

Response from Members of the Committee on Radioactive Waste Management to the House of Lords Science and Technology Committee Call for Evidence on Setting Science and Technology Research Funding Priorities

Introduction

1. This response to the call for evidence is submitted by the Chair of the Committee on Radioactive Waste Management (CoRWM) on behalf of its members. It is not a formal CoRWM response because there has been no opportunity to discuss and agree it at a plenary meeting of CoRWM.

2. CoRWM was established in 2003 to advise the Government on the method (or methods) to be adopted for the long-term management of the UK's higher activity radioactive wastes (HAW).¹ It reported in 2006 and recommended geological disposal, preceded by robust interim storage and accompanied by an intensified programme of research and development (R&D) (CoRWM, 2006). The UK Government accepted these recommendations and began to implement them (UK Government et al, 2006; Defra et al, 2007; Defra et al, 2008). The Scottish Government decided against geological disposal and is developing a policy of near-surface, near-site storage while supporting R&D.

3. CoRWM was reconstituted in 2007 with the role of carrying out scrutiny of the UK programme for the long-term management of HAW and providing independent advice to Government (Defra et al, 2007). It reports to the Secretary of State for Energy and Climate Change and to the Environment Ministers in Scotland, Wales and Northern Ireland. During 2009 CoRWM has issued two reports to Government: one on interim storage and one on geological disposal (CoRWM, 2009a, 2009b).

4. For about the past 18 months, CoRWM has been scrutinising the UK arrangements for R&D related to the long-term management of HAW. It issued a draft report for consultation in July 2009 (CoRWM, 2009c). It is currently finalising this report in the light of responses to that consultation. The report will be submitted to Government and published at the end of October 2009. This response to the call for evidence is based on the findings that will be detailed in the report.

Organisations that Fund or Carry Out Research on the Long-Term Management of HAW

5. Research relevant to the long-term management of HAW is funded and commissioned by:

- the Nuclear Decommissioning Authority (NDA), which has strategic responsibility for decommissioning most of the UK's civil nuclear sites and specific responsibility for implementing geological disposal
- nuclear site licensees, including the NDA's Site Licence Companies, British Energy (which is owned by EDF and Centrica) and contractors to the Ministry of Defence (eg AWE plc, which runs Aldermaston)
- the regulators of the nuclear industry, namely the Health and Safety Executive, the Environment Agency and the Scottish Environment Protection Agency
- the Research Councils.

6. Almost all of this research is publicly funded, either directly or indirectly. The main exception is research funded by British Energy, which is ultimately funded by electricity consumers. This would also be the case for research by the operators of new nuclear power stations.

¹ HAW includes both high level waste (HLW) and intermediate level waste (ILW).

7. CoRWM estimates that the annual UK spend on R&D relevant to the long-term management of HAW is currently about £30 million. Over 80% of the spend is by the NDA and its Site Licence Companies. Research Council spending is about £2.25 million per year, mainly by the Engineering and Physical Sciences Research Council (EPSRC).

8. The organisations that carry out the research are:

- universities (with funding from the Research Councils and via contracts with the NDA, nuclear site licensees and the regulators)
- the National Nuclear Laboratory (NNL), which is a Government owned, contractor operated organisation (GOCO)
- research institutes (eg the British Geological Survey)
- nuclear site licensees
- consultants and contractors (to the NDA, nuclear site licensees and the regulators).

How Decisions are Made to Fund Research on the Long-Term Management of HAW

9. CoRWM has investigated how research funding decisions are made within the NDA and within the Research Councils. It has also investigated links between the various funding bodies, with a view to determining the nature and extent of co-ordination between them.

NDA and its Site Licence Companies

10. Within the NDA and its Site Licence Companies there are three different mechanisms for identifying research needs and deciding what research to fund. These mechanisms are for research on:

- treatment, conditioning, packaging and storage of HAW
- management of nuclear materials that may be declared to be waste (spent fuels, plutonium, uranium)
- geological disposal.

11. Most of the research on treatment, conditioning, packaging and storage of HAW is funded by the Site Licence Companies. They identify their needs in conjunction with the Life Time Plans for their sites. NDA funds some research directly, through its Direct Research Portfolio. All the research is discussed at an operational level by the Nuclear Waste Research Forum, which has members from NDA, all its Site Licence Companies, British Energy, the Ministry of Defence and the regulators. There can also be discussions at a more strategic level at the NDA's HAW Strategy Group, which has members from the same organisations as the Forum.

12. Research on the management of nuclear materials is funded directly by the NDA and by a few of the Site Licence Companies (principally Sellafield Ltd). It can be discussed at a strategic level at the NDA's UK Spent Fuels and Nuclear Materials Overview Group, which includes representatives from Government and the regulators, as well as NDA.

13. Research on geological disposal is funded by the NDA's Radioactive Waste Management Directorate (RWMD), which will become a wholly owned subsidiary of the NDA and eventually the Site Licence Company for the geological disposal facility (or facilities if there is more than one). RWMD published its R&D strategy for consultation in 2008 and issued the final version in 2009 (NDA, 2009). It is currently developing its R&D programme to implement the strategy and has told CoRWM that it will publish the programme for comment late in 2009. RWMD is establishing a small advisory panel to assist it in establishing and running its R&D programme.

14. The NDA Research Board on Nuclear Decommissioning and Waste Clean Up is an advisory body that aims to “promote a common understanding and collaboration between relevant bodies across the UK about respective R&D needs, risks and opportunities required to enable the delivery of the NDA mission”. It has members from Government, regulators and the Research Councils, and two independent members. The Nuclear Waste Research Forum (para 11) reports to the Board.

