

How WENRA's Safety Reference Levels support the safe disposal of radioactive waste

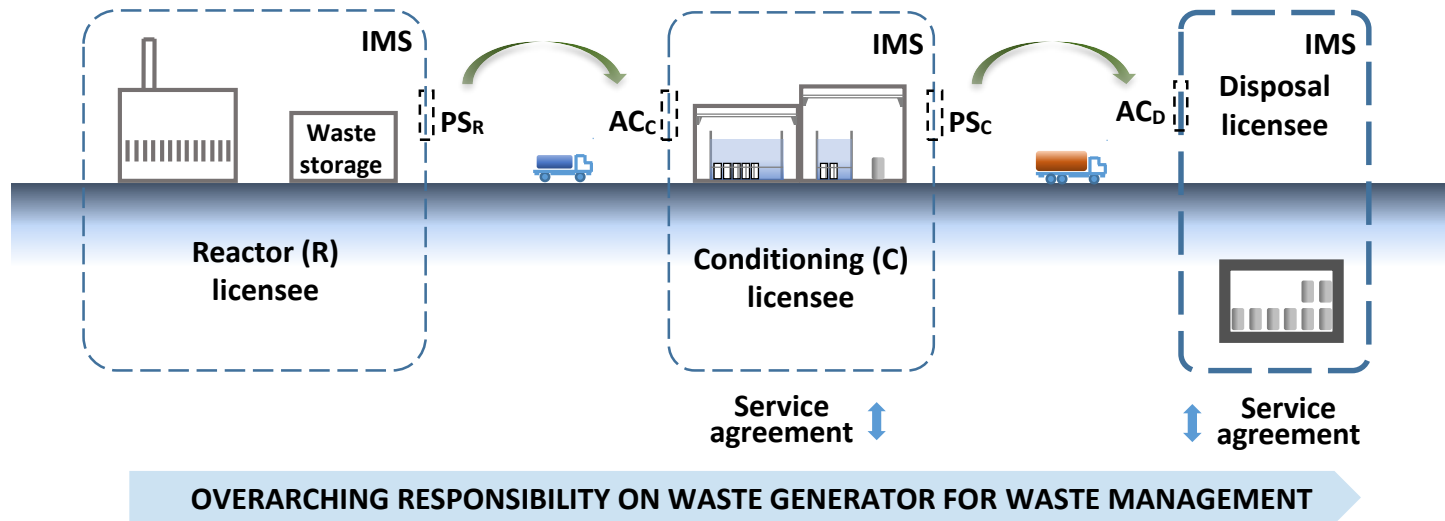
Italian National Repository Siting Seminar, SOGIN, Rome, 24 November 2021

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Editor of WENRA's Report on SRLs for the disposal of radioactive waste

1 Waste management overall context

- **Disposal is the endpoint for sequence of management steps**
 - Each licensee is responsible for safety of their licensed activities
 - Waste generator is responsible for overall management of waste
 - Important to ensure that interfaces are properly managed



IMS = Integrated Management System integrates all activities including quality control

