
Dounreay


VOLVO

5th International Forum on the

Decommissioning of the Fukushima Daiichi Nuclear Power Station

Safety during decommissioning

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Dounreay – The site

- Research site for fast reactor technology
- 2 fast reactors, both liquid metal cooled
- 1 material test reactor
- Facilities for
  - Fuel manufacture
  - Post irradiation examination
  - Reprocessing
  - Storage and transport
- Innovative and experimental

Dounreay – History

1954

1955

UK Atomic Energy Authority begins construction

1955

Craft apprentice training scheme starts

1955

UKAEA starts building housing estate in Thurso

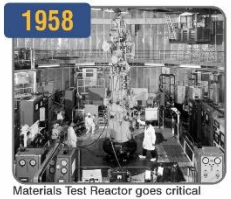
1957

Nuclear reaction takes place for first time in criticality test cell

1957

Visits by HRH The Queen Mother and The Duke of Edinburgh

1958



Materials Test Reactor goes critical

1958

Fuel reprocessing begins

1959

Experimental Fast Reactor goes critical

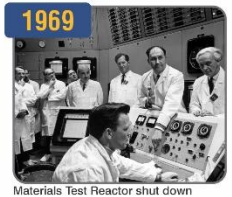
1962

First electricity exported to National Grid

1966

Construction begins of Prototype Fast Reactor

1969



Materials Test Reactor shut down

1974

Prototype Fast Reactor goes critical

1977

Experimental Fast Reactor shut down

1983

Radioactive particles discovered on beaches

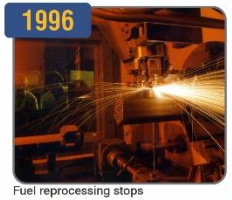
1988

UK Government announces withdrawal from fast reactor technology

1994

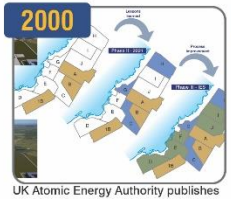
Prototype Fast Reactor shuts down

1996



Fuel reprocessing stops

2000

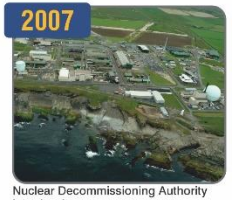


UK Atomic Energy Authority publishes site closure plan

2004

Fuel fabrication stops

2007



Nuclear Decommissioning Authority inherits site

2008

Dounreay Site Restoration Ltd

Site Licence Company created

2012

Cavendish Dounreay Partnership

A partnership between Cavendish Nuclear | CH2M | AECOM

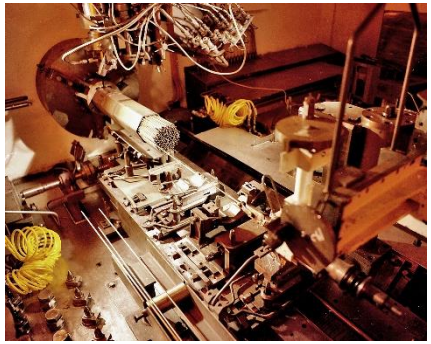
Management contracted out to Babcock consortium

2021

NDA

Nuclear Decommissioning Authority takes management in-house

The technical challenges



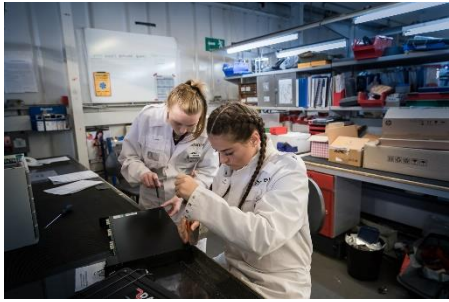
- Very novel and innovative designs – cutting edge of nuclear power
- Many facilities built quickly and modified later
- Legacy issues of contamination and waste
- Decommissioning not considered during design, build or operation
- High hazards
  - Nuclear fuel of varying types
  - Radioactive liquid metals
  - Liquors and residues

The people challenges

- Highly educated with a drive for perfection
- Looking for certainty and accuracy
- Long service at Dounreay – often same facility
- Know and love the plants and site

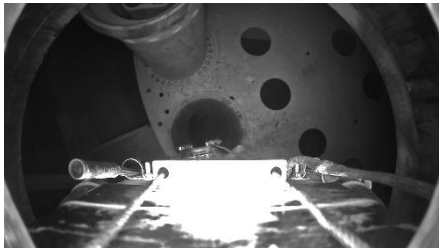
Resulting in:

- Uncertainty can be a challenge
- Sometimes over analyse
- Is focus always balanced?
    - Safety / environment / security
    - Nuclear / radiological / conventional



An example – Prototype Fast Reactor sodium heel pool

- A small amount of sodium in bottom of reactor vessel
- Fire and radiological risk
- Very long and tortuous path to top of reactor
- Use of rigs to mock up route
- Repeated attempts to overcome problems one by one
- Stop – reflect - understand – adapt – try again
- Success!



Some challenges

- Be safe and protect the environment as people care about these things
- Do not over prescribe – ‘hand rails not hand cuffs’
- Don’t let the desire for ‘perfect’ solutions stop ‘good enough’ progress
- Encourage free thinking and a problem solving mindset
- Use your learning to adapt and improve when things don’t go as expected
- Think ‘end to end’ to identify the issues and connections
- Celebrate and build on successes

People are the key
They are the ones that deliver

Questions?