

Cost-Benefit Analysis for Regulatory Clearance of VLLW Metal Radwastes at KAERI

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1. Introduction

In Korea, the first regulatory clearance was conducted in 1994. Since then, regulatory clearance has been conducted for radwastes from numerous nuclear facilities.

At Korea Atomic Energy Research Institute (KAERI), nuclear facilities have generated diverse metal radwastes that have extremely low levels of radioactivity. Thus, reducing the amount of metal radwastes by regulatory clearance has become one of important tasks for radwaste management. The total amount of metal radwastes was about 40 tonnes, all of them were cleared by regulatory clearance in 2015.

In this study, the cost for the clearance and the disposal cost saving were analysed, and, based on that, the economic efficiency of the regulatory clearance was discussed.

2. Procedure of Regulatory Clearance

The metal radwastes such as spent ventilation filter frame, rebar within concrete, dismantled radwastes of exhaust fan at radiation field and parts of hot cell equipment were generated during the operation of nuclear facilities at KAERI. For regulatory clearance, radioactive contamination was monitored for all these radwastes, and then they were washed and rinsed with pressurized water. They were cut and stored at a designated area in Radioactive Waste

Treatment Facility (RWTF) at KAERI.



Fig. 1. VLLW Metal Radwastes cleared in 2015.

After a series of processes, samples were taken for radioactivity analysis. This analysis results showed that the major radionuclides in radwastes were Co-60, Cs-137 or U-238. The radiological doses were assessed based on a clearance scenario. A scenario for the regulatory clearance was set up using RESRAD-RECYCLE Code, and default parameter values of this code were used for the assessment.

After permission from a regulatory body in Korea, the metal radwastes were cleared by committed disposal for recycling.

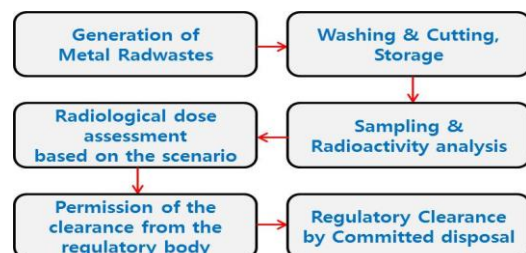


Fig. 2. Procedure of Regulatory Clearance for Metal Radwastes.

3. Cost-benefit Analysis

3.1 Cost Estimation

Until now, all the activities for the regulatory clearance were explained. These activities were accompanied with time, labor, and costs. Some parts of the activities were outsourced.

In total, the regulatory clearance costs about 50 Thousand US dollars and spans two years. Because a discount rate is not applied in the cost estimation, the present value is somewhat underestimated. Among the several cost terms, the labor cost due to outsourcing accounts for about 60 %, and secondary wastes accounts for about 15 %.

3.2 Benefit Estimation

In Korea, the final disposal of low and intermediate level radioactive waste costs about 12 Thousand US dollars per 200 L Drum. So, due to the regulatory clearance, a disposal cost of about 1 million US dollars for about 80 drums was saved.

3.3 Cost-benefit ratio

A cost-benefit analysis result shows that the regulatory clearance costs about 50 Thousand US dollars while saving about 1 million US dollars.

Therefore, it can be concluded that the regulatory clearance of 80 drums of VLLW metal waste shows a cost-benefit ratio more than 20.

4. Conclusion

There have been recent increases in the type and amount of radwastes considered for regulatory

clearance in Korea. Metal radwastes account for most of the primary radwastes subject to regulatory clearance. At KAERI, a variety of metal radwastes with extremely low radioactivity were generated from nuclear facilities. The metal radwastes about 40 tonnes were cleared by regulatory clearance in 2015. The regulatory clearance was conducted in the form of committed disposal for recycling. By use of regulatory clearance, the disposal costs for radwastes were greatly saved. Additionally management of radwaste became more efficient in view of storage capacity.

REFERENCES

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