

Packaging of Low Activity IONSIV Cartridge Waste (Conceptual stage)

Summary of Assessment Report

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Background

Magnox South has provided Conceptual stage proposals for the packaging of low activity IONSIV Cartridges in a form that will allow for their acceptance at a future disposal facility.

The proposals are based on packaging the cartridges within 500 litre drums and conditioning with cement grout to produce the disposal packages. The submission is limited to the low activity IONSIV Cartridges (<3.5 Sv/hr contact dose), that have arisen from the implementation of cooling pond clean-up processes at Magnox Electric generating stations. IONSIV is used to selectively remove radioactive isotopes of caesium from cooling pond water in order to reduce the dose rate to operators working in these areas. In some case operations have been curtailed early before the units have been loaded with caesium to their design capacity. This has resulted in the production of a number of low activity IONSIV Cartridges.

This document summarises the results of the assessment carried out by NDA Radioactive Waste Management Directorate for low activity IONSIV Cartridges. The assessment has been carried out using the Letter of Compliance process, whereby the disposability of the proposed waste packages by assessment against intermediate level waste (ILW) packaging standards and specifications and the Geological Disposal concept. Further information on the Letter of Compliance process is available elsewhere¹.

Scope of the Proposals

The packaging of the waste is expected to give rise to up to 24 off 500 litre Drum waste packages. The waste represents less than 0.005% of the total volume of waste being considered in the reference case for the Geological Disposal concept. It is suggested that the proposals be considered as LOW priority under the current regulatory prioritisation scheme. The principal reasons for this judgement are the low significance of the inventory and relatively small volume.

Packaging Proposals

It is proposed that the complete IONSIV Cartridges are transferred into a 500 litre Drum, which is fitted with high density concrete shielding, and immobilised with 3:1 BFS/OPC encapsulation grout. This approach is applicable to some 24 IONSIV Cartridges and hence would produce 24 off 500 litre drum waste packages.

It should be noted that the proposal presents a change to the previous endorsed strategy for transfer of spent cartridges to Ductile Cast Iron (DCI) drum, immobilised with polymer and overpacked with cement grout within 3m³ Box. Nevertheless, this packaging route remains the lead option for the higher activity cartridges, eight of which currently exist and are present at Dungeness. The revised proposals would offer a significant improvement in disposal volume utilisation and potential cost savings from handling, transport, storage and disposal.

¹ Guide to the Nirex Letter of Compliance Process, Nirex Document WPS/650, June 2006.

The proposals are considered to be a necessary component of a wider Integrated Waste Strategy (IWS) for the Magnox North and South sites and the approach is a 'fit for purpose' graded approach for disposal of the wastestreams. It should be noted that the packaging principle is based on use of cementitious grout, for entombment of the low activity wastes and reduction voidage.

Assessment of Disposability

The acceptability of the proposed packages has been assessed against criteria established within the Geological Disposal concept and associated Generic Waste Package Specification (GWPS). The proposed package has been found to be compliant with the requirements of the GWPS.

The Assessment of Disposability is based upon the inventory data supplied by Magnox South.

The assessment of Transport safety shows that it would be possible for packages containing IONSIV Cartridges to comply with all relevant transport safety criteria. This assumes that the packages would be transported in a Type B transport container (as defined by IAEA Transport Regulations), for example the Standard Waste Transport Container (SWTC).

Similarly, the assessment of Operational safety shows that it should be possible for the packages to be handled and stored safely within a Geological Disposal Facility.

The post-closure assessment has revealed no significant areas of concern that should prejudice disposal of packages containing IONSIV Cartridges.

The Conceptual stage submission, and the resulting assessment by RWMD, has been based upon a number of assumptions regarding the performance of the waste packages that would eventually be produced. This assessment has considered waste packages produced from grout encapsulation of low activity IONSIV Cartridges is expected to be compatible with the disposal concept.

Future Development

Having determined that the proposed waste product is, at this Conceptual stage, capable of being compliant with disposal requirements, RWMD have identified a number of issues that need to be incorporated within Magnox South's development programme to provide the level of evidence required for Interim stage endorsement.

At the Interim stage RWMD would expect to see the details of the proposals further developed and substantiated through the provision of evidence in the following general areas:

- Provision of an improved and justified waste package inventory, with particular emphasis on sites of operation and radionuclides of significance;
- Development of wasteform envelope and demonstration that the proposed process is robust to potential variations in water content;
- Development of appropriate data measurement and recording proposals;
- Confirmation of design details of the barytes liner and waste container design;
- Development of a draft Waste Product Specification.
- Development of a draft Criticality Compliance Assurance Document

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 Geological Disposal concept and can be endorsed as disposable through the issue of a Conceptual stage Letter of Compliance.