

A Study on the Determination of Disposal Priority for LILW in Korea

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1. Introduction

Since 1977, KHNP (Korea Hydro Nuclear Power Co.), the major electric power company in Korea has generated about 70,000 LILW (low and intermediate level radioactive waste) drums converted as 200L drums. These LILW drums have been stored in temporary storage facilities of each plant site and have been prepared to dispose in Kyongjoo repository which will be constructed in 2009. The present LILW drums are classified into 4 categories: DAW (dry active waste), evaporator bottom, spent resin, and spent filter. For safe disposal, waste drums should be disposed in determined priority.

2. Status of LILW in Korea

Each waste type has the difference in the amount of production and the characteristic. This difference influences the determination of disposal priority.

2.1 DAW

DAW has been generated about 36,610 drums until now. This amount occupies 56% of total wastes generated by NPP (Nuclear Power Plant) in Korea. DAW has the low radioactive level compared to other waste type. But some old DAW drums generated in the early period of nuclear generation has the high radioactive level to excess of the regulation limit for disposal in GWAC (general waste acceptance criteria). DAW drums have been included various material such as plastic, paper, wood, metal and etc. Therefore, there are some possibility that some old DAW have free liquids and harmful materials. The characterization of free liquids is possible by NDA (Non Destructive Assay) system, but that of harmful materials is very difficult.

2.2 Evaporator Bottom

Evaporator Bottom has been generated about 19,040 drums until now. This amount occupies 28% of total wastes generated by NPP. Evaporator Bottom has the low radioactive level compared to spent resin and spent filter. In case of DAW, the differences of radioactive activities for individual waste drums are broad. But although totally the radioactive actives of evaporator bottoms are higher than those of DAW, there are no drums exceeding the regulation limit. Evaporator bottom drums have been generated by one procedure and these have little difference in components and radioactive

level. Therefore the raw waste of the drums can be evaluated easily. Presently evaporator bottom drums are solidified by paraffin. Paraffin has low compressive strength and heat resistance, and the additional study of the drums solidified by paraffin is needed for final disposal.

2.3 Spent Resin and Spent Filter

Spent resin and spent filter have been generated about 9,650 drums and 1,588 until now. These amounts occupy 14% and 2% of total wastes generated by NPP. Spent resin and spent filter have the high radioactive level compared to other waste types. Similar to evaporator bottom, spent resin and spent filter drums have homogeneity in components. Therefore the physical, chemical and mechanical characteristics of these drums can be evaluated easily.

3. Overseas Case for Disposal Priority

The disposal priority of overseas repository is dependent on their situation.

3.1 Spain

Since 1990, El Cabril repository has been operating in Spain. The type of El Cabril repository is a near surface engineered facility. In Spain, first of all, DAW drums having low activities were disposed and secondly evaporator bottom drums were disposed. Extra waste drums such as DAW having high activities, spent resin, and spent filter have been stored temporarily.

3.2 Hungary

Since 1976, Puspokszilay repository has been operating in Hungary. The type of Pusposkzilay repository is a near surface engineered facility. Pusposkzilay repository was constructed for RI waste but from 1983 to 1996, LILW drums generated Paks NPP were disposed because of the saturation of capacity of Paks temporary storage. In Hungary, first of all, DAW drums having low activities were disposed. Other waste drums except DAW having low activities have been stored temporarily.

3.3 Japan

Since 1992, Rokkaho repository has been operating in Japan. The type of Japan repository is a near surface engineered facility. In Japan, first of all, homogenous

waste drums such as evaporator bottom, spent resin and spent filter were disposed and secondly DAW drums of which the characterization was operated were disposed. Extra waste drums such as DAW drums of which the characterization were not operated, have been stored temporarily

4. Conclusion

Considering the characterization and status of waste type in Korea, and the overseas cases, the disposal priority of LILW in Korea can be proposed following: (1) concentrate bottoms drums solidified by a cement and DAW drums whose radioactivity level is very low and detailed characterization of the waste is identified easily because of the homogeneity, (2) Spent resin solidified by a cement, (3) spent filter, (4) DAW drums whose radioactivity level is relatively high activities but the characterization is well identified. The extra waste drums such as spent resin in HIC, evaporator bottoms solidified by a paraffin, and DAW contained with some possible harmful materials, are needed the additional study.

This disposal priority is determined regard to only safety. Therefore if other factors such as economy, real situation of NPP, and etc are considered, this disposal priority can be changed.

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