Radiological Impact Assessment in the LLWR's 2011 Environmental Safety Case

Presentation to: IRPA13

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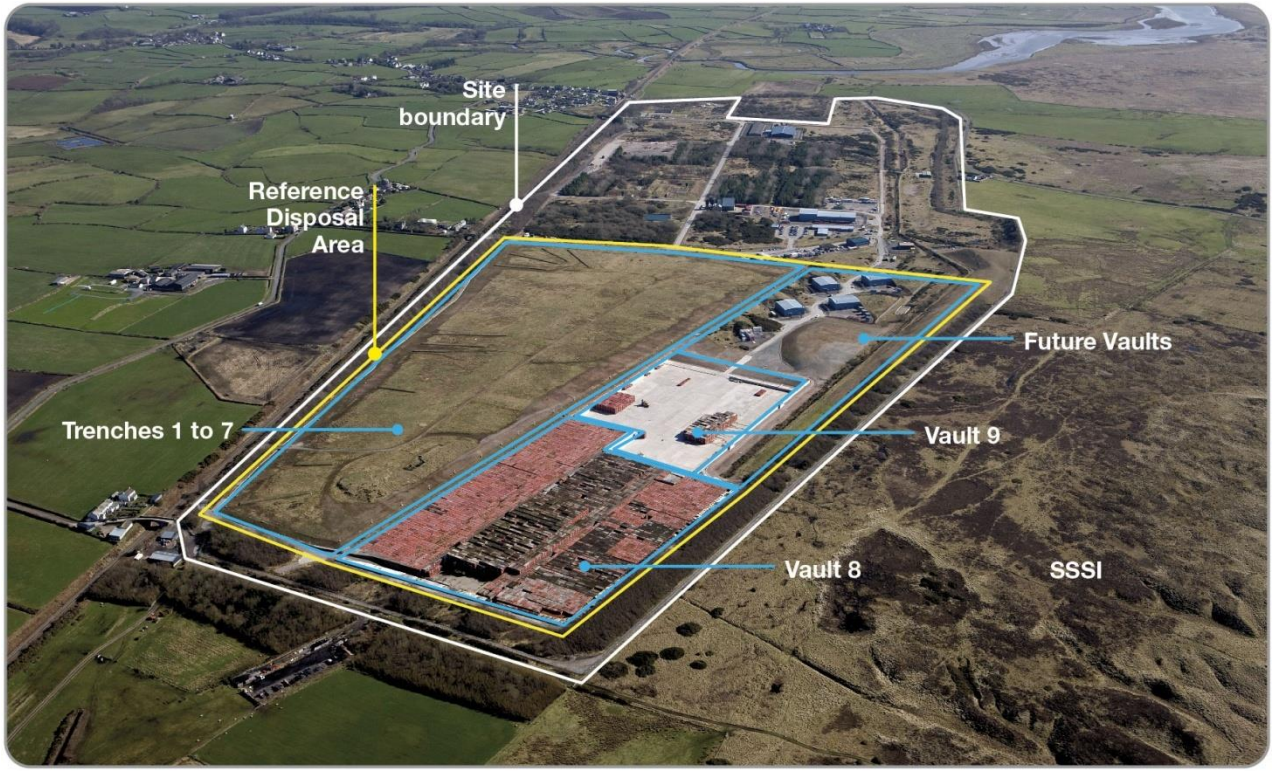
LLW Repository Ltd

Presentation

- Context and importance
- Structure and presentation
- Optimisation
- Assessments

