

CORWM REPORT TO GOVERNMENT

REPORT ON NATIONAL RESEARCH AND DEVELOPMENT FOR INTERIM STORAGE AND GEOLOGICAL DISPOSAL OF HIGHER ACTIVITY RADIOACTIVE WASTES, AND MANAGEMENT OF NUCLEAR MATERIALS **October 2009**

EXECUTIVE SUMMARY

1. CoRWM's remit is to provide independent scrutiny and advice to Government on the long-term management, including storage and disposal, of higher activity radioactive wastes and materials that may be declared to be wastes. This is the last of three reports produced in 2009 that describe the results of the Committee's scrutiny and provide advice to Government.

Scope of Report

2. This report is about CoRWM's work during 2008 and much of 2009 on:
 - the UK's process for providing research and development (R&D) in the management of higher activity wastes
 - the skills requirements to support R&D in the Managing Radioactive Waste Safely (MRWS) programme, in particular those R&D skills to enable implementation of geological disposal
 - the infrastructure requirements, in particular those facilities supporting R&D on highly radioactive materials and R&D that will need to be carried out underground
 - public and stakeholder engagement on the above topics.
3. For each topic, the current position is summarised and advice is given for use in making plans for the R&D to be carried out over several decades and beyond. CoRWM intends to monitor whether and how this advice has been acted on by Government and others.

How CoRWM Worked

4. CoRWM worked by gathering information from the Nuclear Decommissioning Authority (NDA), its Site Licence Companies (SLCs), other nuclear site licensees, the Research Councils, Learned Societies and other organisations in the UK involved in R&D of relevance to the MRWS programme. It looked at the processes used to define R&D strategies in other countries. It held meetings with all the major organisations and it helped to organise meetings on the current state of national R&D in storage and geological disposal with the Radioactive Waste Immobilisation Network. It also sought the views of stakeholders and the public *via* its website and at CoRWM stakeholder events in October 2008, February 2009 and September 2009. A draft of this report (without conclusions and recommendations) was sent to key stakeholders for comment and a full draft placed on the CoRWM website for public comment. Responses to all the requests for comments were taken into account in preparing the final version of the report.

Overall Conclusions and Recommendations

5. This report sets out the information CoRWM gathered on each topic, references CoRWM and other documents for more details, and gives CoRWM's conclusions on each topic. The overall conclusions and recommendations are as follows.

Strategic Co-ordination of UK Radioactive Waste Management R&D

6. CoRWM considers that there is a need for more strategic co-ordination of R&D for the management of higher activity wastes throughout the UK. This strategic co-ordination is required within NDA (including its SLCs), between NDA and other parts of the nuclear industry (including the Ministry of Defence), amongst the Research Councils, and between the nuclear industry, its regulators and the Research Councils.
7. Within NDA, the need is for more strategic co-ordination of R&D carried out by its SLCs, its Radioactive Waste Management Directorate (RWMD) and within its Direct Research Portfolio (DRP). It is particularly important to co-ordinate RWMD's R&D for implementation of geological disposal with SLC and DRP R&D for waste conditioning, packaging and storage and for the management of spent fuels, plutonium and uranium that may be declared to be wastes. The lack of such co-ordination would lead to a poor use of NDA's resources (effort, time and money).
8. Between NDA and the nuclear industry there is a need for strategic co-ordination of R&D and agreement on national priorities. As well as enabling better use to be made of resources, this would ensure that key issues are tackled in a timely way.
9. Of the five Research Councils that could potentially fund research relevant to the management of higher activity radioactive wastes, only two are doing so at present and only one at a substantial level. Research Councils do not seem to have recognised the need to come together to identify the fundamental research required to underpin the MRWS programme. They should work together in an open and transparent way and involve prospective researchers in all the relevant fields, as well as the nuclear industry and its regulators. All these stakeholders should agree national priorities for the research to be funded by the Councils. This will maximise the benefits of the Research Councils' resources to the MRWS programme.
10. CoRWM does not wish to be prescriptive about the co-ordination mechanisms to be used in any of these cases. However, it has identified a number of attributes it thinks that the mechanisms should have in all cases. The mechanisms should:
 - cover the R&D needs of all the relevant UK organisations
 - be open and transparent
 - involve researchers, the nuclear industry, its regulators and other stakeholders
 - agree national priorities for R&D
 - encourage innovation
 - foster collaboration with other countries
 - ensure R&D is carried out in a timely manner
 - involve independent national and international review
 - ensure R&D results are disseminated and acted upon.
11. In CoRWM's view no single existing body, as presently constituted, is capable of overseeing the necessary strategic co-ordination mechanisms. Either several bodies would need to work together or an existing body would need to be augmented in order to fulfil the oversight role.
12. It is essential that future UK R&D programmes for the management of higher activity wastes contain sufficient fundamental research, as well as applied research and development. In deciding which R&D to fund and when, account should be taken of the needs of the overall programme for the management of higher activity wastes, the needs for safety case development and the lead times and durations of R&D projects.

Recommendation 1

CoRWM recommends to Government that it ensures that there is strategic co-ordination of UK R&D for the management of higher activity wastes. Such co-ordination is required within the NDA, between the NDA and the rest of the nuclear industry, amongst the Research Councils and between the whole of the nuclear industry, its regulators and the Research Councils.