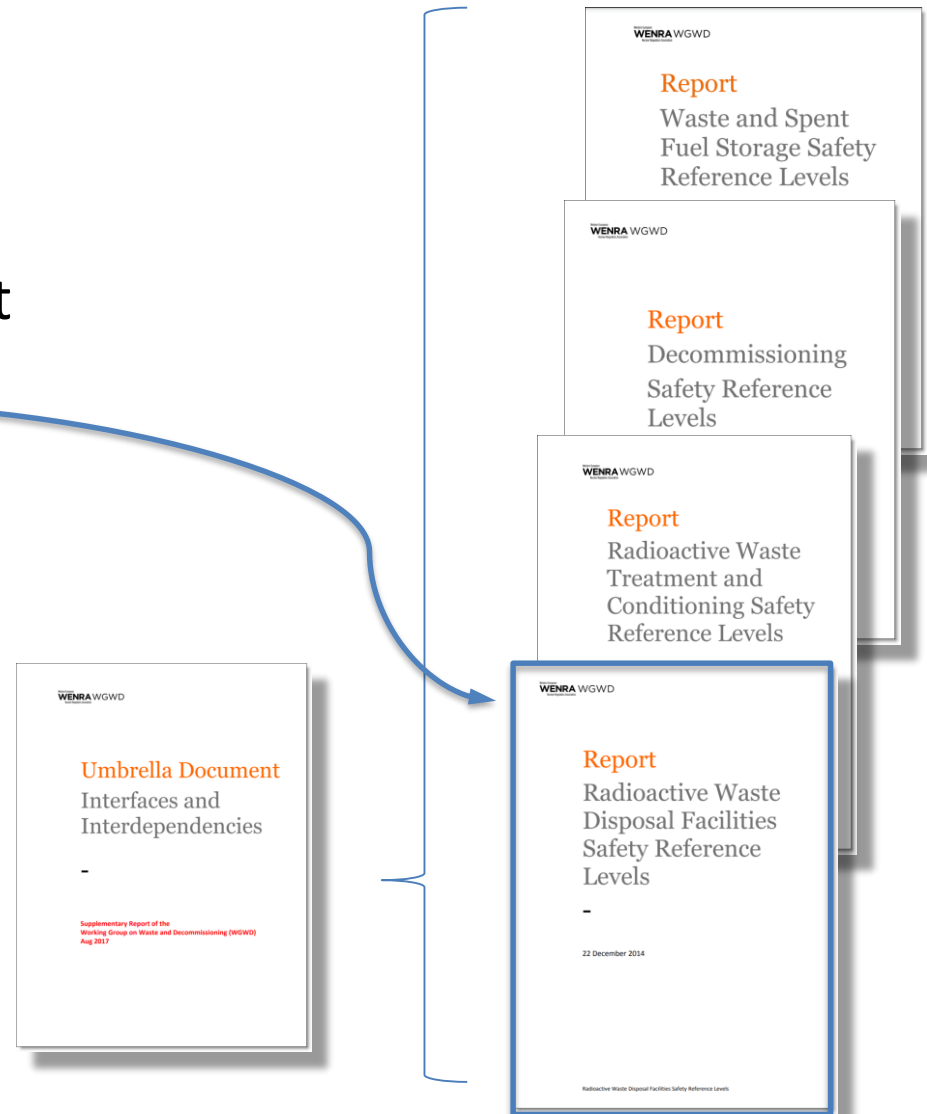
AC_x = Acceptance Criteria, licensee X

PS_x = Package Specification, licensee X

2 WGWD SRLs overall context

- Storage SRL report
- Decommissioning SRL report
- Waste processing SRL report
- **Disposal SRL report**
- Umbrella document
 - Interfaces & Interdependencies

The reports can be downloaded using the following link:
www.wenra.eu/wgwd



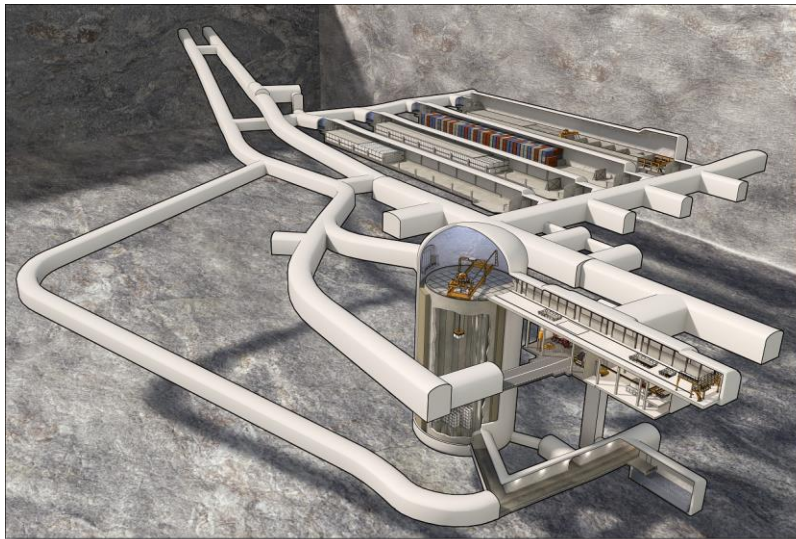
3 Operational and post-closure safety

- **Safety concerns for conventional nuclear facilities (e.g. nuclear power reactors) addresses safety during operation**
- **Specific for disposal facilities – post-closure safety**
 - Provided for by isolation (underground) and containment (technical and natural barriers)
- **Disposal system solution**
 - Post-closure safety for the disposal system is accomplished by the disposal facility (i.e. engineered constructions) and the containment – or barrier functions – of the waste packages.
- **Demonstration of operational as well as post-closure safety**
 - The main “tool” used to demonstrate operational as well as post-closure safety is defined as the Safety Case. The Safety Case should integrate all aspects of operational safety and post-closure safety, and provide for all necessary arguments and evidence to support licensing and implementation of a disposal facility.