Low Level Waste Repository

- UK's national LLW disposal facility



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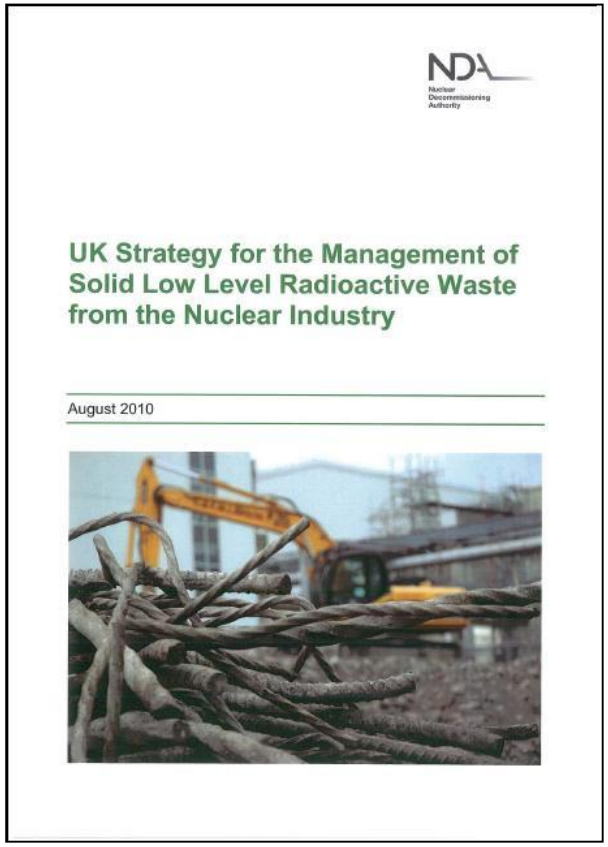
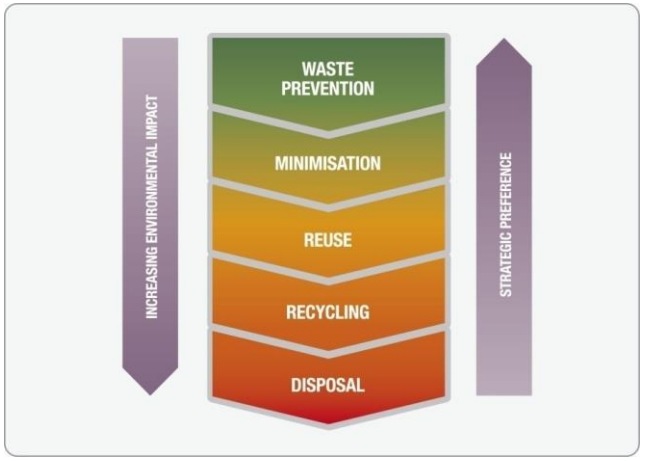
Low Level Waste

- < 4 GBq/t alpha and
  12 GBq/t beta/gamma
  (110/320 nCi/g)

- Contains long-lived radionuclides at disposal

National LLW Strategy





- Key aspects:
  - implementation of waste hierarchy
  - ‘best’ use of existing assets

Importance of ESC

- Safety cases produced under previous management company failed to make:

  '*an adequate or robust argument for continued disposals of LLW*'

- Current regulatory Permit only allows us to store waste in Vault 9

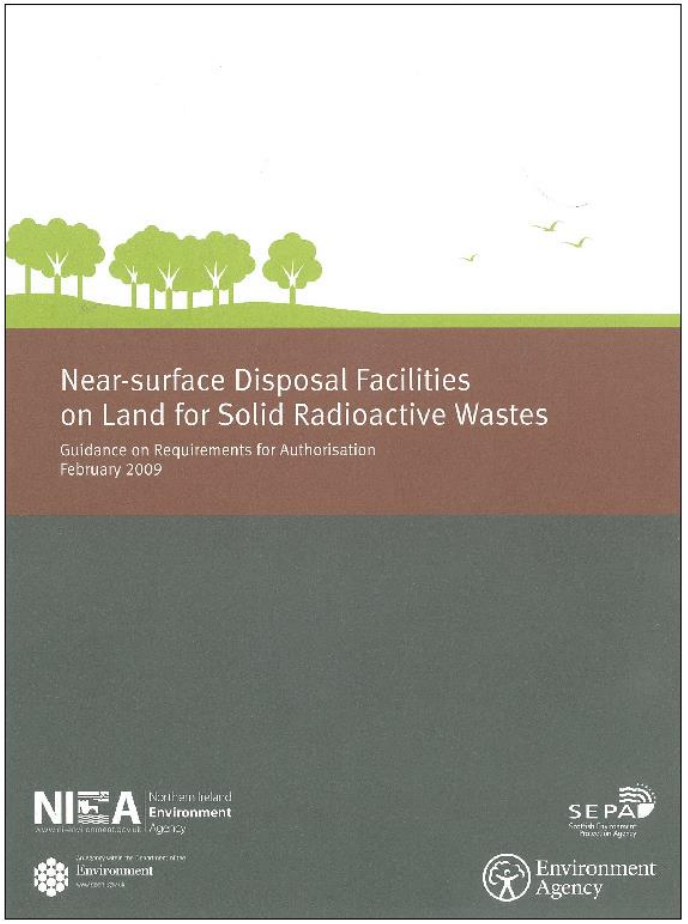
- Future use of the LLWR and implementation of UK Strategy depends on successful outcome of ESC

