



**Nuclear Waste
Services**

Introduction to the Geological Disposal Facility

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Outline

- Who are NWS?
- The radioactive waste inventory
- UK policy for disposal of higher activity radioactive waste
- The concept of geological disposal
- GDF timelines and milestones
- Cross-industry links

Who are Nuclear Waste Services?

Nuclear Waste Services specialises in managing, treating, and safely disposing of the UK's radioactive waste.

Our goal is to ensure that waste is managed in a way that **protects people and the environment**, now and in the future.



A customer and community focused business with safety at its core



A great place to work, where people are respected, included and can perform at their best



A centre of excellence to drive and deliver value for the taxpayer

Inventory for Geological Disposal

About 90 % by volume of the UK's radioactive waste is LLW and disposed of at licensed surface facilities

Inventory for geological disposal comprises:

Higher activity radioactive waste:

- High Level Waste
- Intermediate Level Waste
- Low Level Waste (not suitable for LLWR)

Nuclear materials (not yet waste)

- Spent fuel
- Plutonium
- Uranium

Potential wastes from New Nuclear Build

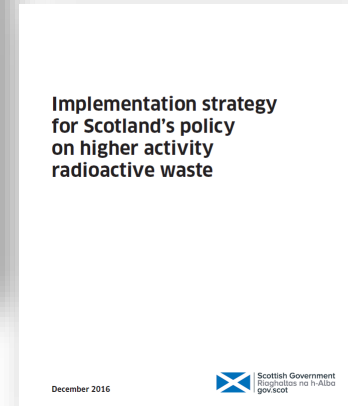
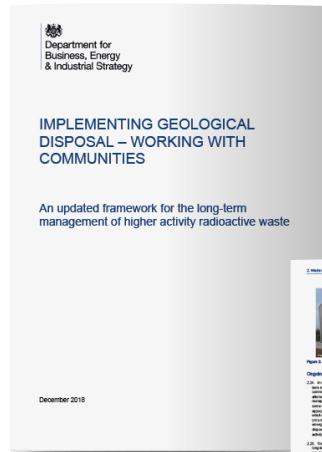
- Up to a generating capacity of 24GWe



Current UK Policies On GDF Siting

A GDF will only be built where there is both a willing community and a suitable site :

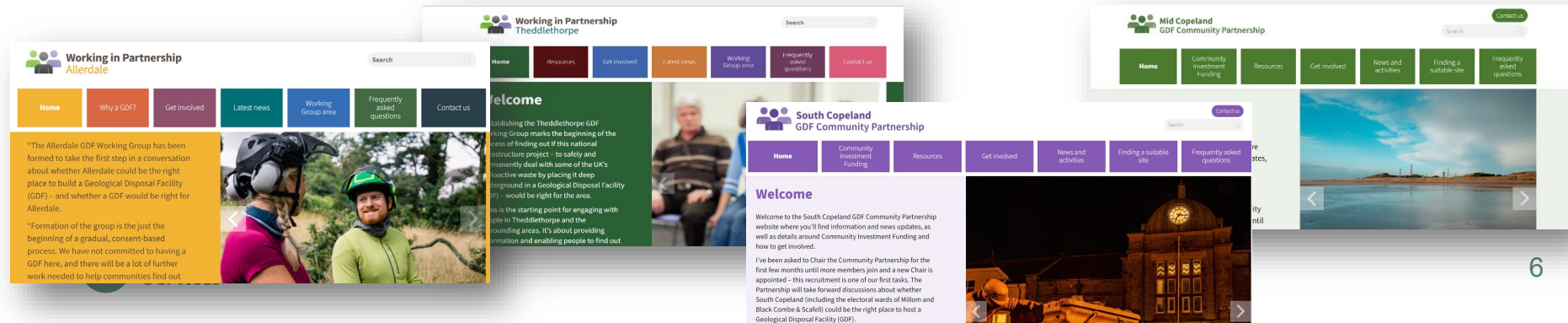
- UK Government policy on ‘Working With Communities’ published 19 December 2018
- Devolved nations have their own policies



Finding a willing community

We have four communities who want to work with us to explore the implications and potential benefits of a GDF:

- **Copeland** – two Community Partnerships
 - Mid Copeland formed November 2021
 - South Copeland formed December 2021
- **Allerdale** – Community Partnership formed January 2022
- **Theddlethorpe** – Community Partnership formed June 2022



Finding a suitable site

- **Site Evaluation** is the process through which sites can be assessed to consider whether they meet the relevant requirements for a GDF
- There are six siting factors that will need to be considered as part of the site evaluation process – **down select to two sites in 2025***
- **Geosphere Characterisation** is the process through which the sub-surface geology will be assessed to identify site suitability, through non-intrusive and intrusive investigations
- **Borehole drilling for geosphere characterisation is currently planned for 2029***
- These boreholes will help to identify if there is a suitable rock volume to host a GDF and support a **post-closure safety case**



* For planning purposes



Site Evaluation – How we will Evaluate Sites in England, (February 2020).

