

## Packaging of Residues from MAC Vaults at Trawsfynydd (Final stage)

### Summary of Assessment Report

Issue date of Assessment Report: 3 August 2007

---

### **Background**

British Nuclear Group Project Services has tendered a submission, on behalf of Magnox Electric, seeking Final stage endorsement of waste packages produced as a result of packaging and conditioning of the residues that remain in the vaults that had contained Miscellaneous Activated Components (MAC) at Trawsfynydd Decommissioning Site.

This Assessment Report summarises the conclusions of the NDA Radioactive Waste Management Directorate assessment of the Final stage submission for the packaging of these vault residues. The assessment has been carried out as part of the Letter of Compliance process, whereby NDA examines the disposability of the proposed waste packages by assessment against the standards and specifications for the packaging of Intermediate Level Waste (ILW) and the Phased Geological Repository Concept (PGRC). Further information on the Letter of Compliance process is available elsewhere<sup>1</sup>.

### **Scope of the Proposals**

The submission covers the vault residues that will remain in the MAC vaults after the retrieval of the MAC itself. This material is also described in the submission as Loose Particulate Waste (LPW). Much of this material, and especially the radioactive component of the waste, consists of spalled corrosion product and debris that was originally part of the MAC itself. Consequently, it can be considered to constitute a small part of the Trawsfynydd MAC waste streams 9G36 and 9G37 as defined in the 2004 Radioactive Waste Inventory.

The specific activity of the waste is relatively low and the inventory of the packages would be at the lower end of the spectrum expected for ILW packages. The volume of waste is small and it is estimated that only one or two standard containers would be required for packaging. The volume of waste is an insignificant fraction of the ILW scheduled for disposal under the PGRC and accounts for <0.01% of the total reference volume.

Under the proposed categorisation of waste packaging proposals detailed in the revised arrangement for the regulation of the conditioning of ILW, it is concluded that these proposals would be allocated to Category Y<sup>2</sup>.

---

<sup>1</sup> *Guide to the NDA Radioactive Waste Management Directorate Letter of Compliance Process*, NDA Document WPS/650, June 2006.

<sup>2</sup> *The Management of Radioactive Waste on Nuclear Licensed Sites – Guidance from HSE, EA and SEPA to Licensees. Part 1: The Regulatory Process*, draft document for consultation, February 2007 (NDA document reference #527516).

## ***Packaging proposals***

At present, retrieval of MAC from Vault 1 has been completed and subsequently about 40 litres of residue was collected. The MAC currently stored in Vault 2 remains to be retrieved and the total volume of residues therefore is not yet known. The submission reports a preliminary estimate of the total volume of residues of 1-2 m<sup>3</sup>, although, based on the retrieval from Vault 1, the total volume eventually may be lower, perhaps of the order of 100 to 400 litres. It is likely that only a single 3m<sup>3</sup> Box will be required to accommodate this volume of residues.

The residues would be removed from the vaults and packaged using the currently installed conditioning plant and associated retrieval equipment for the MAC. Retrieval of the residues is assisted by a remotely operated vehicle (ROV) and vacuum suction equipment. The waste would be packaged in a 3m<sup>3</sup> Box as developed for packaging MAC, but using a modified waste basket (the Type IV basket). The Type IV basket incorporates an integral paddle to allow immobilisation of the material by 'in-basket' mixing with cement grout. A 10mm mesh incorporated into the top of the basket, above the paddle, would be used to retain any slightly larger items that might foul the paddle mixer.

When loaded, each basket would be retrieved and placed into the box. Up to eight baskets may be loaded into a single box, with the option of using dummy baskets to occupy spaces if necessary. When retrieval is complete, the residues would be immobilised in each basket in turn by adding liquid cement grout (the immobilisation grout) and stirring through a drive attached to the paddle. The baskets would then be cemented into place by flooding the box with grout (the infill grout).

Both the immobilisation grout and infill grout would be based on a 3:1 mix of pulverised fuel ash (PFA) and ordinary Portland cement (OPC), although with differing water-cement ratios. Different mixes are required to allow for the water demand of the dry waste and need to produce a good quality wasteform. After grouting, the packages would be decontaminated and loaded into concrete overpacks for interim storage at the site.

## ***Assessment of Disposability***

The assessment reported herein has been restricted in scope to addressing the new information provided in response to the Action Points placed previously. A review of this information has concluded that the necessary actions have been undertaken and that the revised, and better substantiated, radionuclide inventory is lower than that provided previously. Consequently, it has been established that proposed packages would give rise to minimal risks and would be acceptable for disposal under the PGRC.

Since the wastes considered in this assessment represent a small fraction of the Trawsfynydd MAC as a whole, the current report does not present a separate Assessment of Disposability for the vault residues. Instead it is envisaged that these wastes would be included in the Assessment of Disposability for Trawsfynydd MAC, when this is produced at a later stage.

## ***Conclusion***

The assessment of the proposals has concluded that packages containing MAC vault residues are expected to be consistent with disposal under the PGRC and can be endorsed at the Final stage.

It has been noted that the storage of waste packages within concrete overpacks, as practised at Trawsfynydd Decommissioning Site, may have an influence on the longevity of the packages. The need for evidence of the conditions within such overpacks and any effect on longevity has been identified as a generic issue relevant to all package stored in this manner. Consequently, it is proposed that a qualification be placed on the endorsement of the vault residue packages to ensure that this issue is addressed in a timely manner.