

Suggestion on State Control of non-Nuclear Purpose Nuclear Material

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1. Introduction

The ultimate responsibility of control of nuclear material falls on the scope of national authority. In the Comprehensive Safeguards Agreement with a country, the IAEA requires it to prepare SSAC (State System of Accounting and Control of Nuclear Material) [1] and report information of nuclear material and facilities periodically. The owners with large quantity of nuclear material such as NPP or nuclear laboratory have a well-organized accounting system required by domestic law, Nuclear Safety Act. Concerning holders of small amount nuclear material mainly for non-nuclear purposes, the accounting system is not mandatory and even the license for using nuclear material is not necessary if he/she has amount less than specified in the law.

In this paper, key issues that may induce difficulties in nuclear accounting and bring confusion to holders of nuclear material for non-nuclear use are presented and effective ways to improve the present state system are suggested.

2. Key Issues on Non-Nuclear Purpose Nuclear Material

2.1 Legal Framework

According to the IAEA Additional Protocol, a state is required to report information of non-nuclear purpose nuclear material and exempted material [2]. There rises some difficulties when collecting the information because any clear legal definition about 'non-nuclear purpose' doesn't exist. Even more, holders of small amount of nuclear material don't need to get license for use (e.g., less than 300g for depleted U) and don't have any obligation to submit accounting reports. Which means that there are not a little possibility of missing nuclear material out of state control. Information about nuclear material can be reported during administrative processes as follows:

- Nuclear Material Accounting Report
- Import & Export Requirement
- License for Use of Nuclear Material

These are controlled mainly by the government (NSSC) with the supports provided by several entities which have its own technical specialties in nuclear material. Therefore, information sharing between these entities is very much important for timely collection of information without missing or delay.

2.2 Accounting and Control of non-Nuclear Purpose Nuclear Material

In ROK, major nuclear facilities such as NPPs, the fuel fabrication manufacturer, and the national nuclear research laboratory have to have its own accounting system and submit accounting report to the government. These kinds of responsibilities are not imposed on other organizations holding relatively small amount of nuclear material (usually less than 1SQ), which includes universities, research labs, medical institutions or NDA firms, etc. The ROK government should prepare accounting reports about non-nuclear purpose and exempted nuclear material in its territory as a whole with virtual MBA, KOX.

The holders of non-nuclear or small quantity nuclear material amount to around 130 in the ROK, so it is not easy to receive information from individual contacts. In order to streamline the process of data collection, an online system has been being operated (National LOF Management System) through which the holders can input the information about their nuclear material and changes. This is not required mandatorily, however, so there still exists possibility of typos or data missing. To prevent these problems, KINAC performs site visits to the locations of the holders to provide technical supports. Around 30% of holders are selected each year for this site visit.

2.3 Private Holders

Most holders of non-nuclear purpose or exempted nuclear material are NDA firms and hospitals that use depleted uranium as shielding material. Nowadays, the number of private organizations using uranium dioxide (UO₂) or plutonium dioxide (PuO₂) as CRM (Certified Reference Material) for the analysis of water quality is on the increase. Since the required amount for this task is only ppm level, the accounting and control for these small amount of nuclear material will be more difficult

if this trend is going on. Moreover, the NDA is not a quite promising business and even the entry barrier is not so high in Korea. Therefore, it is very common that many NDA companies start and shut down the business very frequently because of economic reasons. The nuclear material can be taken by other companies through legitimate transactions, but some of the material will be exposed to the risk of missing or unauthorized disposal, which makes nuclear material accountancy complicated.

2.4 Suggestions for Improvement

The possibility of diversion of non-nuclear purpose nuclear material for manufacturing nuclear explosive devices is very low, and the priority of material accountancy for that cannot be high in the context of efficiency of IAEA safeguards. In the meanwhile, the domestic legal framework should be well-organized to complete the state's duties required by the international pacts. Also it is required to amend the processes that might bring confusion to the holders of nuclear material. The ways to improve the material accounting system for non-nuclear purpose nuclear material are suggested as follows:

- Not applying IAEA safeguards for non-nuclear purpose nuclear material especially for CRM with extremely low amount (~ppm)
- Imposing legal responsibilities of accountancy on holders of non-nuclear purpose nuclear material except the case described above
- Unifying the process of license for use of nuclear material and the process of nuclear material accountancy into single one

3. Conclusions

The role of state is essential for the IAEA to complete its safeguards mission, and well-defined legal structure is prerequisite for effective control of nuclear material. The current accounting system for non-nuclear purpose nuclear material has some difficulties in tracking without missing. When the loss of nuclear material happens and the reason cannot be identified, it could be a negative impact on a state's nuclear transparency even if the amount is small. To minimize this kind of risk, it is necessary to amend laws and improve implementing system. In addition, it should be stressed how to enhance recognition of the nuclear material holders on the importance of nuclear material accountancy.

REFERENCES

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