4 Example: Disposal facility in Sweden

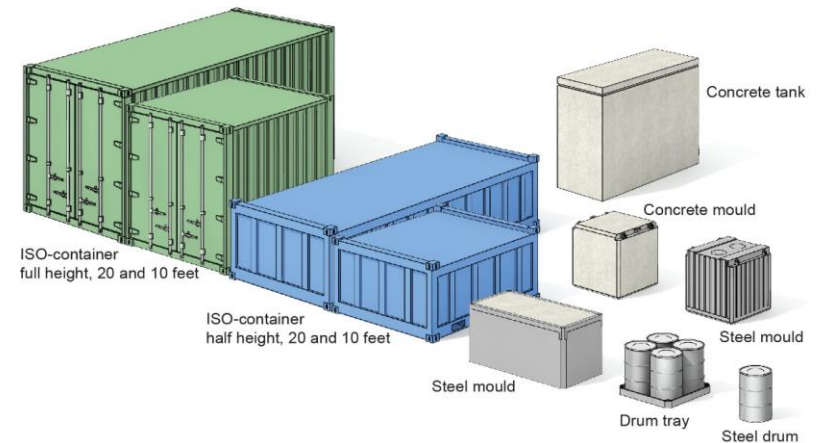
SFR – Disposal facility for low- and intermediate level waste short-lived operational waste

- Rock cover: 60 meters
- In operation since 1989
- Current total capacity: 63 000 m³
- Volume of disposed waste: 40 000 m³



SFR. Disposal facility for short-lived LILW waste

Source: SKB



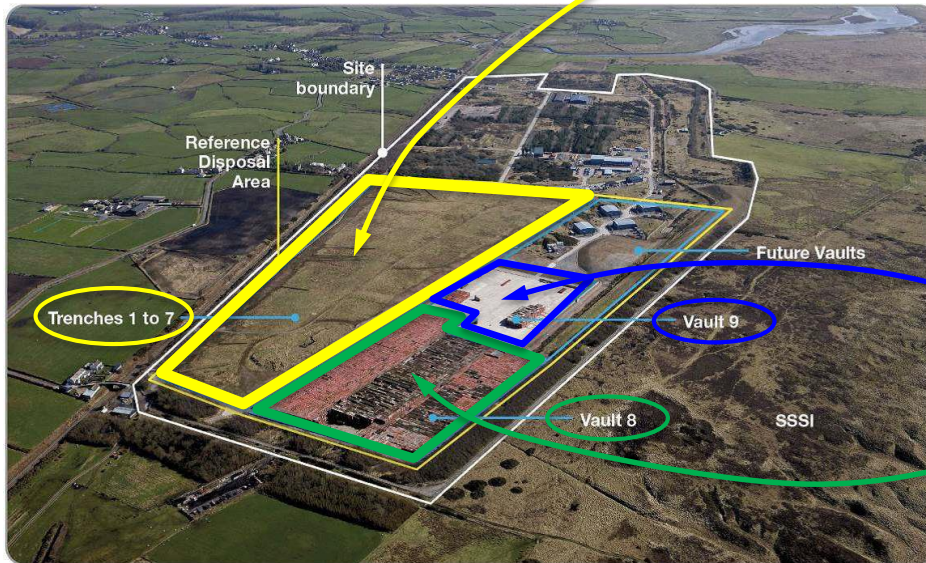
Waste containers used for waste packages

Source: SKB

5 Example: Disposal facility in UK

Near surface disposal facility for low-level waste in Cumbria

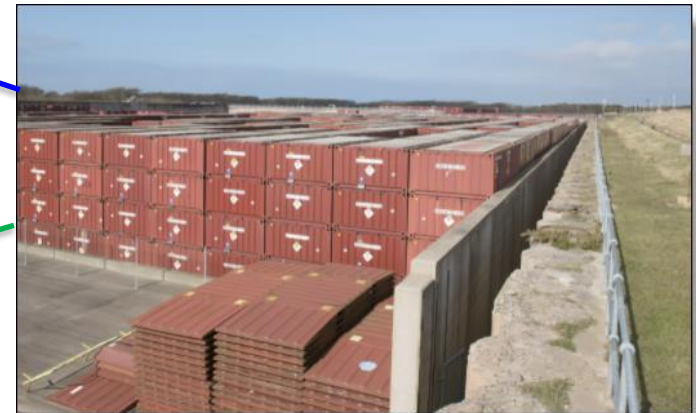
- In operation since late 1950's
- Volume of disposed waste: 1 033 000 m³ (reported 2019)



