



## Nuclear

### Client

United Kingdom Atomic Energy Authority (UKAEA)

### Location

Thurso, Caithness, Scotland,  
United Kingdom

## Dounreay Decommissioning

### Project Description

CH2M HILL is a business partner in Dounreay Site Restoration Limited (DSRL), the wholly owned subsidiary of UKAEA serving as the Site Licence Company responsible for the closure programme at Britain's former centre of fast reactor research and development under contract to the Nuclear Decommissioning Authority (NDA). Dounreay is Scotland's largest nuclear decommissioning project and the second largest in the United Kingdom. For forty years, the site was a research and development centre for fast reactor technology.

Restoring the 140-acre Dounreay site on the north coast of Scotland is a significantly complex nuclear decommissioning task, possibly one of the most challenging in the world. The clean-up programme, which is currently planned in five phases, will be completed by 2024 at a cost of £2.5 billion.

CH2M HILL has been a key player in successfully managing and operating the site's decommissioning, waste management and fuel disposition strategies, environmental remediation, and site infrastructure/laboratory operations. Significant decommissioning progress of redundant facilities has been a result of establishing focused, accountable project clusters addressing similar hazards, reducing overhead operating and maintenance costs, streamlining waste management, implementing project delivery incentive programs, and involving the workers in the planning and execution of work.

In addition, CH2M HILL has been an integral part of the DSRL team for the new construction of waste storage and nuclear fuel retrieval/processing facilities to support the decommissioning and waste management programme. Key personnel have been instrumental in the start up of nuclear and decommissioning operations.

In our first year supporting UKAEA on the Dounreay decommissioning program, the DSRL team demolished 23 buildings, more than in any previous period in site history, bringing the Dounreay site closer to an interim end state. Ultimately, the only facilities remaining after decommissioning will be associated with long-term waste storage that will eventually be decommissioned when a national U.K. waste strategy has been implemented.

The real "engine" to efficiency gains has been the involvement of workers during the conversion from a management and operations site to a decommissioning organisation. Significant decommissioning progress has resulted from the application of innovative approaches such as:

- Utilizing specific decommissioning technologies – diamond wire cutting, robotics applications, bespoke non-destructive assay models for the Shaft & Silo complex, and in-reactor cameras
- Re-prioritising the decommissioning programme to identify and execute critical path activities ahead of non-essential work

- Maintenance rationalisation
- Working on potential socio-economic impacts with local communities and supply chain to prepare for Dounreay's closure
- Bringing site closure expertise from United States closure programmes into the Scottish Highlands to promote the highest probability of success for a viable post-Dounreay economy
- Implementing unique hazard reduction techniques developed at previous CH2MHILL decommissioning sites
- Structuring and streamlining organisational resources, including a overall process innovation for crew utilisation and integrating skills transfer across projects

CH2M HILL is supporting the safe and efficient decommissioning of three sodium-cooled reactor complexes, including a prototype fast reactor and an intermediate-level waste shaft, which was used from 1959 to 1977 (when an explosion occurred) for disposal of solid radioactive waste. To date, the team have accomplished the sodium destruction processing for the Dounreay Fast Reactor's (DFR) secondary sodium coolant and the Prototype Fast Reactor (PFR) entire sodium inventory. Additionally, DFR and PFR have completed construction and start up of a liquid metal processing plant to neutralise liquid metal. The resulting neutralised liquid is then transferred to an ion exchanger for removal of radiological impurities.

Equally important to the acceleration of the decommissioning programme has been the outreach approach to the regulators, stakeholders, and workforce. As a matter of protocol, DSRL partners with the community on socio-economic regeneration at all the nuclear decommissioning sites we manage. The team collaborates with NDA and regulators on the development and implementation of detailed project plans and schedules.

### **Safety**

Safety and environmental protection are the highest priorities in restoring Dounreay. Recognizing the significant safety performance improvements made at Dounreay, the NDA and Nuclear Installations Inspectorate have been very supportive of efforts made to enhance the safety programme. In fact, the safety rate has dropped below NDA regulations since CH2M HILL arrived on site. The TRIR was reduced from 1.8 in April 2006 to 0.34 in March 2008, and the Days Away Case Rate dropped significantly from 4.5 to 0.2.

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