Integration of operational and dismantled waste and improvement of information function

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1. Introduction

As a measure to prevent unauthorized disposal of radioactive wastes and recurrence of similar events, the existing information management system of radioactive wastes has been improved.

To establish a safety management system for radioactive wastes, a system for comprehensive management of information on radioactive wastes (operational wastes, dismantled wastes, and clearance-level wastes) is required.

In this paper, dismantled wastes generated during the dismantling of KRR-2 (Korean Research Reactor-2, TRIGA Mark-III) and UCP (Uranium Conversion Plant) are described.

2. Methods and Results

2.1 Motivation

According to a Nuclear Safety and Security Commission survey on the status of dismantled wastes generated during the dismantling of KRR-2 (Korean Research Reactor-2, TRIGA Mark-III, Seoul) and of UCP (Uranium Conversion Plant, Daejeon) ('18.02~'18.05), 10 violations were identified. Currently, work is being carried out to prevent the recurrence of similar incidents after establishing a transparent follow-up plan to restore public confidence.

In this study, a system for information management of radioactive waste was developed to address problems caused by a lack of management regarding radioactive waste generation, radioactive waste treatment, radioactive waste disposal, and interdepartmental communication.

2.2 Advanced Safety Information Management

Low- and intermediate-level radioactive waste management is operated by the radioactive waste management module among the systems of the radioactive waste treatment under Advanced Safety Information Management (ANSIM) [1]. The radioactive waste management module manages solid, liquid, and liquid-legacy wastes. A number of reports, radioactive waste characteristics, and applications for drums of radioactive waste have been managed.

ANSIM is a reasonable system in terms of document management and project management of radioactive wastes, but its scope of control is limited to solid/liquid radioactive wastes generated from nuclear facilities. In addition, its management procedures are mainly implemented document-oriented; therefore, it is limited in terms of its configuration management of radioactive wastes.

2.3 Dismantled waste

Dismantled waste information was analyzed, extracted based on data from previously managed file types, and was designed the database by means of a parsing method.

2.3.1 Data collection

The data were collected by dividing the raw data of the dismantled waste storage and the historical data of the KRR-2/UCP.

O Raw data of the dismantled waste storage
-records of drum management
-classification of waste contents
-status of storage: concrete/combustible/non-combustible /soil sludge/220L drum
-classification of waste contents
-records of status of storage
O Historical data of the dismantled waste
-records of KRR-2
-records of UCP

2.3.2 Data analysis

Although the current storage status could be determined by the waste drum base through the data status and list, further work was required to make database needed to be obtained by the staff in charge of separating the wastes or extracting the status.

According to an analysis of drum management records for raw data extraction of drum, although the form of drum management records is the same, the drum management records were managed in different forms

because different types of data were entered or some forms were modified depending on the staff.

Upon analyzing the management properties of dismantled waste, attributes to be managed by the system were identified (Table 1).

Table 1: Data properties of dismantled waste

name of properties	
Serial no.	Loose contamination_α
Request department	Loose contamination _β
Types	Radiation dose rate _max
Drum no.	Date of measurement
Type of drum	Name of measurement
Date of packaging	Contents
Separation 1m	Weight(KG)
Total radioactivity	Date of treatment
Date of carried out	Inspected nuclide
Storage	Remarks

2.3.3 Data processing

A parser program was developed to extract raw data from drum management records regarding dismantled waste material.

By way of a comparison of the various formats of drum management records, three types of parser were derived.

In the case of drum management records, it is possible to construct them using a form-based method. In the case of historical data, however, data processing was carried out using Excel because the structure of the data was irregular.

By way of a comprehensive analysis of the status of dismantled waste (dismantled waste storage 1, 2) and historical data (KRR-2 and UCP), a list of dismantled waste information was constructed (Table 2).

Table 2: list of dismantled waste information

Clearance-level storage	Dismantled waste storage-1 & 2	
Serial No.	Serial No.	Order
Management No.	Drum No.	Date of carried-in
Contents	Types of drum	Contents
Weight(Kg)	Date of packaging	Weight(KG)
Date of generation	Contents	Management No.
Detected nuclide	Weight(KG)	Dose rate
Concentration(Bq/g)	Total radioactivity	Radioactivity concentration
Dose rate(uSv/hr)	Date of carried out	Total radioactivity
Scheduled treatment	Storage place	Remarks
Date of treatment	Loose contamination-α & β	
Remarks	Radiation dose rate_max	
	Radiation dose rate_1m separation	
	Date of measurement	
	Name of measurement	
	Radiation dose rate_contact	
	Main nuclide	
	Radioactivity	

2.3.4 Analysis of the results

The data matching the dismantled waste DB schema was implemented so that it could be entered into the appropriate class by uploading to the database.

Dismantled waste data can be used as lists, reports, and charts in the system and can be analyzed as needed. Figure 1 shows the status of the waste storage and waste classification.

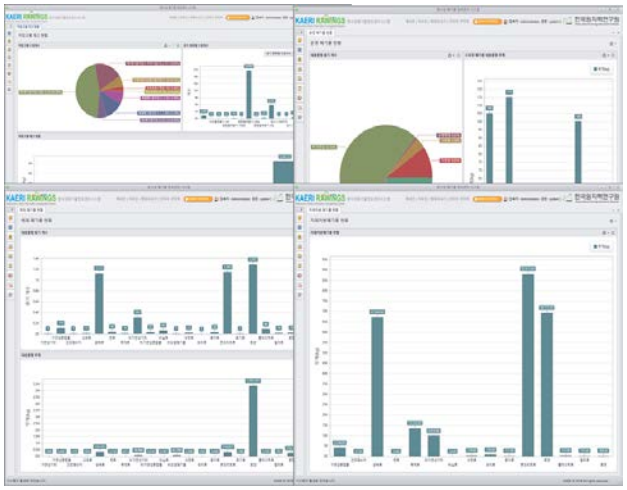

Fig. 1. Status of dismantled waste: storage and classification

3. Conclusions

An information management system for radioactive wastes at KAERI has been improved by integrating the management of operational-level waste, dismantled-level waste, and clearance-level waste by means of an ANSIM operational waste management function and menu. In addition, radioactive wastes of various kinds of characteristics have been implemented for easy traceability and configuration management and for the management of radioactive wastes over a full life cycle. The improved system will be used to ensure transparency in the management of low- and intermediate-level radioactive waste inventory and to

restore public confidence in the management of radioactive wastes.

REFERENCES

[1] ANSIM: Advanced Nuclear Safety Information Management. http://ansim.kaeri.re.kr:8080