

# Packaging of Waste Packages from MEP and WEP with Raised or Missing Lid Bolts

## Summary of Assessment Report

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### **Background**

Process faults can arise due to missing or ineffective lid bolts, and this has historically been a relatively common cause of process variations at the Magnox Encapsulation Plant (MEP) and the Wastes Encapsulation Plant (WEP) at Sellafield. In undertaking assessments and providing endorsements via Letters of Compliance, Nirex has historically assumed all bolts are effective, consistent with waste packaging proposals and in particular with the package design as described in the Waste Product Specification. Since the container lid forms a component of the package containment boundary, missing or ineffective bolts may be relevant to safety assessments for storage and longer-term waste management. It is therefore important to consider the significance of bolting process variations to long-term waste management.

In March 2005 Nirex requested BNGSL to provide details of those waste packages that have ineffective or missing bolt(s). The information provided by BNGSL in response to the request has been used to assist the NDA Radioactive Waste Management Directorate's generic assessment work on the performance of waste packages with ineffective or missing lid bolts, and as the basis of package specific assessment of the disposability of MEP and WEP waste packages with the detailed lid bolting process variations. This Assessment Report summarises the conclusions of the NDA Radioactive Waste Management Directorate assessment of the lid bolting process variations at MEP and WEP.

### **Conclusions of the Assessment**

The information provided by BNGSL shows that 1.4% of WEP packages and 3.6% of MEP packages are affected by one or more raised or missing bolts. Analysis of time-based trends also suggests that WEP has been improving its practices and has had more success with package remediation. An Action Point has been raised requesting consideration of whether best practice has been adopted in the design of the bolted closures.

The assessment has been largely positive in its outcome, with no significant PGRC safety issues identified. Releases in impact accidents are not expected to increase significantly although it should be noted that the results may not apply to extreme scenarios where, for example, only a few bolts are fully tightened and these are adjacent rather than equi-spaced around the flange. Nevertheless, packages with lid bolting process variations may be non-compliant with the Generic Waste Package Specification due to package height or due to retention of free liquids from pressure washing, and may become non-compliant in the future due to surface contamination risks.

The assessment estimates that a nominal 36mm zone will be present above drums for stillage on stillage stacking to contain the protruding bolts. It is understood that bolts are 40mm long, raising the potential for conflict between stillages. However, it is judged unlikely that bolts would stand fully proud, and the records provided suggest that this is indeed not the case. It is also assumed that, to achieve current store stacking, potential conflicts have

been avoided. Nevertheless, it is recommended that at the time of export from store, checks should be made that bolts are not fully proud.

Water is expected to penetrate lid seals during decontamination pressure washing, which might be exacerbated by poor seal compression associated with incompletely tightened or missing bolts. It is possible some water which penetrates the ullage space can be absorbed by the wasteforms, eliminating free liquids, although this is not established. In the case of the MEP product there may also be questions about whether additional water will significantly affect the rate of corrosion of embedded Magnox and uranium metals and affect product longevity. A further Action Point has been raised to consider the extent and significance of this issue.