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Operation of the Radioactive Waste Treatment Facility at KAERI

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1. Introduction

In KAERI, radioactive wastes are generated from the HANARO Research Reactor, nuclear fuel cycle facilities and research laboratories. All these wastes are collected, treated and stored in the RWTF (Radioactive Waste Treatment Facility).

In the interim storage facilities at KAERI, there are about 12,500 drums of solid wastes.

In this paper, the RWTF is briefly introduced and then the activities for the treatment of the radioactive wastes in 2006 are described.

2. Description of the RWTF

The RWTF has been operating since 1990 and has collected, treated and stored all types of low and intermediated radioactive waste generated at KAERI. The RWTF consists of the Treatment facility with 9 processes, the Solar Evaporation Facility and the interim Storage Facilities. The composition of the RWTF is shown in Table 1.

Table 1. Facilities and composition of the RWTF

Facility	Composition
Treatment Facility	· Liquid Waste Treatment - Storage process - Evaporation process - Bituminization process · Solid Waste Treatment - Compaction process - Cementation process - Shredding process · Gas waste treatment · Decontamination · Laundry treatment
Solar Evaporation Facility	(zero release of effluent)
Interim Storage Facilities	· Low level waste storage · Intermediate level waste storage (Monolith)

The major activities of the RWTF are as follows;

- Collection, treatment and storage of liquid and solid radioactive wastes
- Solar evaporation of a very low-level liquid waste
- Management of the solid waste storage facilities
- Periodic inspection and maintenance of the process facilities
- Reduction of the radioactive wastes for a disposal
- R & D for a volume reduction of the radioactive wastes

3. Collection and Storage of Radioactive Wastes

The radioactive liquid and the solid wastes generated at KAERI in 2006 were collected and classified according to their levels and stored in the liquid waste storage tanks or the solid waste storage facilities, respectively.

3.1 Solid Waste

The amount of solid waste generated in 2006 was 752.25 drum on the basis of a 200 liter drum and the volume was 150,450 liter.

The distribution of the solid wastes generated in 2006 is shown in figure 1. As shown, the combustible waste accounts for about 47% of the total waste while the high-radiation waste only accounts for about 0.5% of the total waste.

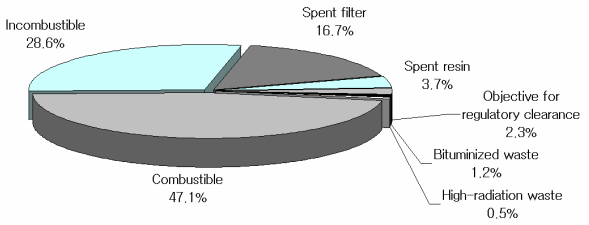

Figure 1. Distribution of solid waste generated in 2006

3.2 Liquid Waste

The amount of liquid wastes collected in 2006 was 181.12m^3. Among them, the liquid wastes generated from the RI production facility, the HANARO research reactor, the irradiated materials examination facility (IMEF) and the post irradiation examination facility (PIEF) were directly collected through a pipe-line in the liquid waste storage tanks in the RWTF. While the R & D laboratories liquid wastes were collected using a 20 liter P.E. bottle.

Some of the liquid waste with a very low level was directly sent to the storage tank of the solar evaporation facility.

4. Treatment of radioactive waste

4.1 Solid Waste

Due to the modification of a nuclear facility at KAERI, some equipment was generated and sent to the RWTF. In 2006, a filter bank, fume hood, exhaust duct and spent drum were dismantled.

Table 2 shows the dismantled equipment for 2006.

Table 2. Specification of dismantled equipment

Generator	Equipment	Dimension (mm)	Qty.
IMEF	Filter bank	3100×720×2000	4
	Duct	1200×2500×600	12
PIEF	Fume hood	1200×1800×1600	2
	Duct	-	177
	Filter box	800×1200×700	2
	Exhaust fan	1200×2000×1600	2
RWTF	Spent drum		667

After dismantling, some parts were decontaminated and stored in drums.

4.2 Liquid Waste

In 2006, 306 m^3 of liquid waste was evaporated. During the evaporation, 70 m^3 of demi. water was used and as a result, 376 m^3 of condensate was generated.

Also, in the solar evaporation facility, 315 m^3 of condensate was treated

4.3 Other Treatment

Using a laundry treatment process, 409 clothes were treated. In addition to that, 3,050 liter of waste was bituminzed.

5. Other Activities

As a disposal site for low and intermediate level radioactive wastes was determined in 2005 and will be operated from 2009 in GyeongJu, Korea, the RWTF is preparing a disposal of the radioactive wastes there.

A plan for the waste certification program was established to cover the requirements for a radiological, physical and chemical characterization, a physical/chemical restriction, prohibited items, packaging, identification, labeling and documentation. This program was set up as a preliminary program for a certification of the radioactive waste generated at KAERI and should be revised to meet the WAC (Waste Acceptance Criteria) of a disposal agency.

On the other hand, contaminated soil and concrete wastes were characterized for a regulatory clearance. These wastes were generated during the decommissioning process of a research reactor in 1988. The analysis results showed that more than 70% of the soil can be regulatory cleared without any treatment.

REFERENCES

[1] KAERI, Operation of Radioactive Waste Treatment Facility, KAERI/MR-455/2006, 2006.