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”
ALARP

similar option adopted elsewhere
relevant good practice
existing plant / equipment
plant lifetime
operational experience
modern standards
timescales for implementation
cost-benefit analysis
Case Study: Springfields Fuels Limited

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

- Enriched Uranium Residues Recovery Plant (EURRP)
- Maximum enrichment of 5.0\% $^{235}\text{U}$
- 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?