New ALARP Residues Recovery System – Design Concept to Operation

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Overview

- Overview of regulatory structure in the UK
- Discussion relating to recent changes in guidance and driver to “As Low As Reasonably Practicable”
- Review of how these changes have affected the design of a new facility
- Learning from operating the new facility and subsequent improvements

Regulatory Structure

- The Health and Safety Executive (HSE) – responsible for overseeing health and safety regulation in Great Britain

→ Nuclear Directorate

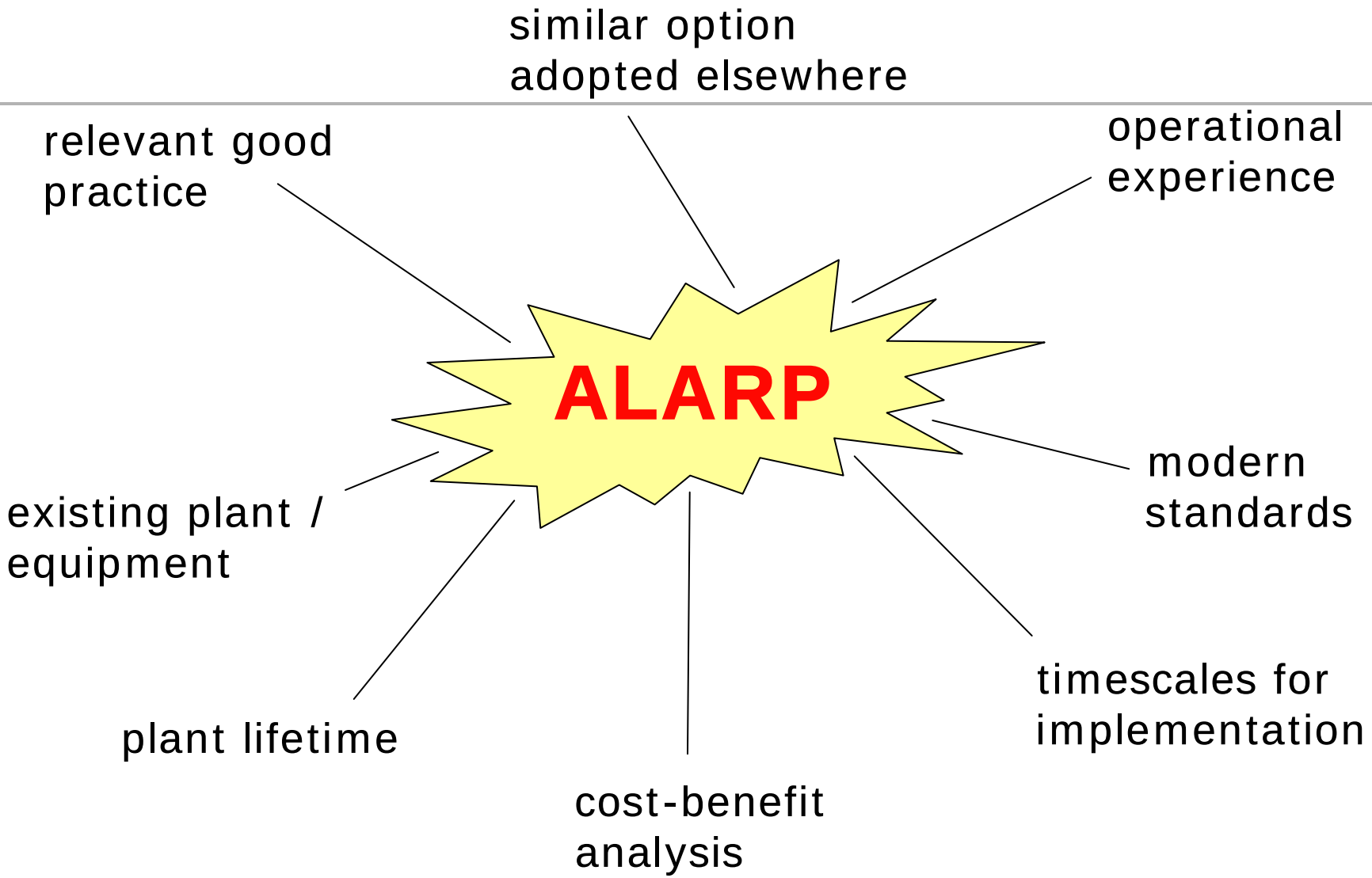
→ Nuclear Installations Inspectorate (NII)

  - grant nuclear site licences;
  - attach appropriate conditions to the licences;
  - grant permissions.