Suitable Host Rocks For A GDF

Higher Strength Rocks

e.g. granite, gneiss,
crystalline rocks



Very strong, easier to
construct in, very low
matrix permeability



Lower Strength Sedimentary Rocks

e.g. clay-rich mudstones



Very low permeability,
chemistry allows for
sorption of radionuclides,
fractures self-seal

Evaporite Rocks

i.e. rock salt

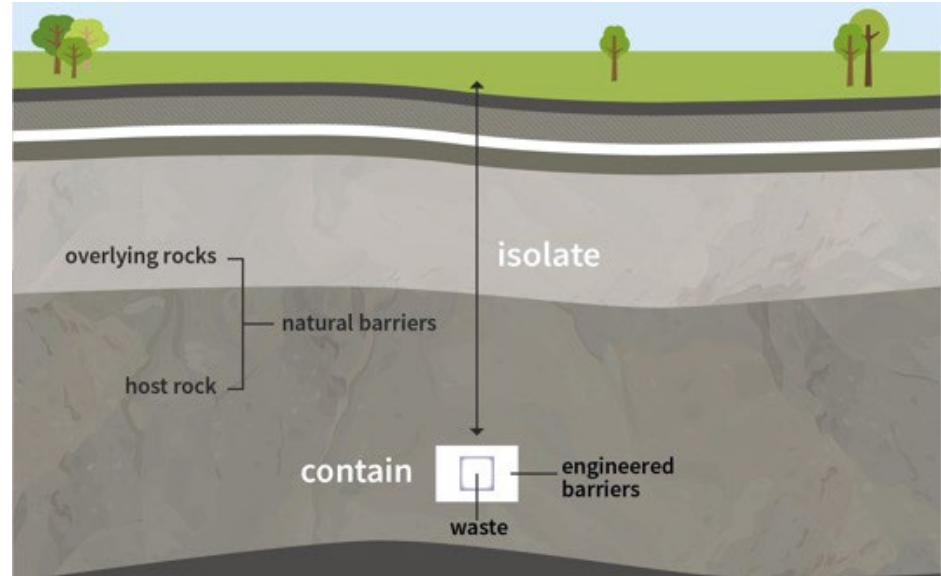


Essentially dry, no
groundwater movement,
fractures and voids self seal

Geological Disposal Facility (GDF)

Geological disposal involves isolating **higher activity** radioactive waste from the environment deep underground in a highly engineered mined facility.

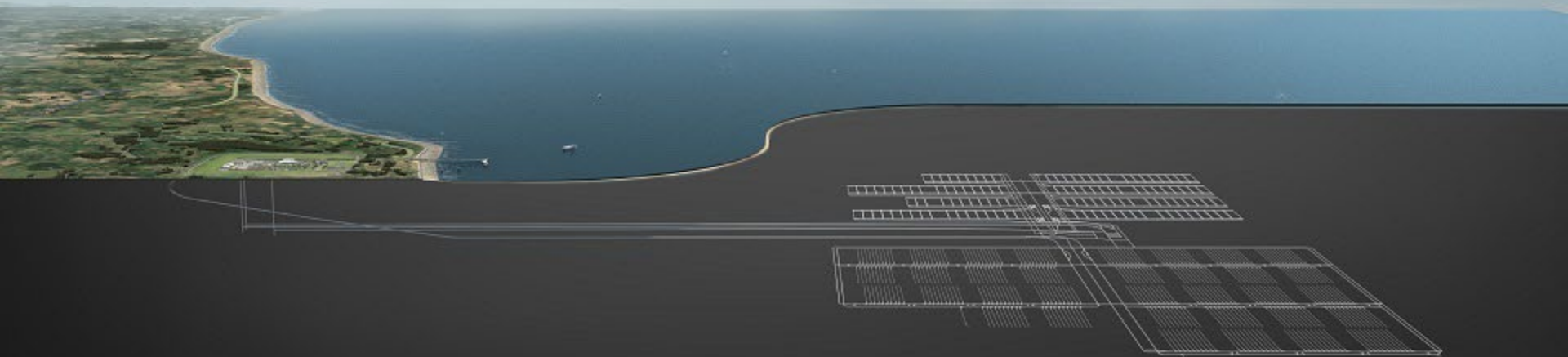
- Will be between 200m-1000m below the surface
- Makes use of multiple engineered barriers and specific types of host rock to isolate and contain the waste until the waste naturally decays
- Passive safety - once filled it will be sealed, and no longer require active management



