Radioactive Waste Management Directorate

Packaging of Sludge from the Original Fuel Storage Pond, Sellafield

(Interim stage)

Summary of Assessment Report

Issue date of Assessment Report: 14 May 2008

Background

The Original Fuel Storage Pond facility was built in 1949/50 for the purpose of receipt and storage of fuel and isotopes from the Windscale Piles as well as the decanning of the fuel elements prior to reprocessing. Following the closure of the Piles and commissioning of the First Generation Magnox Storage Pond, plant operations were scaled down, although the facility was still used for storage of certain materials. As a result, the Original Fuel Storage Pond still contains an inventory of oxide and metal fuels, radioactive sludge and other solid wastes.

The Original Fuel Storage Pond LSTP project provides the plant and equipment for management of sludge retrieved from the pond. In February 2004, the LSTP project provided a Conceptual stage submission to Nirex for the solidification of sludge retrieved from the Original Fuel Storage Pond. Subsequently, a Conceptual stage Letter of Compliance and Advice Report were issued. The Advice Report identified the work that would be required to develop the proposals for the Interim stage submission (as specific Action Points).

Sellafield Ltd has subsequently submitted a formal request to NDA Radioactive Waste Management Directorate (RWMD) to review the status of development work undertaken in relation to sixteen of the Action Points raised in 2004.

This Assessment Report provides an assessment of the progress made in respect of these Action Points. This sets out the RWMD response to the completed development work. This provides the mechanism for formal closure of Action Points where this is deemed possible. Additional advice is also provided where further requirements are identified to enable resolution of outstanding Action Points. It is intended that any outstanding Action Points would be addressed as part of a full Interim stage submission by the LSTP project.

The evidence provided by Sellafield Ltd has enabled nine of the sixteen Action Points to be closed out. Those Action Points that have been resolved relate to defining the composition of the sludge, the potential effects of Wigner energy release resulting from the presence of graphite in the sludge, corrosion performance of the product container, the safeguards status of the nuclear materials present in the sludge and the effects of organic materials in the sludge on post-closure safety.

Due to the variability in composition of the sludge in the pond, there are considerable difficulties in obtaining inventory data applicable to the sludge as a whole. Whilst three Action Points relating to the provision of radionuclide inventory data have been closed out on account of the fact that some data has now been supplied, these measurements were derived from only a small sample of the sludge in the pond and are not necessarily representative of the composition of the entire waste stream. Sellafield Ltd should be aware that this radionuclide inventory data provided may be used in future assessments by RWMD. Sellafield Ltd is therefore encouraged to consider whether the data submitted would be

appropriate for this purpose or whether better inventory data could be supplied and justified for future use.

It has not been possible at this time to close out any Action Points relating to the development of a suitable wasteform. This is considered to be a significant area of uncertainty and significant effort will be required to resolve the outstanding issues in line with the timescales for submission of any Interim stage proposals for packaging the sludge. Further advice has been provided to enable timely resolution of these issues.

Whilst some useful information has been generated from the wasteform work completed to date, RWMD considers that a more appropriate simulant, or range of sludge simulants, need to be prepared for use in the development work which better reflect the variability in sludge composition. The definition of a grout formulation for encapsulation of the sludge is also fundamental to the onward development programme. Work to date has been carried out using a range of grout formulations, and this has prevented a suitable waste formulation envelope being defined. The resolution of other Action Points hinge on the definition of the formulation envelope.

This opportunity for interaction with Sellafield Ltd during the course of the wasteform development work is welcomed by RWMD and demonstrates good practice. Sellafield Ltd is encouraged to continue to work in collaboration with RWMD in order to facilitate timely resolution of the remaining Action Points in advance of the formal Interim stage assessment of the sludge packaging proposals.

The proposals to package the sludge wastes have been judged against regulatory guidance[1] and the view of RWMD is that they be considered as LOW priority for regulatory scrutiny.

[1] *The Management of Radioactive Waste on Nuclear Licensed Sites – Part 1: The Regulatory Process*, Guidance from the Health and Safety Executive, the Environment Agency and the Scottish Environment Protection Agency to nuclear licensees, December 2007.