Safety Assessment Principles (SAPs)

- Guidance document against which NII inspectors judge adequacy of safety case, not to be used as standards
- Some guidance is rooted in legal requirements
- Encourage application of the safety hierarchy
- Re-issued to bring up to date in 2006 – driver to make risks “ALARP”


similar option
adopted elsewhere
relevant good
practice
operational
experience
ALARP
existing plant /
equipment
modern
standards
plant lifetime
cost-benefit
analysis
timescales for
implementation

Case Study: Springfields Fuels Limited

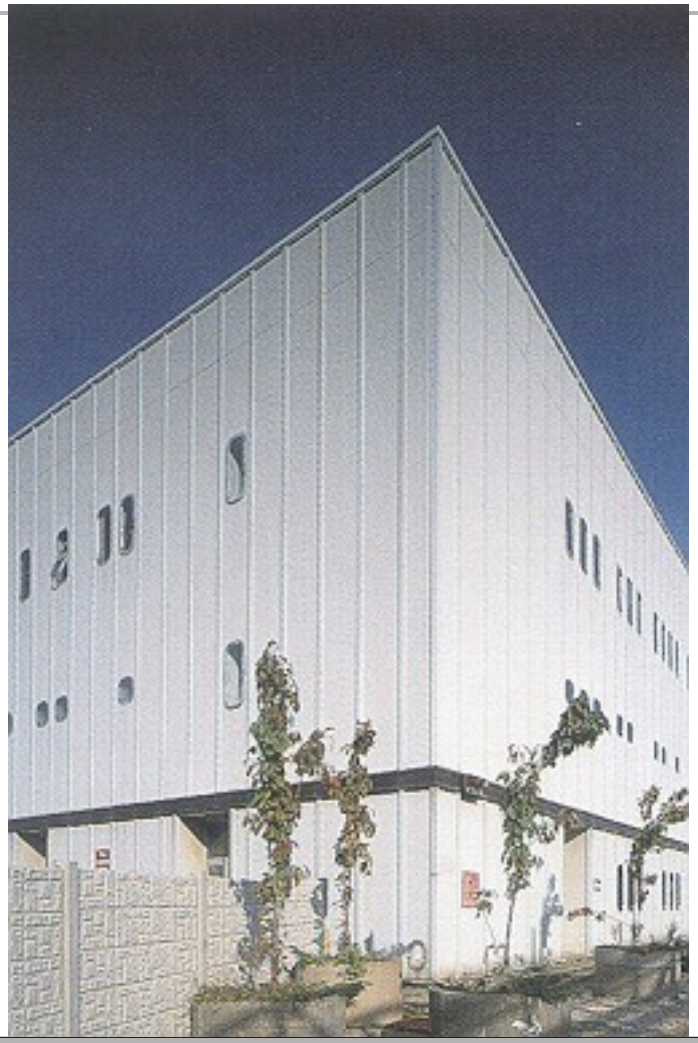
- Preston, north-west England
- Low enriched uranium systems – manufacturing Magnox, AGR and PWR fuel
- Owned by Westinghouse

Westinghouse

National Nuclear Laboratory

The Plant

- Enriched Uranium Residues Recovery Plant (EURRP)
- Maximum enrichment of 5.0 $^{w}/_{o}$ ^{235}U
- Recovers uranium from residue streams for reuse in the fuel cycle
- Lifetime extension – some areas highlighted for refurbishment

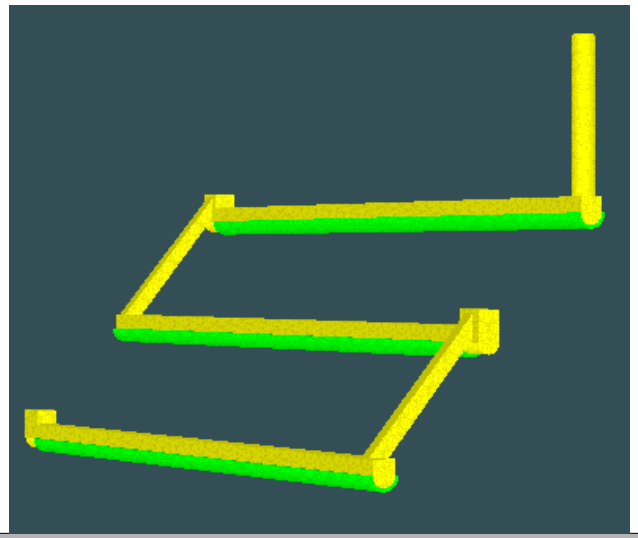


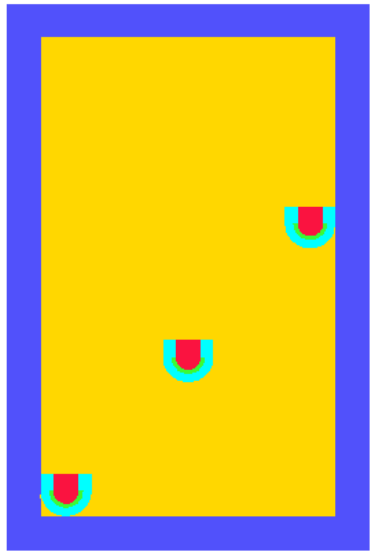
Channel Dissolver

Washed Slurry Handling System

Building ALARP into the Safety Case

- Modelled using MONK8B
- Hard-wired trips
- Automated systems
- Improved level of containment
- Driver to reduce levels of contamination





The Issues Discovered…

- Potential build-ups in non-safe geometry cubicles
- Significant accumulations
- Difficult cleaning operations
- Increased internal dose hazard
- Build-up of ammonium nitrate on main filter bank

The ALARP Solution

Any questions?