

## Packaging Options for 2 metre Box Design

### (Interim stage)

#### Summary of Assessment Report

Issue date of Assessment Report: 6 February 2007

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### **Background**

UKAEA has tendered a submission seeking Interim stage endorsement of the proposed design for the 2 metre Box container. The proposed design has previously been assessed and endorsed by Nirex at the Conceptual stage, through the issue of LOC/508929.

This document summarises the results of the assessment carried out by Nirex in response to the submitted design and associated documents. The assessment has been carried-out as part of the Letter of Compliance process, whereby Nirex examines the disposability of the proposed waste packages by assessment against intermediate level waste (ILW) packaging standards and specifications and the Phased Geological Repository Concept (PGRC). Further information on the Letter of Compliance process is available elsewhere<sup>1</sup>. The assessment reported herein builds upon that undertaken and reported at the Conceptual stage.

### **Scope of the proposals**

The current submission does not specify or limit the contents of the proposed container and it is anticipated that in future an endorsed 2 metre Box design would be cited in specific packaging proposals. The 2 metre Box is intended as a container for the packaging of decommissioning wastes and would be expected to be utilised as a non-fissile Industrial Package for transport under United Kingdom and IAEA Transport Regulations.

### **Description of proposals**

The construction of the proposed box is based around four corner posts that provide structural strength, and lifting and stacking features. A base plate is welded to the corner posts and side and end panels are welded to fill in the gaps between the corner posts and the base plate. The container lid would be bolted into place and would employ an elastomeric seal to support the lid and provide sealing. The box lid also includes a filtered vent to prevent pressurisation and a grouting port.

It has been proposed that the container would be fabricated in grade 1.4404 (316L) stainless steel sheet, typically 6mm in thickness, with thicker, structural elements such as the corner posts being fabricated in grade 1.4307 (304L) stainless steel plate.

The container includes the provision for concrete shielding to be cast into place. A high density concrete would be used, supported by a stainless steel reinforcement mesh. Such a concrete typically would be based on magnetite or barytes aggregates. The thickness of the shielding is variable and can be tailored to a particular waste to ensure that the payload of the box is maximised whilst still meeting dose-rate constraints.

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

### ***Assessment of Disposability***

The 2 metre Box is specified as a non-fissile Industrial Package type 2 (IP-2) to the IAEA transport regulations, and the 2 metre Box would be compliant with the ISO freight container design and testing regulations, such that it can be transported as an IP-2 container. The container also must be compliant with Nirex specifications for the 2 metre Box.

The proposed container design has been reviewed against the requirements for a 2 metre Box as codified in the relevant waste package specification, which in turn demonstrates compliance with the requirements of the PGRC. This review has concluded that, subject to minor modifications or additions to some design drawings, the proposed container design is consistent with the relevant specification.

### ***Requirements for further development work***

Assessment of the proposed design has identified a number of issues that would need to be addressed prior to the provision of a Final stage submission for the proposed container design. Furthermore, at the Final stage it would be expected that all drawings and specifications would be finalised and approved, and that documentation such as the Design Safety Report (DSR) and Manufacturing Specification would have been completed. This would require that all necessary regulatory testing also had been completed satisfactorily. The specific requirements would include the following:

- finalised design drawings, including all modifications identified herein together with changes arising from prototype manufacture and testing;
- a finalised and approved Design Safety Report;
- finalised Manufacturing Specification, including all modifications identified herein together with changes arising from prototype manufacture and testing, and further documentation covering the manufacture of the concrete shielding;
- satisfactory results from regulatory testing;
- results of, or an accepted schedule for, drop-testing to encompass the requirements under the PGRC;
- provision of acceptable proposals for the placement of the shield lid.

### ***Conclusions***

The Interim stage submission from UKAEA for the 2 metre Box design has been assessed. The assessment of the proposals has concluded that the proposed design is expected to be consistent with disposal under the Nirex Phased Geological Repository Concept (PGRC) and can be endorsed at the Interim stage.