- Removing wastes and/or finding a new repository would cost ~£1B

- Failure would lead to disruption of decommissioning programme

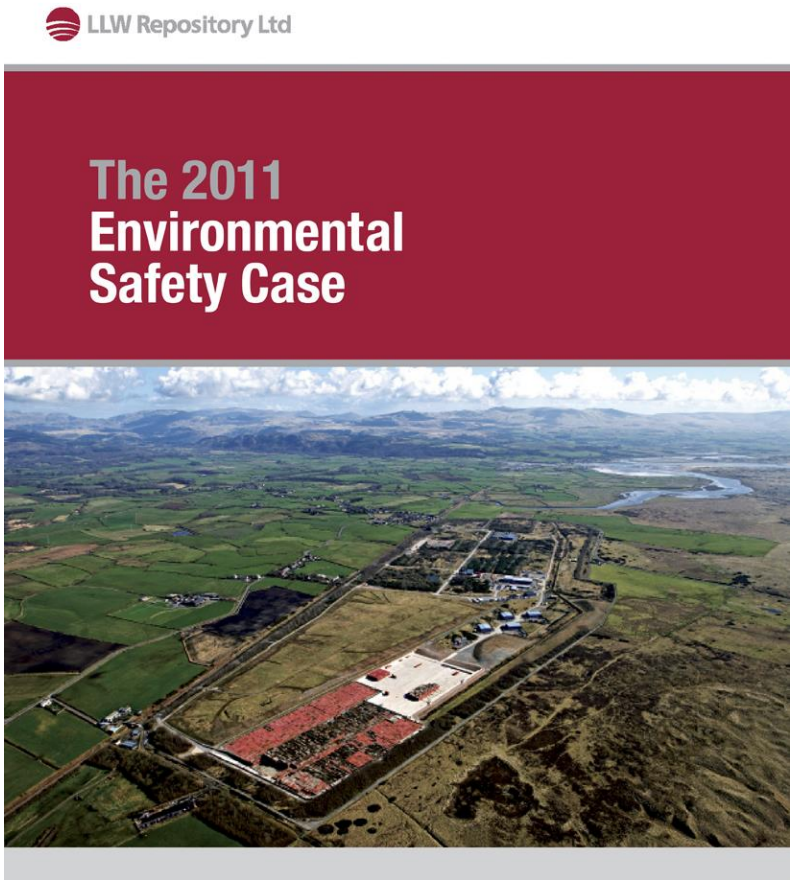
Regulation

- Environment agencies provide guidance on ESCs: ‘GRA’
- Not prescriptive
- But requirements are for a modern ‘safety case’
- Excludes, e.g. worker safety

