

GEOLOGICAL DISPOSAL

Policy Statement 3
January 07



Background

In the context of radioactive waste management, geological 'disposal' has a specific meaning, which is burial in geological formations in a purpose built facility with no intention to retrieve the waste once the facility is closed. Following concerns that the specific meaning of the term was not widely understood and that its use could be misleading, the Steering Group agreed to publish this statement.

The statement outlines the:

- the nature of geological disposal
- observations about confidence levels in its long-term safety
- qualifications associated with support for geological disposal and
- qualifications associated with use of the term geological 'disposal'.

Nature of Geological Disposal

The nature of geological disposal can be summarised by reference to statements in CoRWM's report to Government¹. This explains that:

- Geological disposal is based on the concept of the retention of radioactive wastes by a combination of engineered containment within a geological barrier.
- Concepts for geological disposal are based on an extremely long period of containment of the waste during which time its level of radioactivity will diminish through the process of radioactive decay.
- It is acknowledged that at some point in the very far future radioactivity will eventually make its way into the biosphere, but at levels expected to be insignificant in terms of impact on health and the environment.

¹ Committee on Radioactive Waste Management, 'CoRWM's Recommendations to Government', Document 700, July 2006, Chapter 15.

- The concept of 'phased geological disposal' involves incorporation of design features to enable a repository to stay open and function as a storage facility for several hundred years, before backfilling and closure.
- A decision on repository design is not needed until underground investigations have begun. This allows time for further research, discussion and agreement with potential host communities and others on repository design features.

Levels of Confidence in Long-Term Safety of Geological Disposal

The great majority of CoRWM members had sufficient confidence in the long-term safety of geological disposal to recommend it to Government as the end point of a strategy for long-term management.

As set out CoRWM's report to Government², this confidence took into account the following:

- In those countries that have made firm decisions on long-term waste management, all have decided that geological disposal is the best way forward.
- Based on reconstruction of historic records, there is high confidence in the scientific community that there are areas of the UK where the geology and hydrogeology will be stable for a million years and more into the future.
- Work on natural analogues shows that geologies with a low water flow will retain radionuclides over very long periods.
- After taking into account the various uncertainties that exist, regulators have been satisfied that risk targets can be met in all countries where individual sites have been examined.
- 'Worst case' estimates suggest that the maximum level of radioaction exposure would occur around 200,000 years into the future at levels close to current maximum levels of background radiation. By contrast, 'most likely' case estimates suggest negligible human doses over the relevant period of several hundreds of thousands of years.
- As a result of a combination of design and geology, it is thought very unlikely that radioactivity will reach the biosphere in quantities large enough to cause significant harm over many hundreds of thousands of years.

CoRWM acknowledge, however, that:

² Committee on Radioactive Waste Management, 'CoRWM's Recommendations to Government', Document 700, July 2006, Chapter 13.

- the suitability of any individual site could not be affirmed until detailed site investigations had taken place;
- some stakeholders are not convinced of the above case for confidence in long-term safety and question the interpretation of evidence, whether or not all assumptions are reasonable, and whether all relevant scenarios have been considered; and
- there is no way in which the debate between supporters and opponents of geological disposal can be definitively resolved now because incontrovertible evidence does not exist.

NuLeAF recognises that there will be a spectrum of views among its member authorities on the degree of confidence that can be placed on the long-term safety of geological disposal.

Qualified Endorsement of Geological Disposal

CoRWM's recommendations are formulated in a way that take into account the existence of varying levels of confidence in the long-term safety of geological disposal. They are expressed in the following terms:

"Within the present state of knowledge, CoRWM considers geological disposal to be the best available approach for ... long term management ... when compared with the risks associated with other methods of management." [Recommendation 1]

"The aim should be to progress to disposal as soon as practicable, consistent with developing and maintaining public and stakeholder confidence." [Recommendation 1]

"There should be a commitment to an intensified programme of research and development into the long-term safety of geological disposal aimed at reducing uncertainties at generic and site-specific levels .." [Recommendation 4]

"The commitment to ensuring flexibility in decision-making should leave open the possibility that other long-term management options (for example, borehole disposal) could emerge as practical alternatives. Developments in alternative management options should be activity pursued through monitoring or and/or participation in ational or international R&D programmes." [Recommendation 5]

In other words, CoRWM's support for geological disposal is qualified by reference to:

- it being the best available approach in the current state of knowledge
- a commitment to undertake R&D to reduce uncertainties about long-term safety and
- flexibility to leave open the possibility of other practical alternatives.

CoRWM also recognises that a robust programme of interim storage must play an integral part in long-term management strategy and recommend that

this must be “robust against the risk of delay or failure in the repository programme” (recommendation 2).

These perspectives are broadly consistent with comments submitted to CoRWM by NuLeAF during the Committee’s public and stakeholder engagement programme³.

Definition and Use of the Term Geological ‘Disposal’

NuLeAF’s use of the term geological disposal should be seen in the context of this qualified endorsement and acknowledgement of the varying levels of confidence in long-term safety. Against this background, NuLeAF accepts the definition of the term, as used by Government, the regulators, the nuclear industry and the scientific community, namely that:

‘geological disposal’ refers to burial in geological formations in a purpose built facility with no intention to retrieve the waste once the facility is back-filled and closed.

Use of the term must not be read to imply unqualified acceptance of geological disposal, nor that all member authorities have the same level of confidence in its long-term safety or consider that it constitutes a solution.

³ NuLeAF, ‘Phase 4: Public and Stakeholder Engagement’, letter to CoRWM, 26 May 2006.