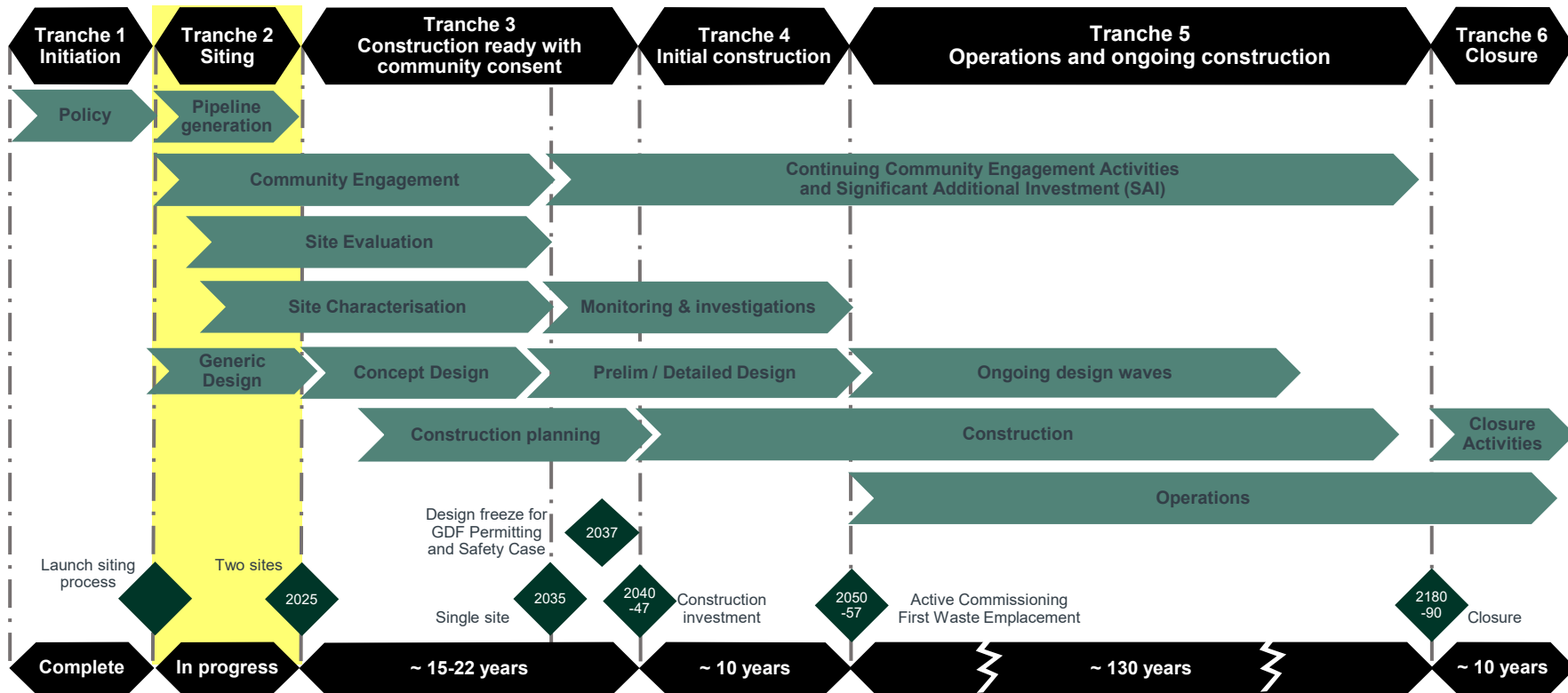
Internationally accepted as best solution for long-term management of these wastes

What Could A GDF Look Like?

- We also look at the geology below the seabed, from the coast out to the limit of UK Territorial Waters (12 nautical miles)
- This would require a surface facility to be constructed at the coast, and an accessway constructed under the seabed
- Policy requires that this would be accessed from land



GDF Overarching Programme



ISE. Initial Site Evaluation

Potential cross-industry links

- Inshore basis of well design and offshore drilling
- Challenges around deployment of long-term monitoring
- Borehole sealing technologies – what is best practice in offshore industries?
- Environmental baseline monitoring as part of the Nationally Significant Infrastructure Project (NSIP) process
- Laboratory capability and analysis





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Thank you!
Any questions?

More information

To learn more about the UK's mission to deal with radioactive waste:

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