

Packaging of Harwell LLW Sludges

(Final stage)

Summary of Assessment Report

Issue date of Assessment Report: 12 April 2006

Background

UKAEA has submitted a proposal seeking “Final Stage” endorsement for the waste packages expected to result from retrieval and conditioning of low level waste sludges that currently reside in the Higher Level Activity Storage Tank Facility (HLA Tanks) on the Harwell Site. This facility, comprising ten stainless steel tanks, holds low activity sludge that has been accumulated as a result of effluent treatment and clean-up operations.

This document summarises the results of an independent assessment carried out by Nirex in response to the submitted proposals. The assessment has been carried out as part of the Letter of Compliance process¹, whereby Nirex examines the disposability of the proposed waste packages by assessment against ILW packaging standards and specifications and the Phased Geological Repository Concept (PGRC).

Although the HLA Tank sludge is classed as low-level waste on the basis of specific activity, much of it is judged unlikely to meet Conditions for Acceptance for the LLW repository at Drigg because of total alpha radionuclide content. It is proposed therefore to condition the material in line with Nirex packaging standards and specifications to enable future management in accordance with the Phased Geological Repository Concept.

The HLA Tank sludge comprises some 41m³ of settled sludge which is proposed to be packaged into 149 Nirex standard 500 litre Drums. This represents some 3.7% of the 2,000m³ of low level waste identified in the PGRC reference case volume, but less than 0.05% of the total volume of waste being considered in the reference case for the PGRC. The wastes do not make a significant contribution to the total inventory of any radionuclide considered in the Nirex Phased Geological Repository Concept (PGRC).

Packaging Proposals

The material contained within the HLA Tanks comprises caked material, wet sludge and clear supernate resulting from floc treatment of historic aqueous effluent arisings. Sampling has shown that the wastestream activity is held almost wholly in the solids component and it is proposed to discharge the bulk of the supernate and to re-mobilise the settled material.

It is expected that some of the specific tanks will contain sludge of such low activity that it will be potentially suitable for disposal to the LLW repository at Drigg. Subject to confirmation by sampling, this material would be packaged in mild steel 500 litre Drums and treated in a manner appropriate for low level waste. These waste packages are excluded from consideration by Nirex.

The recovered sludge would be transferred to a stock vessel in the immobilisation plant and characterised. The sludge would be dispensed to and immobilised in a 500 litre lost paddle Drum, using a blend of PFA/OPC (Pulverised Fuel Ash /Ordinary Portland Cement) powders.

¹ The Nirex Process for Assessment of ILW Conditioning and Packaging Proposals, Nirex Technical Note, March 2006

The conditioned product would be allowed to cure and then would be capped. The completed drums would then be transferred for interim storage in the Harwell Vault Store.

Assessment of Disposability

The acceptability of the proposed packages has been assessed against criteria established within the PGRC and associated Generic Waste Package Specification (GWPS).

The Assessment of Disposability is based upon the inventory data generated by the UKAEA sludge sampling programme.

The proposed package is compliant with the requirements of the Nirex GWPS and has been judged to follow established good practice. Numerous analogues of the proposed wasteform are available and the associated development work assessed previously by Nirex provides confidence that an adequate wasteform can be produced for the Harwell HLA LLW Sludges.

The assessments of transport safety show that it should be possible for 500 litre Drums containing Harwell LLW Sludge to comply with all relevant transport safety criteria. This assumes that they will be transported in a Type B transport container (as defined by International Atomic Energy Agency Transport Regulations) with at least 70mm thick walls, such as the Standard Waste Transport Container.

Similarly, the assessments of Operational Safety show that it should be possible for 500 litre Drums containing Harwell LLW Sludge to be handled and stored safely within a repository based on the PGRC.

The post-closure assessment has revealed no significant areas of concern that should prejudice disposal of packages containing Harwell LLW Sludges. This is not unexpected due to the relatively small quantity of radioactivity associated with them.

In summary, the assessment has concluded that a Disposability Case has been made for packages containing Harwell LLW Sludge when judged against the Phased Geological Repository Concept.

Conclusions

On the basis of the submitted information, the assessment of the proposal has concluded that the proposed packages will be compliant with the requirements of the Nirex Phased Geological Repository Concept (PGRC) and can be endorsed at the Final stage. The Disposability Case for the LLW Sludge packages has been finalised and no issues are identified as requiring further action.