International Conference on the Safety of Radioactive Waste Management, Decommissioning, Environmental Protection and Remediation: Ensuring Safety and Enabling Sustainability

Contribution ID: **320** Type: **ORAL**

Reimagining the nuclear cycle as a circular economy: challenges and opportunities

Taking the UK as a case study, we have seen a massive shift away from disposal in dedicated radioactive waste repositories(1). This has been achieved through improved sorting and segregation, metal recycling and volume reduction through incineration, but most significantly by diversion to non-nuclear disposal facilities.

Dedicated radioactive waste disposal capacity is a precious resource and so these achievements should not be underestimated. Available capacity for disposal of UK LLW has been extended by decades as a result. However, as landfill capacity becomes increasingly scarce and unacceptable to the public, there remains much work to be done.

Reducing the nuclear industry's reliance on disposal is a difficult challenge for technical and societal reasons, including cost. To address this issue, creating a circular economy will be essential and this may best be achieved within the industry. To do this we cannot rely on thinking about what to do with waste, we need focussed action at the "front end"with designers, engineers and programme delivery professionals actively seeking out opportunities to reuse materials. We will also need to design in repairability, refurbishment and remanufacture(2) , which in turn will require a change in the approach to specification within the industry.

The industry's entirely appropriate focus on safety can be a barrier to material reuse, which is partly seen in specifications. Addressing this issue will require careful consideration to balance the needs of safety with the benefits of increased material reuse within the industry. Whilst this may seem a challenge, the nuclear industry has for a long time had a "cycle"mindset and this presents a great opportunity to reimagine the nuclear cycle as a fully sustainable one for current times.

(1) Nuclear Waste Services, Waste Management Dashboard (https://assets.publishing.service.gov.uk/government/uploads/system/uploads
(2) Ellen Macarthur Foundation, The butterfly diagram: visualising the circular economy (https://ellenmacarthurfoundation.org/circular-economy-diagram)

Primary author: Dr CLARK, Matthew (Hopegill Associates)

Presenter: Dr CLARK, Matthew (Hopegill Associates)

Track Classification: Track 4 - Integrating the views of society into decision-making considering technical, environmental, social, and economic factors