Future Waste Packaging

Discussions within the UK
Key stakeholders

• Radioactive Waste Management (RWM) is a subsidiary of the Nuclear Decommissioning Agency (NDA) in the UK. RWM’s objectives are:
  • develop the specification, design and environmental and sustainability assessments for the disposal system and to obtain support from the regulators
  • work with waste producers to identify and deliver solutions to optimise the management of higher activity waste
  • deliver a focused programme to support geological disposal and optimised packaging solutions

• Sellafield Ltd is the operator of the Sellafield site, the site is owned by the NDA. Sellafield’s operations include:
  • Decommissioning and clean up of legacy facilities and waste on site
  • Spent nuclear fuel management
  • Safe, secure and appropriate storage for special nuclear materials
  • Nuclear waste management - all three forms of nuclear waste: high, intermediate and low
Background

- The driver for a different approach to waste packaging has been discussed within the UK over a number of years.
- UK Operators/waste management organisations have identified a proposed opportunity for a new type of package to facilitate future waste processing, storage, transport and disposal.
- The proposal has been raised with ONR as the UK regulator and discussed with other international organisations.
UK waste management
Scale of future Sellafield waste packaging need

Wastes that may benefit from new package.
Current packaging options for High activity Waste

- **IP-2**
  - Contents weight = ~65 tonnes
  - Cavity volume = ~20 m³
  - 10mSv/hr @ 3m unshielded contents
  - LSA limits
  - Self Approval

- **Type B**
  - Contents weight = ~34 tonnes
  - Cavity Volume = ~3m³
  - Contents constrained by containment requirement at ACT
  - High Dose rate contents
  - Competent Authority Approval
Issues with current packaging

• IP2 package is limited in contents by the “unshielded” dose limits.
  • Shielding of package cannot be used to mitigate the dose rate.

• Type B package is limited in volume and mass of content due to package design requirements.
  • Need to meet drop and fire requirements which impose significant structural design constrains.

• Using Type B packages would increase the cost, overall volume of storage and number of transports required to manage the UK’s waste.

• Use of Type B and IP2 also requires waste to be sorted and processed which exposes operators to dose.
New package type proposal

Type B

Opportunity for new type

Type ???
New type that takes account combination of wastes and container performance
- Large waste containers
- Can be used for medium dose rate/medium activity wastes

Industrial Packages
Scope of package design/requirements

- Containment
  - Provided by contents due to the classification as LSA or SCO
- Shielding
  - Provided by Package.
- Some level of accident condition demonstration required
  - Type B levels for shielding?
  - Less than Type B but more than IP2?
- Would Competent Authority approval be required?
Benefits of new packaging proposal

• Higher content loading of packages:
  • Reduces the number of packages to be shipped.
  • Reduces need for compaction and sorting prior to transport.

• Simplification of decommissioning by allowing packaging of broader range of material in storage and transport packages.
  • No need to separate waste by dose level to meet IP2 requirements.
  • Benefit of reducing dose to operators involved in waste sorting and packing
  • Proposed scope would include approx. 40% of Sellafield waste stream, so significant impact.

• Implementation at an IAEA level rather than UK specific:
  • Available for use by other countries in the future benefiting from UK knowledge and experience in waste packaging and transport.
  • Inter-country transport capability.
Forward look

• Production of a technical paper for the TRANSSC Packaging Performance and Approval TTEG.
  • Currently RWM and Sellafield in discussion with WNTI to support this.
  • Discussions with other stakeholders who may be interested in supporting paper production.
  • ONR offer to carry out initial review.

• Discussion within the TTEG and adoption into paper for TRANSSC plenary

• Proposal put forwards for adoption within next SSR-6 review cycle.

Radioactive Waste Management  Sellafield Ltd  Office for Nuclear Regulation