

Safeguards management approach on nuclear waste at KAERI

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1. Introduction

Nuclear waste containing nuclear material is subject to International Atomic Energy Agency(IAEA) safeguards under IAEA safeguards agreements, even though the amount of nuclear material is very small. Therefore, Korea Atomic Energy Research Institute (KAERI) submits an accounting report to IAEA on the nuclear waste and receives inspections from IAEA.

There are 11 nuclear facilities at KAERI and the amount of nuclear waste occurred from the nuclear facilities at KAERI has been increased.

This report reviews the status of the nuclear waste at KAERI and describes the safeguards approach of nuclear waste.

2. Safeguards approach in the liquid waste

Radwaste Treatment Facility(RWTF) annually solidifies the liquid waste of the non nuclear material collected from all laboratories at KAERI to asphalt after evaporation. On the other hand, the liquid waste of nuclear material occurred from the chemical analysis laboratories and R&D laboratories after the experiments should not be solidified under the current safeguards approach, so the nuclear waste has been stored in each laboratory. However, it is difficult for the laboratories to store and manage them due to the no enough space for storage, corrosion of container and nuclear material accountancy etc.

Therefore, KAERI discussed a safeguards approach for the liquid waste of nuclear material with IAEA at the 14th IAEA/ROK Joint Review Meeting on Safeguards Implementation, held in Vienna during 29-30 September, 2005. As a result of discussion, the liquid waste of nuclear material will be terminated the application of nuclear material safeguards after solidification at RWTF and the detailed procedure is as follows;

- ① manufacture of tank for liquid waste
 - ② creation of a Location Outside Facilities(LOF) for the tank
 - ③ collection of liquid waste from the laboratories
 - ④ report transfer to retained waste (TW)
 - ⑤ re-transfer from retained waste before the solidification of liquid waste (FW)
 - ⑥ notification of plan on solidification to IAEA
 - ⑦ solidification of liquid waste to asphalt
 - ⑧ termination of safeguards after solidification
- ※ IAEA could perform the inspection if necessary.

KAERI investigated the status of nuclear liquid waste at KAERI, and is preparing for the approval of the Korea Institute of Nuclear Safety(KINS) and manufacture of tank.

3. Safeguards approach in the solid waste

The solid wastes occurred from nuclear facilities are scattered at KAERI and UF6 cylinders have been placed in the open air. It is necessary to manage and control the solid wastes in a separate space.

Therefore, KAERI has discussed internally how to manage and control the nuclear wastes since 2005. As a result of discussions, KAERI decided to construct a nuclear waste storage building to store the wastes and residues of uranium, such as UF₆, UF₄ and scraps which are no longer used at KAERI. The status of nuclear waste at KAERI is shown in Table 1.

The waste storage will occupy a part of a new research building which will be constructed near the cold neutron laboratory which is being constructed. KAERI submitted the preliminary design information for the storage in August 2006, and will provide the further information on design and completed Design Information Questionnaires(DIQ) this year.

Table 1. Status of solid waste of nuclear material at KAERI

Type of nuclear material		Comment
NU	Scrap	
DU	Scrap	
	U ₃ O ₈	Occurred from oxidation
	Metal chip	Occurred from cutting of ingot
	Alloy	
	Debris	
	UF ₄ slag	
	UF ₄ powder	
	UF ₆ cylinder	

The space of storage and the arrangement of the drums should be considered because IAEA inspector could request to open a drum or measure the weight in order to verify the each drum. Therefore, the arrangement of the drums can be considered like Fig. 1 and other arrangements method can be reviewed if it is inconvenient for the inspectors.

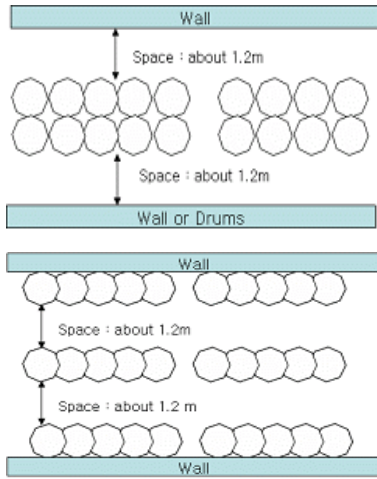


Fig. 1. Arrangement method of drums on nuclear waste

4. Conclusion

This report reviewed the safeguards approach on nuclear waste. KAERI needs to submit the revised DIQ of LOF for nuclear liquid waste after approval of KINS and manufacture of tank. The management and control on nuclear wastes occurred at KAERI will be improved by storing together into one storage building. For the IAEA inspection, the space of storage and the arrangement of the drums should be considered. Also, the department to manage and control on nuclear wastes should be determined.

REFERENCES

- [1] INFCIRC/153(corrected), The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, IAEA, 1972.
- [2] Minutes of the 14th IAEA/Republic of Korea Joint Review Meeting on Safeguards Implementation, September 2005.