

# Study on Modification of Solid Radioactive Waste Management System at KAERI

Dong-Ju Lee\*, Il-Sik Kang, and Dae-Seok Hong

Korea Atomic Energy Research Institute, 111, Daedeok-daero 989beon-gil, Yuseong-gu, Daejeon, Republic of Korea

\*dongju15@kaeri.re.kr

## 1. Introduction

The Operational Radwaste Control Team at Korea Atomic Energy Research Institute (KAERI) manages various types of radioactive wastes generated during the operation of nuclear facilities (nuclear cycle facilities, HANARO, RI production facility, nuclear R & D facilities, etc.) [1]. The radioactive waste from the waste generation department is repackaged at the Radioactive Waste Treatment Facility (RWTF) and a sample representing their generation characteristics is taken. After identifying the concentration of radionuclide using the representative samples and reviewing the waste characteristics, wastes meeting waste acceptance criteria will be delivered to the final disposal site.

As the safety of radioactive waste management becomes more important, the importance of transparent history management in the treatment and disposal of waste is also increasing.

In this paper, we reviewed the current solid radioactive waste management system for improvement. Based on the technical review, we plan to establish a transparent management system for solid radioactive waste at KAERI.

## 2. Solid radioactive waste management system

### 2.1 Procedure of solid radioactive waste management

Presently, generated radioactive waste is classified into major categories (combustible, non-combustible, waste filter, waste resin, etc.) and collected in packaging containers (200 L drum, 100 L plastic pack, 50 L container, etc.) [2]. When collecting waste drum from the generation department, the waste management department requires the list of items for waste management. The radioactive waste management department manages the waste after it is loaded into the radioactive waste storage, and from this time, history management for waste drum begins.

For treatment, waste drum at storage is sent to RWTF. At the RWTF, the waste drum is repacked. It is also included in the history management.

Table 1 shows an example of the list of generated waste drum.

Table 1. List of the Generated Waste Drum

Waste type	Volume (L)	Serial Number	Major Nuclide	Waste Contents
Combustible	200	7J-001	Co-60, Cs-137	Vinyl, Paper

### 2.2 Issues of current solid radioactive waste management system

Through final disposal was begun in 2015, there are still lots of issues for waste characterization as follows.

First, it is difficult to trace the history of repackaged waste by contents and prove the representativeness of the waste samples, because the history management through classification of the waste contents (vinyl, paper, plastic, etc.) is not performed in the waste generation department.

Second, in the case of facilities where radioactive wastes are generated intermittently, it is necessary to store the wastes in the radiation area for a long time to fill a 200 L drum with one type of radioactive waste which may cause problems such as workers' radiation exposure and possibility of waste loss.

Third, the waste management system linked through related departments is not established. As the relevant departments performing waste disposal work manage the history data separately, it is difficult to trace the history of the waste for disposal.

## 3. Plan for modification of management system

### 3.1 Introduction of small sub-package

The waste generation department uses small sub-packages to collect wastes with the same generation characteristics. The same generation characteristics refer to wastes generated from same radiation work at a facility and with same contents. That is, the waste generation department collects waste with same generation characteristics in several small packages and packs them in a 200 liter drum. Then record the waste characteristics (weight, contents, nuclides, etc.) so that the traceability of the generated waste is possible.

Figure 1 shows the management items for small sub-package.

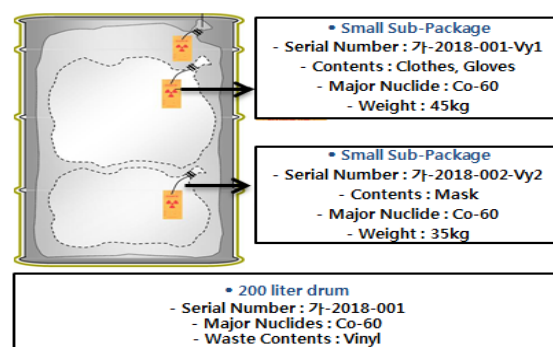


Fig. 1. Example of Management items for Small Sub-Package.

The main difference of this system from current management systems is that serial number and weight management are performed based on a small sub-package.

### 3.2 Management of mixed waste with different generation characteristics

Radioactive waste generated in small-scale laboratories where wastes are generated intermittently or generated by collecting residual wastes during waste treatment process can be sorted into contents according to the small sub-package waste management system of Section 3.1 and collected in one drum. That is, even if the generation characteristics are different, it can be collected in one drum, and the history can be clearly managed. This will enable the waste management department to perform accurate repacking and representative sampling of mixed waste.

### 3.3 Integrated history management

While the waste generation department carries out the history management of the wastes based on small sub-package, the waste management department receives the waste data and also performs the waste history management (repackage, waste sampling, etc.) based on 200 liter drum. Based on the collected representative samples and history information, the radiochemical analysis department analyzes the radiological characteristics of each drum. In this process, data on waste characteristics are managed from generation, treatment, analysis and finally to disposal.

Figure 2 shows the example of history data on waste characteristics.

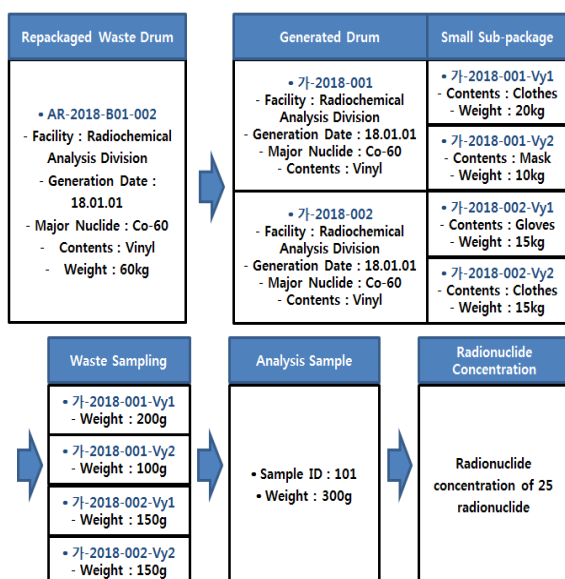


Fig. 2. Example of History data on waste characteristics.

## 4. Conclusion

In this paper, we reviewed the plan to modify the management system of solid radioactive waste at KAERI. The effects of the modified radioactive waste management system are as follows.

First, it can shorten the waste packaging period at the generation site. Waste generation department will collect the waste with the same generation characteristics in units of small sub-packages and deliver the packaged drums to the waste management department immediately. Through this, it is possible to solve the issues on workers' radiation exposure and loss of waste.

Second, it is easy to review waste generation characteristics. By performing life time waste management from generation to final disposal, it will be possible to accurately record the generation characteristics of each drum and to utilize it to review the waste generation characteristics for preparing final disposal.

Third, transparent history management of the waste becomes possible. The contents and weight of the waste can be finely controlled in units of small sub-packages. Also, repacking history and analysis information also can be reviewed appropriately.

Through this modified waste management system, it is expected that more safe and efficient waste management, treatment and disposal process will be established at KAERI.

## REFERENCES

- [1] Korea Atomic Energy Research Institute, "Operation of Radioactive Waste Treatment Facility", KAERI/MR-609 (2017).
- [2] Korea Atomic Energy Research Institute, "Regulations for Radioactive Waste Management", 2-14.24.