Analysis of Data Field of Radioactive Waste Management for Development of Decommissioning Waste Management Program

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1. Introduction

The Korean government determined permanent shutdown of Kori 1 unit in 2017. As a result of decommissioning, large amounts of decommissioning waste will be generated. The proportions of the wastes by waste categorization were reported to be 4.2% for intermediate level waste (ILW), 28.7% for low level waste (LLW), and 67.1% for very low level waste (VLLW) [1]. The half of VLLW is estimated to be clearance waste after the delay and decay process.

Article 9 of Radioactive Waste Control Act in Korea requires collection, investigation, analysis, and management for radioactive waste control. Therefore, applicant or licensee should establish radioactive waste control system.

International Atomic Energy Agency (IAEA) proposed requirement for tracking radioactive waste management [2]. The countries with nuclear power plant (NPP) decommissioning experience, including the USA, Germany etc. constructed management system for decommissioning radioactive wastes and implemented. However, there is no such waste management system for NPP decommissioning in Korea.

Final objective of this study is to develop a waste management system for NPP decommissioning. As a beginning step for the objective, we analyzed data field of radioactive waste management program.

2. Materials and Methods

We reviewed radioactive waste management system to derive requirements for development of a decommissioning waste management program. Table 1 shows some examples of radioactive waste management programs. Each country and IAEA possesses independent management system to manage radioactive waste effectively.

Table 1. Examples of radioactive waste management programs

Country or Organization	Institute	Management program
IAEA	IAEA	WIRKS
		NEWMDB
		DIRATA
USA	EPRI	Waste Management Tracking System
	DOE	NMMSS, WWIS, SWITS, MIMS, IWTS, CID
Germany	EWN	ReVK
	GNS	AVK
England	Nirex	BRIMS
Japan	JNC	DES
	JAERI	COMSARD
Korea	KAERI	RAWMIS
	KHNP	DREAMS
	KNF	MES

Among various radioactive waste management systems, we selected WIRKS (Waste Inventory Record Keeping Systems), ReVK (Waste Flow Tracking and Control System), and RAWMIS (Radioactive Waste Management Integration System) for the review. WIRKS in IAEA was used as standard for control in member countries [2]. ReVK was developed by EWN (Energiewerke Nord GmbH), which has NPP decommissioning experience [3]. RAWMIS was developed by KAERI (Korea Atomic Energy Research Institute) and used to manage radioactive wastes [4].

3. Results and Discussions

Data field of radioactive waste management system and a common feature are given Fig. 1. WIRKS provides basic requirement of data field for radioactive waste management. ReVK was developed for the decommissioning wastes, thus data

of dismantling was included under ReVK. RAWMIS included data of clearance waste, such as clearance plan.
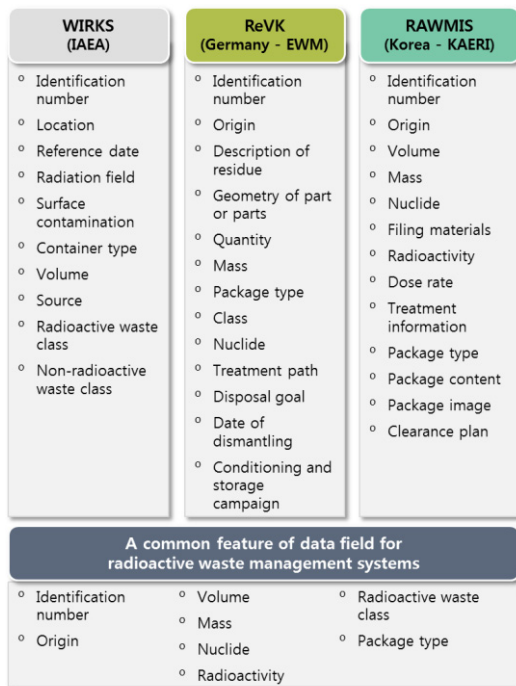

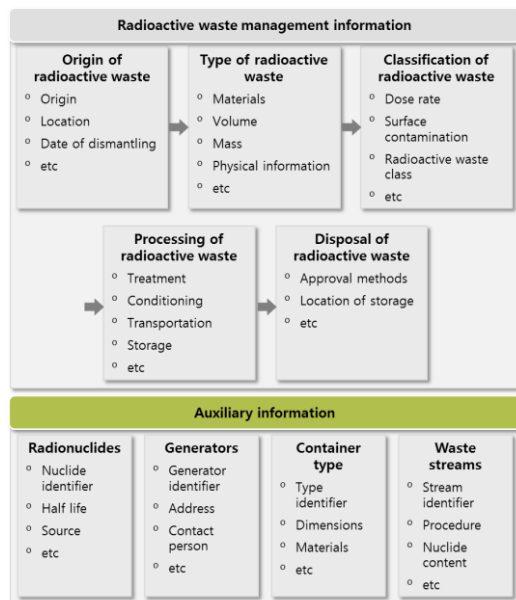Fig. 1. Data field of radioactive waste management system and a common feature.

Fig. 2. Basic structure of radioactive waste management system.

The common features of data field for the radioactive waste management systems included identification number, origin, volume, mass, nuclide, radioactivity, radioactive waste class, and package type. Basic structure of radioactive waste management system based on a common feature is given in Fig. 2. Basic structure of data field consisted of radioactive waste management information and auxiliary information. Radioactive waste management information included origin, type, classification, processing, and disposal of radioactive waste. Auxiliary information included radionuclides, generators, container type, and waste streams.

4. Conclusion

We analyzed data field of radioactive waste management program. Based on this data field requirement, we suggested basic structure of data field for radioactive waste management. The results of this study will be used to develop a waste management system for NPP decommissioning. In addition, it will contribute to the establishment of classification and management system in accordance with the characteristics of decommissioning waste.

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