Analysis of Cases of Foreign Obligated Nuclear Material and Management Practices

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1. Introduction

Foreign obligation generally arises from the reporting requirements of the Bilateral Agreements for Peaceful Nuclear Cooperation, which are necessary to allow the Republic of Korea nuclear industry to trade with foreign countries. It can be defined as a commitment by one government to another to tracking the nuclear materials, non-nuclear materials, equipment and components in a manner consistent with the agreement signed between the two governments. In order to fulfill these requirements efficiently, many countries are managing the items subject to the agreements by applying the obligation code to the nuclear material management and safeguards system. This paper describes the status of domestic management implementation from the perspective of safeguards and export control and overseas practices to trace and report foreign obligation nuclear material.

2. Current Status on Domestic Implementation and Analysis of Foreign Management System

2.1 Current domestic management status

The domestic system of material accountancy has been designed for the purpose of implementing the IAEA safeguards procedures efficiently. In the field of safeguards, the government operates Korea Safeguards Information System (KSIS) which does not manage the information on the country of origin because the origin information has been separately reported semi-annually since 2014. On the other hand, the information on the country of origin is confirmed based on the documentary evidence such as Nuclear Material Transfer report (NMTR) provided by the supplier. Annual reports according to the nuclear bilateral agreement are prepared with the U.S., Australia, Canada, and Japan on the inventories and changes of nuclear materials subject to the agreements according to a concept as shown in Fig. 1.

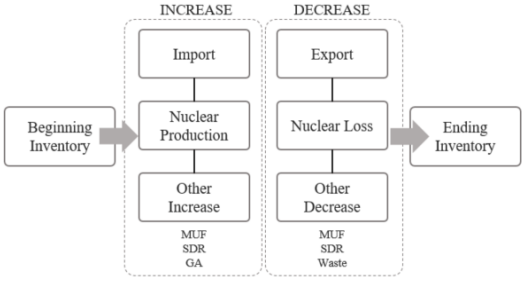

Fig. 1 Accountancy of nuclear material subject to the bilateral agreements

In the field of export control, transferred and re-transferred items should be controlled under the bilateral agreements. Currently, all related tasks such as prior notification and written confirmation of shipment or receipt are carried out in a form of official document. The detailed procedure is shown in the Fig. 2.

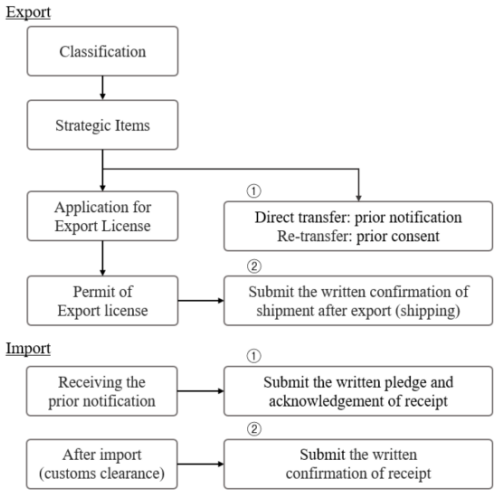

Fig. 2 Diagram of text data pre-processing

The state and licensees confirm the information of foreign obligated material based on the total amount of material they own, and detailed procedures to control the material vary from country to country. In addition, currently, since the two types of tasks mentioned above are conducted separately from the regulaory point of view, there is a possibility of inconsistency in data due to the absence of integrated monitoring system for the overall task. So, it is necessary to understand the status of foreign management practices and integrate the criteria for determining whether items subject to the agreement.

2.2 Overseas management status

In U.S., Nuclear Material Management and Safety Measures System (NMMSS) is used for tracking and tracing the nuclear material. Using the system, facilities also can report on foreign obligated nuclear materials and non-nuclear materials. According to the U.S. Department of Energy (DOE) guide and NMMSS, the U.S. government assigns 15 single country codes and 29 multi-country codes, total 44 obligation codes in Arabic numerals. European Atomic Energy Community (EURATOM), which consists of 28 countries in Europe, designates 7 obligation codes in the alphabet. In Japan and Canada, codes are classified into 9 cases by using

general country code such as KO, AS, CN and U. Table I shows the comparison of U.S. and EURATOM classification codes and Table II shows the status of origin and obligation information in documents provided by country.

Table I: A Comparison of Euratom code and U.S. code

Euratom code (material location of the country)		U.S. Code	
A	U.S. obligated	33	Euratom obligated
C	Canadian obligated	92	Canadian and Euratom obligated
D	Canadian and U.S. obligated	92	Canadian and Euratom obligated
S	Australian obligated	91	Australian and Euratom obligated
T	Australian and U.S. obligated	91	Australian and Euratom obligated
P	Peaceful use material (no obligations)	33	Euratom obligated
N	Not obligated	33	Euratom obligated

More specifically, in cases of supplier's documents in U.S., Canada, and Europe, the information of obligated material and weight is recorded in items country of obligation, obligated weight, foreign obligated material, etc. Whereas, in France, Russia, and China, the information of the obligatory country is not separately described in the related documents.

Table II: Status of Origin and Obligation Information in Documents Provided by Country

Facility	Origin			Obligation	
	Mining	Conversion	Enrichment	Country	Quantity
URENCO (Europe)	○	○	○	○	○
Centrus (USA)	×	×	○	○	○
AECL (Canada)	△(○)	×	○	○	○
AREVA (France)	○	×	○	×	×
Others	×	×	○	×	×

3. Conclusions

In this study, several application cases of obligation code in countries, such as U.S., Canada, and Europe were reviewed. As a result of comparing the country-specific obligation codes and application cases for nuclear materials, it was confirmed that the U.S. had the most systemic and specific procedure to report. Although the document format was different for each country and the origin information was limited in some countries, it is confirmed that establishment of obligation codes suitable for each country's environment should be considered.

In order to apply this information to domestic nuclear industry, first, the status of possession of the origin of imported nuclear material is identified, and the combination of information of the state of concentration, conversion, and enrichment facilities by country. Also, it is necessary to discuss in consideration of accountancy and export control at working-level, centering on domestic facilities. And then, institutional improvement and regulatory system establishment related to safeguards and import and export control should be supported. So, it is required to prepare a systemic designating and reporting procedures for foreign obligated material.

REFERENCES

[1] Department of Energy, National Nuclear Security Administration. Nuclear Materials Management and Safeguards System (NMMSS) Users Guides-Rev.2.1, 2017

[2] Canadian Nuclear Safety Commission. Guidance for Accounting and Reporting of Nuclear Material, GD-336. 2010

[3] World Nuclear Association. Swaps in the International Nuclear Fuel Market, 2015

[4] Agreement for Cooperation Between the Government of the Republic of Korea and the Government of the United Stated of America Concerning Peaceful Uses of Nuclear Energy, 2015

[5] Notice on Import and Export of Strategic Items No.2021-202, 2021

[6] M.Y. Ryu, A Study on Current Status of Obligated Items subject to Bilateral Nuclear Cooperation Agreements, Korea Radioactive waste Society 2021 Autumn meeting, 2021