

The Royal Society response to the Committee on Radioactive Waste Management (CoRWM) consultation: How should the UK manage radioactive waste?

The Royal Society welcomes the opportunity to contribute to the Committee on Radioactive Waste Management's (CoRWM) consultation: *How should the UK manage radioactive waste?* This response has been approved on behalf of the Council of the Royal Society by Sir David Wallace CBE FRS, Treasurer and Vice-President of the Royal Society. It has been prepared in consultation with Professor Charles Curtis OBE, Professor William Gellately OBE, Professor Lewis Roberts FRS CBE, Professor Ekhard Salje FRS, Dr William Wilkinson CBE FRS who have contributed to previous Royal Society reports and responses on radioactive waste management.

1 Narrowing down the options: a proposed short list

We agree with the short listed options presented in the CoRWM consultation document. However, we recommend that CoRWM considers the option of sub-seabed access from onshore tunnels in more detail before this option is excluded from the short list. As similar tunnels have already been used to access coal from the UK mainland, and other countries (such as Sweden) have already developed offshore facilities connected by onshore tunnels, most engineering challenges for this disposal option have already been addressed. Legal advice given to Nirex (and the fact that other countries are actively employing this method of disposal), suggests that sub-seabed disposal from onshore tunnels would not contravene international conventions in the way that off-shore sub-seabed disposal would.

We agree with the reclassification of 'storage forever' option for waste disposal. However, we highlight that the distinction between the options of Deep Disposal and Phased Deep Disposal should not be exaggerated. Any deep geological disposal method may remain open for 50 years or more as it is gradually filled. During this period, decisions can be taken on how to continue monitoring, backfilling and sealing. However, an important distinction that should be made in assessing options for radioactive waste disposal is the effectiveness of the geological barrier in the very long term, which may affect the design of the package containment and backfilling around the packages.

2 Assessing the short listed options

Whilst we acknowledge that part of one of CoRWM's guiding principles recognises the need for 'input based on the best available sound science,' there are no explicit details in the consultation document on how the science community will be engaged in CoRWM's future work. As we have previously outlined, and has been raised by the House of Lords Science and Technology Committee (House of Lords 2004), we have concerns over the low level of scientific representation on CoRWM, especially in field of Earth Sciences. We acknowledge the steps CoRWM has taken to access further scientific expertise, and to introduce peer review and quality assurance into its decision making process. We also welcome, as we highlighted in our response to OST on the Use of Science in Defra (Royal Society 2005), the fact that the Chief Scientific Adviser in Defra has agreed to examine the provision of scientific advice to CoRWM. However, particularly with recent changes to CoRWM's composition, we still have strong reservations about whether CoRWM has the balance

of scientific representation that is necessary to provide the most robust policy advice. We are pleased to offer our continued assistance in CoRWM's future work.

In the next phases of CoRWM's work, especially in the final decision making process, there is a continued (and possibly stronger) need for robust scientific and technical input. It may be necessary to set up a technical committee or sub-committee that includes CoRWM members, to assess and summarise the scientific literature, which CoRWM members cannot be expected to do alongside all their other duties. Purchasing pieces of advice from external contractors is no substitute for continuous input from experts with extensive experience of the relevant technology.

In our response to the Defra consultation on Managing radioactive waste safely, we highlight criteria to aid the selection of disposal techniques (Royal Society 2002). These include (i) applying the principle of best available techniques not entailing excessive cost (BATNEEC), (ii) considering the capacity of 'final' disposal methods to be adjusted in the light of new knowledge and technologies, and (iii) considering changing socio-political conditions. Applying criteria (iii), for example, would make interim storage of High Level Radioactive Wastes (HLW) for over 300 years, as outlined in the short listed options, a risky proposition - since it is possible that the socio-political environment would be less stable by then. In addition, we also consider the principle of 'As Low As Reasonably Practicable (ALARP)' should be applied for assessing the risks of the management options.

A further important issue for consideration for long-term waste management options and sites includes either human induced or natural changes to the environment. For example sea levels and coastlines are changing as a result of climate change and will cause quite rapid modifications to these areas. It is therefore important that the latest scientific understanding of climate change and its impacts are included in the selection of radioactive waste disposal options. On longer timescales, an ice age may change the containment rock strata and impact on the disposal site. However, as this latter change may not take place for tens of millennia, radioactivity of wastes will have significantly reduced by this time, whilst human civilisation and relative concerns are likely to change significantly in the build up to, and onset of, an ice age.

3 Combining options

We agree that there will have to be combinations of intermediate and long-term measures in any long-term management plan. Clearly the physical and safety differences between different radioactive waste streams will require different options. Where possible, CoRWM should separate out waste management options for Low Level Radioactive Wastes (LLW) and HLW streams. However, as the UK's accumulated historical wastes are often ill-defined and chemically deteriorating, this separation into short-lived and long-lived wastes is not always an option.

In our response to the House of Lords we highlight that a management strategy may require both short-term and long-term components (Royal Society 1988), the short-term component being surface storage until sites can be identified using rigorous scientific and engineering criteria.

4 Implementation

Once CoRWM has reviewed and recommended the radioactive waste management options for solid higher activity radioactive wastes, and reported to the Government in 2006, the significant issue of implementation will remain. This means that, until long-term sites can be identified and rigorously tested, the UK is committed to using the present storage of HLW and Intermediate Level Radioactive Wastes (ILW) for an indefinite period, possibly for several decades.

The major problems associated with implementation include: site selection, legal and planning issues and the granting of regulatory consents - all of which may involve public inquiries. Local community and local government consultation will be vital during this period. It is important that this consultation explores both the disadvantages and the potential benefits to local communities, and their future generations, of a radioactive waste repository. We recommend that in considering community implementation strategies reference should be made to implementation strategies in other countries (acknowledging the differing cultural context in the UK) and from the history of developing nuclear sites in Britain.

Site selection criteria need to be developed for long-term storage options. CoRWM is right to begin now to consider the huge changes in tasks and in public attitudes when the process moves onto the selection of potential sites. Interdisciplinary teams should be set up to provide expertise for research, across a number of areas to inform the site selection process and ensure future research is focussed on the safety of potential sites.

References

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