Regulatory Research

13. The Health and Safety Executive (HSE) has a responsibility to ensure that appropriate nuclear safety research programmes are carried out, including nuclear safety research related to the management of higher activity waste. It has a well-established mechanism for fulfilling this responsibility. HSE commissions its own research and sets out the research topics that nuclear site licensees should address.
14. The Environment Agency (EA) and the Scottish Environment Protection Agency (SEPA) have relatively modest research programmes on topics of regulatory interest in the areas of radioactive waste management and related health and environmental protection issues. CoRWM believes that EA will need to commission more independent research as the MRWS programme proceeds in order to carry out its role as a regulator of geological disposal of higher activity wastes. CoRWM also expects that SEPA will need to commission research to assist it in the regulation of the management of higher activity wastes in Scotland.

Recommendation 2

CoRWM recommends to Government that it ensures that the Environment Agency and the Scottish Environment Protection Agency obtain the resources that they need to access and commission the additional independent research required to support them fully in their regulation of the management of higher activity wastes.

R&D Skills to Support the MRWS Programme

15. The importance of maintaining nuclear skills in the UK was recognised some years ago and steps have been taken to reverse the decline that was occurring. In recent years there has been a significant improvement but there is some way to go, particularly for R&D skills.
16. CoRWM has found that responsibility for the provision of R&D skills is split between many organisations. Although each organisation is playing its part, there seems to be a lack of national leadership and strategic direction. CoRWM thinks that this would be best rectified by assigning a single organisation the responsibility for providing this leadership and direction. This organisation should be capable of taking a clear overview of the R&D skills needs of the whole of the nuclear industry, existing and new, civil and defence. CoRWM believes that the Cogent Sector Skills Council, with additional expertise, could fulfil this role.

Recommendation 3

CoRWM recommends to Government that it assigns to a single organisation the responsibility for providing national leadership and strategic direction for provision of R&D skills relevant to the long-term management of radioactive wastes.

Infrastructure Required for R&D – Facilities for Research with Highly Radioactive Materials

17. CoRWM considers that the UK's existing civil facilities for research with highly radioactive materials are inadequate and in need of improvement. In addition, new facilities need to be established in order to support the full spectrum of research relevant to the management of higher activity wastes, including geological disposal.
18. Almost all of the existing facilities for research with highly radioactive materials are operated by the National Nuclear Laboratory (NNL). There are plans to widen access but at present the only R&D that can be performed in these facilities is that funded by NNL customers, primarily the NDA and other nuclear industry organisations. It is essential that funders and providers of fundamental research can access the facilities they need in order to contribute to R&D for the management of higher activity wastes, both now and in the future.

Recommendation 4

CoRWM recommends to Government that it ensures that facilities for research with highly radioactive materials are improved and their capability enhanced so that they can be used for the full spectrum of research relevant to the long-term management of higher activity wastes. These facilities should be accessible to all researchers who need them.

Infrastructure Required for R&D – Underground Research Facility

19. Underground investigations will be needed at the site of any proposed geological disposal facility (GDF) in the UK. These investigations need to include both underground site characterisation work and underground R&D if they are to provide sufficient input to GDF design and safety case development. CoRWM is of the view that this R&D should be carried out in an underground research facility (URF) at any site where it is proposed to construct a GDF.
20. An R&D programme should be carried out in the URF prior to the decision as to whether or not to proceed with GDF construction. This programme should be discussed with a range of stakeholders, including the community local to the site and independent scientists, and agreed with regulators. The geological disposal programme should allow time to carry out the required underground R&D and to disseminate and assimilate its results. It should be recognised that this underground R&D may take decades. The URF should continue to be used for as long as is necessary while the GDF is open.
21. Until a URF is available in the UK, generic R&D should be carried out in underground facilities in other countries. This would allow UK researchers to gain the necessary experience, as well as providing information and techniques to be used in the UK geological disposal programme.

Recommendation 5

CoRWM recommends to Government that an underground research facility be constructed at any site where it is proposed to construct a geological disposal facility.

Public and Stakeholder Engagement for R&D

22. At present, as in the past, stakeholders who are outside the organisations that fund and carry out R&D have little opportunity to influence UK R&D programmes on radioactive waste management. There is a general lack of transparency in

establishing R&D requirements and commercial reasons are often cited as a reason for not publishing results.

23. CoRWM believes that this situation must change. As implied in Recommendation 1, a wider range of stakeholders should be involved in establishing R&D requirements. It is also necessary to make accessible information available to the public about R&D needs, progress and plans.

Recommendation 6

CoRWM recommends to Government that mechanisms are put in place to ensure that a wider range of stakeholders than to date will be involved in establishing R&D requirements for the long-term management of higher activity wastes and that accessible information will be made available to the public about R&D needs, plans and progress.

Specific R&D Issues

24. In addition to arrangements for providing R&D and the skills and infrastructure needed for it, CoRWM also considered some of the topics on which further R&D is likely to be required for the long-term management of the UK's higher activity wastes. In doing so, it recognised that future R&D programmes will need to build on the substantial body of knowledge that already exists as a result of past R&D in the UK and other countries. This current knowledge base is sufficient to be confident that geological disposal is the right way forward. In future R&D it will be necessary to focus on knowledge gaps and uncertainties that are important for UK wastes and, in the case of geological disposal, for the types of rocks in which a GDF may be located. The results of CoRWM's consideration of specific topics are in Section 6 and Appendix A of this report. CoRWM did not attempt to identify, consider or prioritise every topic on which R&D may be needed. The material in Section 6 and this appendix is only intended to illustrate the range of R&D that could be required over the next few decades.