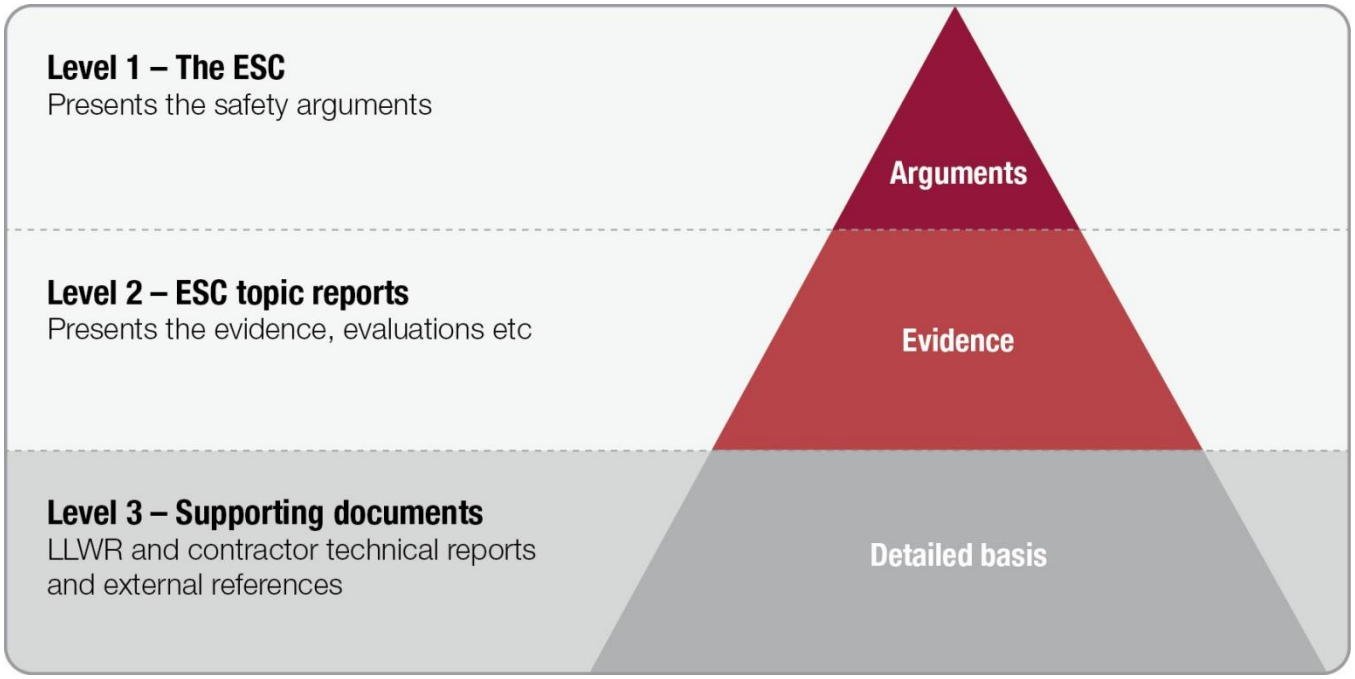


2011 Environmental Safety Case

- Delivered to Environment Agency on the 1st May 2011
- Available on LLWR website: www.llwrsite.com



Documentation Structure



- Plus 20-page Non-technical Summary

Our Case:

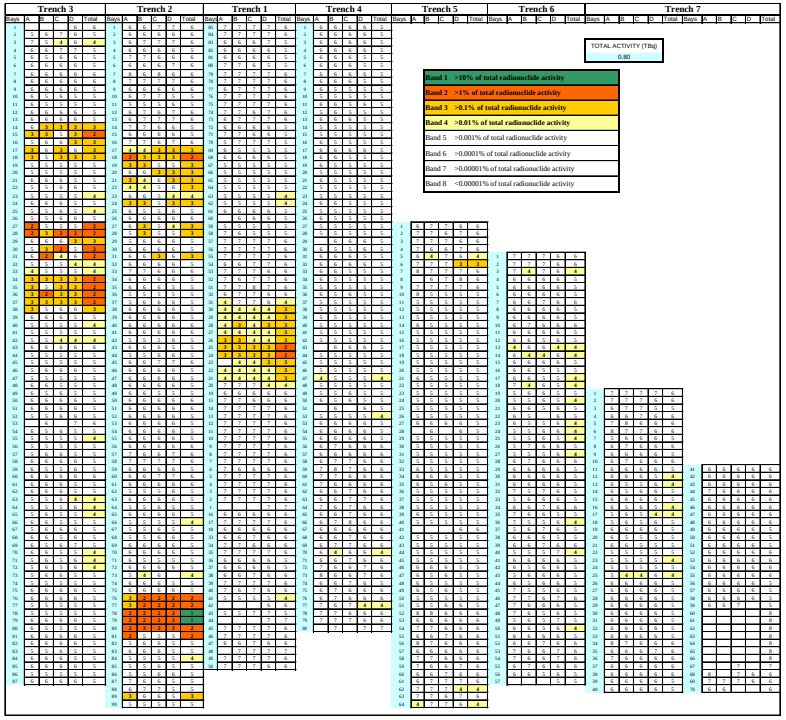
- We have worked within a sound management framework and firm safety culture, while engaging in dialogue with stakeholders
- We have characterised and established a sufficient understanding of the LLWR site and facility, and their evolution, relevant to its environmental safety
- On which basis, we have carried out a comprehensive evaluation of options to arrive at an optimised SDP for the LLWR
- We have assessed the environmental safety of the SDP, showing that impacts are appropriately low and consistent with regulatory guidance. Using our assessments, we have determined the radiological capacity of the facility and conditions under which waste may be safely accepted and disposed

