

Problematic Waste IPT

Problematic Waste Management Case Study

Treatment and Disposal of High Activity Oil


LLW Repository Ltd

Magnox

Challenge

Magnox identified ten drums of waste oil contaminated with solids. The drums were being stored at the Trawsfynydd site. The waste comprised eight drums of Main Sludge Vault (MSV) oil and two drums of Resin Vault 1 (RV1) oil. The waste was high active alpha / beta, with two of the drums being classed as Intermediate Level Waste (ILW).

Incineration was identified as a possible management option, however, the activity of the waste oil was such that disposal by incineration was considered inappropriate. At the time, the limits in the environmental permits held by the incinerator operators were restrictive. These restrictions, which included both package limits and daily incineration limits, meant that the oil would have to be incinerated in small volumes over an extended period of time to prevent breaching the incinerator's permit limits. This would have led to the treatment of the waste taking a number of years. Repackaging would also have been required, resulting in double handling of the waste, which would not have been in line with the ALARP principle. The cost to incinerate the oils was also very high (£ millions), and thus prohibitive.

Solution

Through the LLW Repository Ltd Combustible Framework, initial studies were commissioned at NNL's Preston Laboratory, which has a chemical processing facility specifically designed for treating radioactive oils. These initial studies trialled a management approach involving decontamination of the oil, using an acid wash process, followed by incineration of the decontaminated oil. The acidic aqueous effluent produced could be treated through the existing effluent treatment plant. This oil decontamination method has been used routinely by NNL for a number of years.

The acid wash process for treating the oil involved acid washing with hot sulphuric acid, which removes the activity to the acid, followed by separation of the oil from the acid. The treated oil could then be disposed of by incineration.

Phase 1 was the initial trials stage of the project. These



Rig used for high alpha oil treatment

initial trials included sampling and safety case development for the process. The deliverables from the first phase included:

- A full technical specification for the treatment of the higher activity oils
- Full activity schedule
- Risk register

Work carried out by NNL on samples of the oil showed that at least 95.5% of the radioactivity could be removed.

Following the successful trials, the treatment of the bulk oil (Phase 2) was arranged through the LLW Repository Ltd Alternative Treatment Services (Lot 6) framework.

Combustible secondary wastes (coveralls, wipes etc.) were disposed of by incineration. Solid secondary wastes could be disposed of to permitted landfill (for Very Low Level Waste (VLLW)), or for any Low Level Waste (LLW) to the Low Level Waste Repository (LLWR).

Could this method be used for other wastes?

This method could be used for other oil waste, including oils containing particulates. The process used is a batch process, and there is therefore the potential to consolidate wastes in order to treat them. Various oil treatment techniques are available for other types of oil waste.