The Low Level Waste Repository (LLWR)
Source: LLW Repository Limited

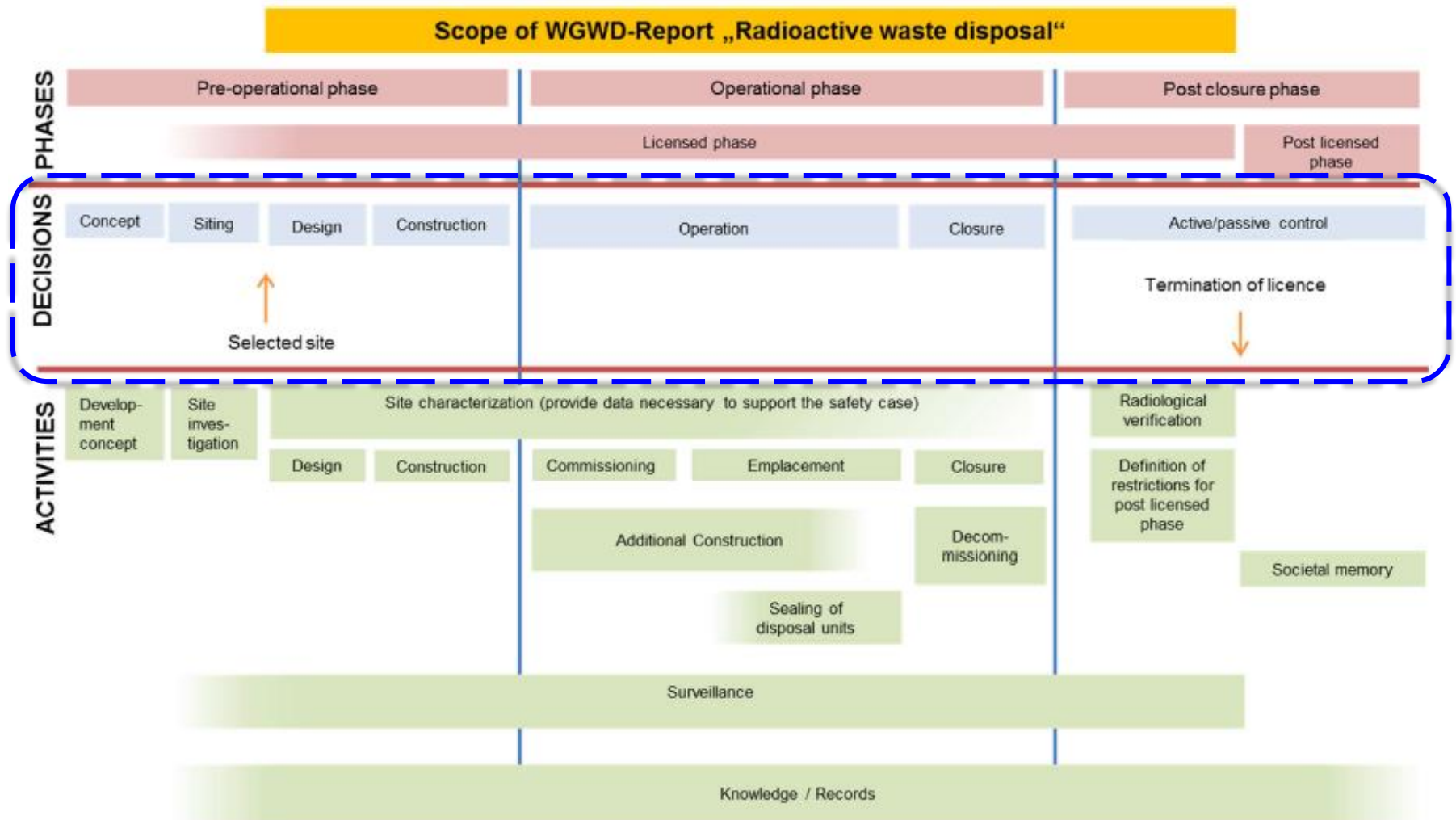


Early landfill practices (late 1950's to late 1980's)
Source: LLW Repository Limited



Up-to-date engineered vault facility design from 1988
Source: LLW Repository Limited

6 Disposal facility development



7 WENRA Disposal SRL report

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8 Summary conclusions

- Responsible and safe management of radioactive waste requires isolation and containment in a disposal facility for the time periods necessary, with due regard to the characteristics of the waste
- Site characterisation, design, construction, operation and closure of the disposal facility must be carefully implemented in order to achieve the anticipated end-state of the disposal facility after closure, governed by an appropriate integrated management system
- Post-closure safety for the disposal system is achieved by a combination of barrier functions by means of engineered constructions, i.e. the disposal facility, and the waste packages.
- A comprehensive safety case must be developed to support the license application, and successively updated to support subsequent authorisations in a step-wise implementation process
- WENRA Disposal SRLs serves to support WENRA member countries to develop an appropriate regulatory framework to support disposal of spent fuel and radioactive waste

Thank you

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