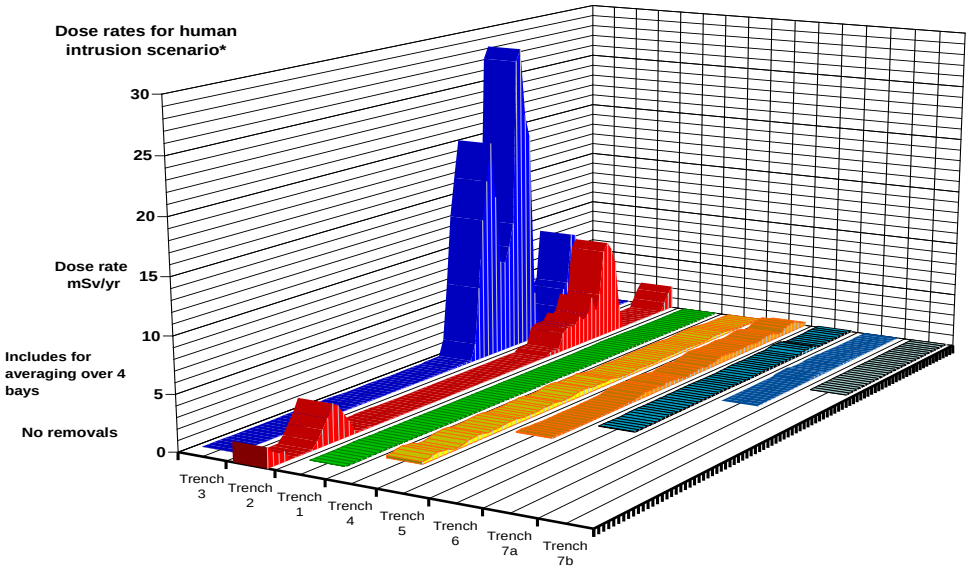
Some Key Advances

- Comprehensive treatment of optimisation
- Improved near-field model GRM
- New, well-calibrated 3-D hydrogeological model
- New or improved assessment models, e.g.:
  - empirically-based model of radon impacts
  - coastal erosion
  - well pathway
- Calculated doses and risks consistent with guidance

Selective Retrieval of Past Disposals?

- Concluded benefits do not justify costs and other impacts





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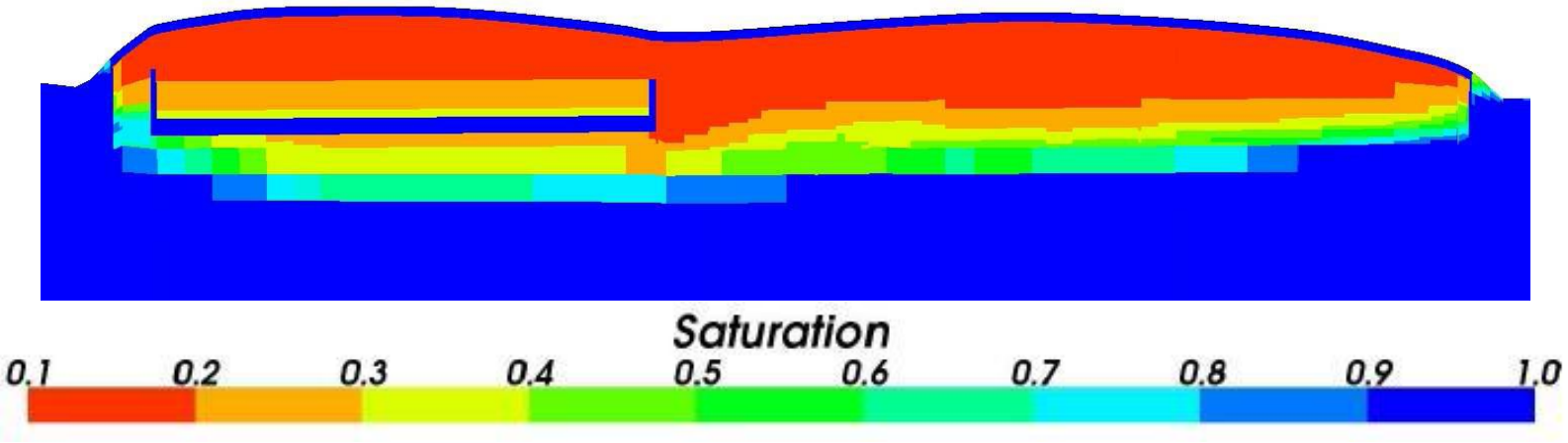
Vault Design and Closure Engineering

- Moved to an unsaturated (as opposed to ‘bath-tubbing’) design
- Removed deep drains
- Reduced cut-off wall depth
- Decisions supported by hydrogeological modelling



Climate Change and Coastal Erosion

- Studies show site will begin to be eroded on a timescale of a few hundred to a few thousand years – timing uncertain, but not outcome
- Assessment calculations show LLWR will be safe even if erosion occurs – radiological doses and risks meet regulatory guidance levels

Summary

- Modern ESC submitted to regulator in May 2011
- Key advances on previous cases in terms of system understanding, optimisation and assessment
- We believe it meets regulatory guidance