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Taking a lifecycle view for the management of legacy metallic fuel

Metallic uranic fuel has been used in the United Kingdom's Magnox fleet of reactors since the 1950s, with the Magnox reprocessing plant at Sellafield forming a key part in the management of spent fuel with over 54,000 tonnes reprocessed to date. Following the retirement of the Magnox reactor fleet and planned completion of reprocessing, the UK will possess an inventory of several hundred tonnes of metallic uranic fuel that will need to be managed and dispositioned.

Metal fuel is not passively safe; its chemical reactivity poses a problem across the lifecycle of storage, treatment and ultimate disposal. At each stage of this lifecycle, the potential for expansive corrosion, gas generation, fission product release and uranium hydride formation must be managed to ensure ongoing human and environmental safety.

This paper describes the approach being undertaken to manage the remaining inventory of metallic uranic fuel in the UK to understand how this material should be stored, packaged and ultimately disposed of in a geological disposal facility. The paper will describe how the following key questions are being considered to manage the lifecycle balance of risk for the remaining inventory:

- How do you make hundreds of tonnes of metal fuel passively safe and what is the right disposal concept for metallic fuel?
- How do you minimise the impact of dose and cost now while ensuring long-term passive safety, sustainability and intergenerational impacts?
- How do you balance the risk of near-term safety with long-term uncertainty?

The paper explains the collaborative approach that has been adopted between the material custodian (Sellafield Ltd) and the geological disposal facility developer (RWM) to understand the risks at each stage in the waste management lifecycle. This information will then be used by the waste owner (NDA) to make risk-informed decisions on the questions set out above.

Do you wish to participate as a Young Professional?

No

Speaker's title

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Do you wish to be considered for a Young Professional grant?

No

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