROK, KINAC, February, 2015