

Prediction of Decommissioning Waste Generation of RadWaste Treatment Facility

San Chae*, Won-Hyuk Jang
Korea Atomic Energy Research Institute (KAERI), 34057, Daejeon, Rep. of Korea
schae@kaeri.re.kr

1. Introduction

KAERI has a plan to construct a new radioactive waste treatment facility for Very Low-Level Waste (VLLW) and Low-Level Waste (LLW). The Nuclear Safety and Security Commission has legislated permission for a preliminary decommissioning plan for a radioactive waste treatment facility in June 2021. Accordingly, the willing licensee should prepare decommissioning plan in chapter 5 of the Safety Analysis Report (SAR) [1]. Chapter 5 consists of several subsections: decommissioning plan, cost estimation, and safety analysis, etc. The one of important things in chapter 5 is total decommissioning cost estimation.

In this study, decommissioning waste generation is predicted and characteristics are analyzed to estimate the decommissioning. This analysis will be available to predict the overall cost of the project.

2. Prediction of Decommissioning Waste Generation

2.1. Feature of the new RadWaste Treatment Facility

The new RadWaste Treatment Facility in KAERI is design to treat history/legacy solid radioactive waste. This radwaste treatment facility is to manage LLW and VLLW radwaste. These low level waste is mainly an effective management method such as separation, drying, and compression without the chemical decontamination. Therefore, the radwaste treatment facility consists of two pretreatment room and a waste storage consisting of two floors. Due to the characteristics of these facilities, the waste with high radioactive concentrations is not expected to be generated even during the decommissioning process.

2.2. Characteristics of Decommissioning Waste

The RadWaste Treatment Facility consists of various small components which are for decontamination. Therefore, at the decommissioning stage, building waste (concrete wall, cement, etc.) has a large amount of the decommissioning waste than component waste. It is shown in Table 1. The building waste consists of concrete, pipes, and conduit and tray that make up the structure. Concrete accounts for a large portion of these wastes.

Because the aim of the waste treatment facility is LLW and VLLW, almost all of the building waste has surface contamination, not volume contamination.

Using devices such as a scabbler to remove surface contamination by 2mm to 5mm, most of the building waste can be classified as clearance waste. In addition, according to the Korea Atomic Energy Research Institute's KRR-2 decommissioning study; only about 13% of facility waste is generated as radioactive waste due to the decommissioning experience [2]. However, in the case of these waste treatment facilities, the ratio of radioactive waste may be lower.

For this reason, decommissioning waste produced from the facilities, which treat LLW, and VLLW consist of clearance level waste.

Table 1. Decommissioning Waste evaluation results

	Building waste				Component waste		
	Concrete (t)	pipe		Conduit and tray(t)	Metals (t)	Inflammable waste	Filter(t)
		Steel	Nonferrous				
Contamination	49.8	6.3	3.3	8.3	25.1	-	0.5
Non-contamination	12,775.1	43.2	27.9	55.5	189.3	0.8	3.3
total	12,824.9	49.5	31.2	63.8	214.4	0.8	3.8

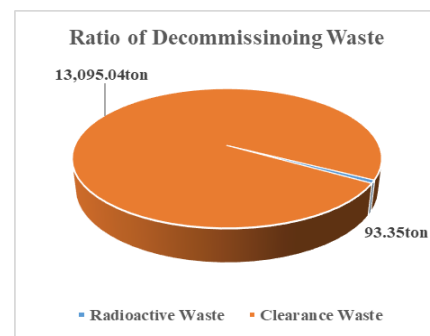


Fig 2. Ratio of Radwaste among Decommissioning Waste

3. Results and Discussions

It is common practice that decommissioning plans and associated cost estimates are prepared for all nuclear installations. In the case of estimates undertaken at the conceptual design stage of a project, the main purpose is to enable designers and client organizations to establish overall project costs [3]. The cost of waste processing, storage, and disposal account for a large

portion of the total decommissioning cost. Therefore, this study, predicts and analyzes the amount of decommissioning waste from the radwaste treatment facility. Overall project cost including decommissioning cost can be calculated based on these results.

REFERENCES

- [1] Act No. 18145, Nuclear Safety Act
- [2] Decontamination and Decommissioning Project for the Nuclear Facility, KAERI/RR-2625/2005, 2005
- [3] International Structure for Decommissioning Costing (ISDC) of Nuclear Installation, OECD/NEA, 2012.