

Control and Management of Small Quantity Nuclear Material (SQNM) on Safeguards

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1. Introduction

Small Quantity Nuclear Material (SQNM) is defined as the nuclear material that is below the amount approved in atomic energy act. SQNM generally lists depleted uranium (DU) used as a catalyst or shielding material in exposure devices in industries. The SQNM users have a duty to report information on possessing and using SQNM regularly to the government. All nuclear materials must be included in IAEA reporting lists according to safeguards agreement and additional protocol regardless of amount.

However, it is difficult to investigate the status of nuclear material possessed in industries because SQNM is excepted regulation item list in atomic energy act. Most SQNM user industries are small companies so they have some problems like the loss of nuclear material after bankruptcy. Even though the damage of radiation leakage is very low, loss or careless management of nuclear material causes confusion. Thus, developing a control and management system for SQNM is essential.

This paper discusses the present condition and prospect of control and management SQNM in Korea.

2. Domestic Status of SQNM Management

A national management system regarding the control of SQNM has been operating since 2004. The national management system in 2009 includes 77 industries and research centers using SQNM in Korea. They are classified National LOF (Location Outside Facilities) on Safeguards aspect differently with other facilities. The National LOF is composed of 3 KMPs; KMP A (58) is NDA Industries, KMP B (17) is Research Centers, and KMP C (2) is Other Industries.

2.1 Declaration of SQNM Usage

Industries possessing SQNM have a responsibility to declare their inventory change and exempted nuclear material information to the government by article 103 in atomic energy act and notification of MEST 2008-156. Declaration reports to submit to the government are as follows:

- Inventory Change Report (ICR)
- Physical Inventory Listing (PIL)
- Material Balance Report (MBR)
- Concise Note

ICR should be handed in 15 days after the end of the month when the inventory changes occurs and PIL and MBR should be submitted in 15 days after physical inventory taking.

KINAC operates a national LOF Web management system and reports of SQNM from industries are submitted to KINAC on-line. However, there has been no legal basis for on-line reporting until now. The industries using SQNM in Korea are mostly small companies, so they feel burdened when making a reports to KINAC.

2.2 Inspection

Nuclear material for non-nuclear usage has been included as an inspection item after the AP was entered into force on February 19, 2004. IAEA inspections were performed 2 times per year on the average for the last 5 years.

National inspections are composed of routine inspections and ad hoc inspections. Preview last inspection result should be done before beginning the inspection. And the inspector has to check operation record, take in/out report, and equipment management manual, etc. with documents and the quantity, ID, and state of declared nuclear material during field verification. Routine inspection is carried out at least once every 3 years and the Ad hoc inspection is performed when necessary.

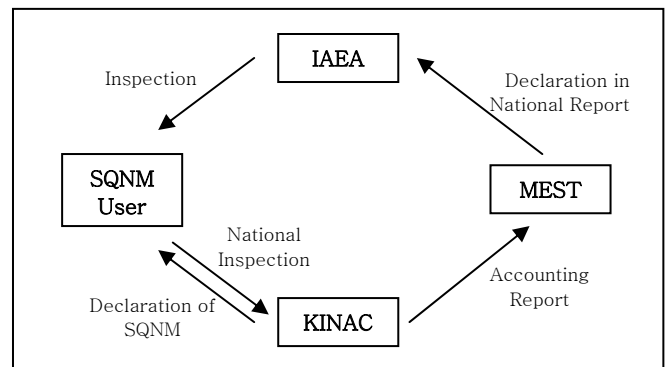


Fig. 1. Diagram of SQNM Declaration and Inspection.

2.3 Education for Industries Using SQNM

Nuclear control education has been performed for persons in charge of nuclear accountings at facility and nuclear cycle research management. But person to use SQNM for non-nuclear usage is excluded the education, so they have been educated at safety class of NDA Promotion Institute for 2 hours in 2 times every year. Field education is also performed during inspection by

national inspectors. Education was performed 10 times on average per year during the last 3 years.

3. Management of SQNM without Record

The industries that use SQNM in Korea are mostly small companies. Opening and bankruptcy of these companies and trade between them are frequently occurred. Thus, it is difficult to confirm the inventory quantity and change.

When they become bankrupt they face the problem of treating the useless devices containing SQNM. Some companies leave devices or throw it away without any notification to the government. In this case, the SQNM can disappear without record. To prohibit this, KINAC is making the SQNM storage facility in KINAC and collecting the data of company and SQNM regularly. The SQNM facility storage is under construction at basement in KINAC and will be operated in 2009.

But, the regulation for transferring or undertaking the SQNM without records to storage at KINAC is still not prepared. So, the notice of MEST should be revised to become the transfer possible.

4. Management of Useless Unclear Material

When a company goes bankrupt or does not need devices which contain including SQNM any more, they have to transfer the device to other company or store it at KINAC. However, storage at KINAC is a temporary solution. A systematic plan to treat useless nuclear material is needed for permanent disposal.

Some plans have been discussed. These include recycling treatment as RI waste or medium-low radioactive waste, or returning to the producer. Discussion about these solutions will continue with regard to economic, environmental and non-proliferation features at present point.

5. Conclusions

It is important to show the nuclear non-proliferation intention of Korea through nuclear material control and management at the national level, and to protect against accidents and material loss. The legal basis and management system for SQNM are established and the system is being operated. But, the law still leaves something to be desired. We have to talk about the treatment of useless nuclear material for permanent disposal. As mentioned above the SQNM users are small company, continuous management and changes of the regulation and work manual are necessary.

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