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AM Background



- Fast nuclear reactors are generally cooled by liquid metal, often sodium
- Dounreay used a Sodium / Potassium combination in DFR (known as NAK) and Sodium in PFR
- The bulk sodium and NAK has been removed from the reactors but a thin coating remains



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AM Background

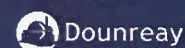


- We hold sodium and NAK in various storage facilities associated with PFR and DFR, mainly in drums or tanks
- We also hold some material from other places that was taken to Dounreay some years ago.
- Alkali Metals are classed as a hazardous material due to their reactive nature, and must be treated accordingly.
- Tanks 1 & 2 form a small part of the overall AM inventory and was undergoing treatment to destroy the sodium, whereas the majority of the remaining AM inventory is only in storage.



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AM inventory status

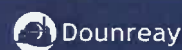


- The total inventory of alkali metals (AM) within Dounreay site ~140 te
- This is broken down to ~137 te of Sodium (Na) and ~3 te Sodium/Potassium (NaK)
- 98% of Dounreay total alkali metals inventory are held within the Prototype Fast Reactor (PFR) Authority To Operate boundary



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AM inventory status

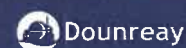


- For the PFR we can broadly categorise this inventory into two areas:
 - In-situ – alkali metals, residue or bulk that remain within their vessels of origin, process, or treatment (e.g. Reactor Vessel, Primary Cold Trap Loop, Sodium Disposal Plant batch tanks etc.) which accounts for approx. 25% of the inventory
 - Ex-situ - alkali metals, residue or bulk that were retrieved from their vessel of origin and packaged for transfer, future conditioning, and treatment (e.g. 200 ltr drum, red oxide putty drum) which accounts for approx. 75% of the inventory



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AM inventory history

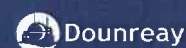


- The original plan was to process all ex-situ and some in-situ alkali metals through the Sodium Disposal Plant (SDP)
- The decision was taken to shut down the SDP, on three fronts:-
 - the plant was close to the end of its operational lifetime and would require substantial upgrades
 - contractual complications (between UKAEA & AEAT)
 - the absence of an agreement in place to return the Sodium from German Facility (KNK) ion exchange columns



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AM storage



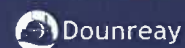
Turbine Hall ISOs



200l AM storage drum

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AM storage issues

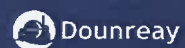


- Both generator transformer house and turbine hall have defects caused by storm damage to the roof causing rainwater ingress
- Pooling of rain water observed around ISO containers containing sodium inventory
- Our investigation has identified accessibility issues, which we are addressing



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AM storage issues

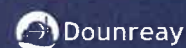


- Our routine inspections identified some drums with potential defects (corrosion or bowing/swelling of drum lids)
- The ONR report indicated that arrangements did not meet our Code of Practice or national good practice
- We believe we are compliant with the core requirements of Dounreay COP 2011, in the short term, but recognise improvements can be made.



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Plan to maintain safety of AM inventory

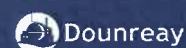


- Alkali metal drum inspections, techniques and action levels and response should we discover any issues have been improved.
- We have reviewed storage of all our inventory and secured additional industry wide peer review of our arrangements.
- Repackaging and redistribution of storage drums as necessary
- In the medium term, consider the design and construction of a new storage facility until final disposal capability is operational



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Work Completed to Date



- 5 drums were taken to inert glovebox for examination. 1 x drum repacked & 4 x drums found no defect
- The operating instruction has been updated as to how we inspect drums utilising photos, heat cameras and mirrors
- Made improvements to make the buildings weathertight (ongoing)
- A Position Statement has been drafted which makes a number of recommendations for further improvements



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Plan to dispose of AM inventory



- Baseline programme is the development and operation of an onsite sodium disposal facility
- Alternative options for offsite disposal will also be explored with the supply chain, NDA and Nuclear Waste Services



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Summary

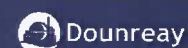


- Our inspections identified some issues which we investigated further and reported to our regulators
- We have acted on our recommendations but recognise we have more to do
- We have baseline strategy for ongoing storage and development of a process to destroy the sodium, currently a destruction route for sodium is not available
- Our commitment to convert the sodium to a safe state remains



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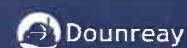
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Questions



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