OUTCOME-DRIVEN APPLIED R&D – LEARNING FROM EXPERIENCE OF UK DECOMMISSIONING PROJECTS TO DELIVER FUTURE SUCCESS

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Abstract

The UK was the first country in the world to commercially operate a nuclear power plant as well as perform a significant amount of research into reactor design and other applications for nuclear material. The UK was also one of the first countries in the world to start to actively decommission nuclear facilities.

This paper will explore how learning from past UK decommissioning projects and experiences, both positive and negative, can inform targeted outcome-driven applied research and development strategies on areas which have the most impact on improving public & worker safety, improving the speed of decommissioning, minimizing waste, reducing lifetime costs and reaching the site end-state.

It will explore how the UKs desire to have and operate an independent nuclear deterrent (and the spinoff of generating electricity from Nuclear Power) drove the construction of many facilities which were built in an extremely short timescale with no real thoughts as to how these facilities could be decommissioned, leading to complex challenges for which solutions needed to be developed.

It will explore how early decommissioning involved exposing the workforce to unacceptable levels of radioactivity as well as generating large quantities of waste which due to nature of the decommissioning processes were unable to be handled in line with the Waste Hierarchy.

It will explore how this early experience of UK decommissioning projects, has been used to develop focused R&D strategies aimed at improving the decommissioning of facilities by adopting tools and techniques used in other industries, adapting their use for the nuances of nuclear decommissioning, improving the nuclear decommissioning toolbox, and seeking to deploy new ideas as early, cheaply and safely as practical.

The UK's experience of developing solutions for nuclear decommissioning challenges will be explored, which include approaches to take, wherever possible, the worker away from unnecessary risk, developing solutions that adopt advances in virtual reality to create task simulation, utilizing robotics and other remote technologies to remove the worker completely from the risk, and integrating technologies to provide end-to-end decommissioning solutions

which seek to make decommissioning safer, faster and cost-effective, significantly improving productivity and accelerating outcomes.

Applied R&D has led to the development of more efficient processes for segregating waste both by activity and physical properties, adoption of digital solutions to track, manage and audit waste consignment information, and assisted in developing a culture of continuous innovation, enhancing the opportunities to treat or reprocess waste as opposed to disposal of all wastes, significantly reducing lifetime costs and improving environmental impacts.

Keywords: Learning From Experience, Risk Reduction, Simulation, Robotics, Waste Minimization, Innovation.