

# Croft Rectangular Box Safstores® for the packaging of ILW

(Conceptual stage)

Summary of Assessment Report

Issue date of Assessment Report: 24 February 2012

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## **Introduction**

Croft Associates Ltd (Croft) has sought advice of the potential disposability issues that could arise from the use of their 'Rectangular Box Safstore'<sup>1</sup> waste containers for the conditioning of intermediate level waste (ILW).

This Assessment Report provides the basis and findings of the Conceptual stage assessment by NDA Radioactive Waste Management Directorate (hereafter RWMD) of the proposed designs of waste container with regard to their potential to form disposable waste packages. The assessment has been carried out through the Disposability Assessment process<sup>2</sup>, whereby RWMD examines the disposability of proposed waste packages by assessment against published packaging specifications.

Because in this case, the use of waste containers has been proposed without any specific knowledge of the wastes that may be packaged using them, this assessment has only considered the compliance of the proposed waste container designs with those aspects of the Generic Waste Package Specification (GWPS) which are pertinent to waste containers. However, it also includes a consideration of the issues that would need to be addressed by users of the containers, especially regarding the information that would be required as part of a submission for a subsequent Disposability Assessment of proposed waste packages.

## **Background**

Croft is developing a range of ductile cast iron waste containers designed for the packaging of the ILW that would arise from the decommissioning and clean-up of NDA and other UK nuclear licensed sites. The nature of the containers is such that they are intended to be used to manufacture 'robust shielded waste packages' in which the container provides most of the required performance of the waste package without explicitly relying on any specific properties of the contents. This relies on the waste container being sufficiently physically robust to ensure that the required waste package performance will be achieved. A consequence of this property is that it permits such waste containers to be used for the packaging of waste in an un-encapsulated form. The waste container will also be required to be capable of providing adequate radiation shielding such that the waste packages can be stored in a lightly shielded facility and transported through the public domain without additional protection. The suitability of the Safstore waste containers to be used to manufacture robust shielded waste packages is a key aspect of this assessment.

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<sup>1</sup> Referred to hereinafter as 'Safstore waste containers'

<sup>2</sup> For further information on the LoC process, reference should be made to *Guide to the Letter of Compliance Process*, NDA Document WPS/650, March 2008.

## **Scope of assessment**

This Conceptual stage Disposability Assessment is limited to a consideration of the suitability of the Safstore waste containers to provide the basis for the manufacture of waste packages that are compliant with the requirements for safe transport to and disposal in a geological disposal facility. The waste containers considered in this Assessment Report are two variants (with 50mm and 150mm wall thickness) each of three designs:

1. A 2m Safstore, the dimensions and handling features of which comply with those specified for 2 metre box waste packages;
2. A 2m half-height Safstore which is dimensionally identical to the 2m Safstore save for it being ~50% of the height; and
3. A 4m Safstore, the dimensions and handling features which comply with those specified in for 4 metre box waste packages.

## **Outcome of assessment**

### Compliance with the RWMD packaging specifications

The assessment shows that the three designs of Safstore waste container are compliant with the container related criteria specified by the Level 2 Generic Specification for robust shielded waste packages.

A comparison of the Safstore waste containers with the existing Level 3 Waste Package Specifications (WPS) for the 2 metre and 4 metre boxes waste packages showed that the they were all nominally compliant but identified the following potential non-compliances:

- (i) The 150mm wall thickness variant of the 4m Safstore has an empty mass of 49t. This means that when the container is filled with waste it could exceed the 65t limit specified for 4 metre box waste packages.
- (ii) The 150mm wall thickness variant of the 2m Safstore has an empty mass of 29t. This means that when the container is filled with waste it could exceed the 40t limit specified for 2 metre box waste packages.
- (iii) The 2m half-height Safstore, whilst possessing dimensions which lie within the envelope defined for 2 metre box waste packages, has a significantly smaller height dimension such that it is not fully compliant with the Level 3 WPS for 2 metre box waste packages.

### Compliance with concepts for a Geological Disposal Facility

The assessment identified the following issues that could preclude the ability of Safstore waste containers to be used for the manufacture of waste packages that would be compliant with the current geological disposal concept:

- (i) Waste packages manufactured using the 150mm wall thickness variant of the 4m Safstore could exceed the 65t limit assumed in the GDF design report for transport packages handled at the GDF.
- (ii) Waste packages manufactured using either variant of the 2m Safstores and with gross masses in excess of 40t may not be able to be safely stacked with other designs of 2 metre box waste package.
- (iii) Waste packages manufactured using either variant of the 2m half-height Safstores and with gross masses in excess of 25t may not be able to be safely stacked with other designs of 2 metre box waste package.

## **Conclusions**

The assessment has concluded that, on the basis of compliance with the container related criteria contained in the Level 2 Generic Specification for robust shielded waste packages, a Conceptual stage Letter of Compliance (LoC) could be issued for the use of each of the three designs of Safstore waste container for the manufacture of disposable waste packages containing ILW.

There are two potential non-compliances of 2m and 4m Safstore waste packages with the existing packaging specifications:

- (i) The possibility of 4m Safstore waste packages with gross masses in excess of 65t has been identified. Such waste packages would not be compliant with the Level 2 Generic Specification or the Level 3 WPS for 4 metre box waste packages and may not be capable of being safely stacked with other designs of 4 metre box waste package;
- (ii) The possibility of 2m Safstore waste packages with gross masses in excess of 40t has been identified. Such waste packages would not be compliant with the Level 3 WPS for 2 metre box waste packages and may not be capable of being safely stacked with other designs of 2 metre box waste package.

Additionally no relevant Level 3 WPS exists for the waste packages that could be manufactured using the 2m half-height Safstore waste container. The disposability of such waste packages was therefore assessed against the existing Level 3 WPS for 2 metre box waste packages but the significantly smaller height dimension of the 2m half-height Safstore would raise issues regarding the stacking of waste packages.

We have undertaken work to investigate whether a case exists to change our packaging specifications and/or GDF designs to accommodate waste packages manufactured using the three designs of Rectangular Box Safstore waste containers. This will include producing Level 3 WPS for robust shielded waste packages manufactured using containers with dimensional envelopes and handling features the same as those proposed for the three designs of Rectangular Box Safstore waste containers.

It is recommended that prior to the submission of proposals to use any of the Safstore waste containers for the packaging of waste, Interim stage endorsement of the waste container designs should be obtained. Such endorsement will require the adequate resolution of a number of issues identified in this Assessment Report, and identified in the form of Action Points to permit compliance with the relevant Level 3 WPS to be demonstrated.

Interim stage endorsement of the waste container designs could then be followed by assessments of proposals to package specific waste streams using Safstore waste containers. Such assessments could then result in the LoC endorsement of proposed waste packages at any of the three assessment stages (i.e. Conceptual, Interim or Final), depending on the degree of development of the packaging proposal and the level of characterisation of the waste to be packaged.