

Briefing Note

Why 'retrievability' is an important issue

> What is retrievability?

Retrievability is the word used when the design of a facility for managing radioactive wastes allows the wastes to be taken out again.

> The debate about retrievability

The issue of retrievability can attract strong debate, particularly about whether a geological disposal facility (GDF) should be kept open after waste emplacement finishes so that the wastes could be taken out again.

Those in favour of retrievability point out it would allow wastes to be removed in response to:

- safety concerns that are only recognised after waste emplacement
- a desire to extract resources from the wastes
- a desire to use alternative waste treatment or disposal techniques developed in the future.

Although recognising that retrievability gives greater flexibility to future decision-makers, the Committee on Radioactive Waste Management (CoRWM) concluded that leaving a facility open, for centuries after waste has been put into it, increases the risks disproportionately to any gains¹.

In its White Paper on implementing geological disposal, the Government also noted that closure of a GDF at the earliest opportunity would provide greater safety and security from terrorist attack, and would minimise the burdens of cost, effort and worker radiation dose transferred to future generations².



> Government policy

In the light of the debate on retrievability, the Government adopted the following position:

“Government’s view is that the decision about whether or not to keep a geological disposal facility (or vaults within it) open once facility waste operations cease can be made at a later date in discussion with the independent regulators and local communities. In the meantime the planning, design and construction can be carried out in such a way that the option of retrievability is not excluded.”

Subsequently, the environment agencies have advised that designing a GDF for retrievability must not undermine its long-term safety. They point out, in particular, that the environmental safety case would need to demonstrate that

1. Committee on Radioactive Waste Management, Managing our Radioactive Waste Safely – CoRWM’s Recommendations to Government, CoRWM Document 700, 2006.
2. Defra, BERR, Welsh Assembly Government, Department of the Environment Northern Ireland, Managing Radioactive Waste Safely – A Framework for Implementing Geological Disposal, Cm7386, 2008.

processes such as deterioration of waste packages would not unacceptably affect safety.

The Nuclear Decommissioning Authority (NDA) has told the Partnership that it will ensure that consideration of retrievability is an integral component of design development for a GDF³, taking account of the White Paper and the environment agencies guidance.

> A retrievability scale

One of the key issues for many stakeholders is to understand the ease (or difficulty) of waste retrieval from a GDF.

The Nuclear Energy Agency (NEA) of the Organisation for Economic Co-operation and Development (OECD) has developed a scale to illustrate the effort needed to retrieve wastes according to the stage in the wastes 'lifecycle'⁴.

This is based on steps 0 to 5:

- 0. Unconditioned waste** – direct access to the waste
- 1. Packaged waste in storage** – the package is directly retrievable
- 2. Packaged waste placed in a vault or cell of a GDF** – retrievable by reversing the operation that put the waste in the repository
- 3. Packaged waste in a sealed vault or cell** – retrievable after removing the material used to backfill the vault or cell
- 4. Packaged waste in a sealed zone in the GDF** – retrievable after re-excavation of galleries and shafts in the GDF
- 5. Packaged waste in a sealed GDF** – waste only recoverable by mining

The NEA points out that as the scale goes from 0 to 5, the difficulty and costs of retrieval increases.

> Enhancing retrievability from a GDF

There are a range of things that could be done to enhance retrievability. According to a 2005 study within the European Union⁵, measures could include:

- **Design of the repository** – improved stability of access tunnels and shafts and disposal vaults, a reduced number of packages per vault, control of environmental conditions in the vaults, reduced distance from emplaced wastes to the nearest access point, enhanced stiffness and water tightness of vault lining and use of easily removable backfill material.
- **Design and monitoring of the waste packages** – ensuring the package material is resistant to corrosion and placing the packages in disposal containers.
- **Operational measures** – keeping disposal vaults, access tunnels and access shafts open.
- **Monitoring of waste accessibility** – monitoring the stability of openings, the extent of water saturation in back-filled vaults, and conditions in the repository.
- **Maintaining equipment** – maintaining or replacing equipment installed to allow reversibility of waste emplacement (eg lifting gear).

3. NDA, Addressing Retrievability in Design, Document 37, 2009.

4. NEA, The NEA Retrievability Scale, A dialogue tool on the management of radioactive wastes using geological repositories, Draft version June 2009.

5. ESDRED Review of Measures for Retrievability (BRW Haverkate, May 05).