Research Councils

15. The Research Councils work together on energy projects through the Research Councils’ Energy Programme, for which EPSRC is the co-ordinating lead. At present EPSRC is the main funder of research related to long-term management of HAW, on which it spends about £2 million per year (out of a budget for nuclear energy related research of about £26 million per year and an overall budget of about £740 million per year). EPSRC is advised by, inter alia, the Letter of Arrangement Group. This has members from NDA, other nuclear industry organisations and the Health and Safety Executive. It is a forum for research funders to share priorities and identify areas for collaboration.

16. The only other Research Council that is currently funding research specific to the long-term management of HAW is the Natural Environment Research Council (NERC). Its main contribution is through the British Geological Survey (BGS), which is a NERC Research Centre. BGS obtains about half its income from NERC and the rest from public and private sector contracts. It is devoting about 13 man years of effort per year to radioactive waste disposal. This effort is mainly funded from outside NERC. (BGS non-NERC income from HAW work is about £0.6 million; NERC spend on this topic is about £0.25 million.)

CoRWM’s Views

17. CoRWM thinks there is insufficient strategic co-ordination of research relevant to the long-term management of HAW within the NDA, between the Research Councils and between the NDA, the Research Councils and other funding bodies. The NDA has various groups at which research is discussed but none has a remit to provide co-ordination at a strategic level or to set research priorities for the whole of the NDA and its Site Licence Companies. It is unclear how EPSRC co-ordinates with NERC. Only EPSRC has a clear mechanism for obtaining input from the nuclear industry and its regulators for its programmes and this mechanism does not seem to include all the relevant organisations. There is no means at present to set national priorities for research on the long-term management of HAW (UK-wide or within England, Wales or Scotland).

18. A further CoRWM concern is that most of the processes by which decisions on research related to the long-term management of HAW are made are not transparent. The discussions are mainly held behind closed doors, they involve only a narrow range of stakeholders and little is published on decisions or the deliberations that led to them. NDA’s RWMD intends to be a notable exception but its annual spend is less than 15% of the total UK spend (about £4 million out of about £30 million).

Balance of Funding for Targeted and Response-Mode Research

19. The long-term management of HAW is an area where the full spectrum of research is needed, from curiosity-driven research without any immediate application to targeted research directed towards a specific practical objective. Curiosity-driven research is particularly important for geological disposal because it is necessary to have confidence that a geological disposal facility will be safe over tens of thousands or millions of years. Research worldwide over the last few decades leads to the belief that geological disposal is

viable but there is more to do to make a robust safety case for geological disposal of UK HAW at a specific site.

20. All nuclear industry research is targeted and almost all the Research Councils' research funds for the long-term management of HAW are placed through managed calls. CoRWM is of the view that this situation is very unsatisfactory and that much more curiosity-driven research is needed, in addition to the targeted research.

21. It seems likely that the current situation is a direct consequence of the limited funds that have been available in the UK for radioactive waste management research since the late 1990s. (For example, the annual spend in 1989-90, in the prices at the time, was about £46.7 million, compared to about £30 million now.) There has been a tendency in the nuclear industry to keep research funding to the minimum to meet short-term needs and to regard curiosity-driven research as a luxury.

22. The closed nature of the decision making processes for research (para 18) has probably exacerbated the situation. In recent years there seems to have been little attempt in the UK to bring together the prospective researchers, who will provide the ideas, with the nuclear industry and its regulators, who will use the results. This is in contrast to several other countries, some of which invite researchers from the UK to contribute their ideas.

23. CoRWM recognises that it is difficult to rectify this situation in the current economic climate. Nevertheless, an attempt should be made. There should be open debate in the UK about research requirements for the long-term management of HAW and opportunities for public comment on proposed research programmes. This would help to make better use of limited funding now and to establish a more balanced approach as economic circumstances improve.

Research Skills

24. CoRWM has also examined the adequacy of UK skills for undertaking research into the long-term management of HAW. It did this against the background of the skills for nuclear R&D in general.

25. The number of people employed in nuclear R&D in the UK decreased from about 9,000 in 1980 to about 1,000 in 2004. Since then there has been a significant improvement, largely as a result of the efforts of the Cogent Sector Skills Council, the National Skills Academy Nuclear and the NDA. There is, however, some way to go for nuclear research skills in general and for skills for HAW management research in particular.

26. There are also concerns about the numbers of geoscience graduates who will be available to do research on geological disposal in the UK. Nationally and internationally, graduates in geophysics, hydrogeology and engineering geology are currently in short supply. There is strong competition from the mining, hydrocarbon, water and civil engineering industries for highly-qualified researchers.

27. CoRWM thinks that provision of research skills for the long-term management of HAW needs more national leadership and strategic direction. It believes that this situation could be best rectified by assigning to a single organisation the responsibility for providing this leadership and direction.

Infrastructure for Research

28. CoRWM has considered the UK situation with regard to two types of facility for research on the long-term management of HAW:

- active facilities, where experiments can be carried out with concentrations and quantities of radioactive materials relevant to HAW
- underground facilities, either close to or remote from prospective sites for a geological disposal facility.

29. Compared to other countries, the UK has a very limited number of research facilities where significant quantities of radioactive materials can be used. The key civil facilities are those operated by the NNL. CoRWM thinks that further development of these facilities is required for UK research on the long-term management of HAW and that it is essential to improve access to these facilities, particularly for university researchers. Now that NNL is a commercially-driven GOCO, it is unclear to CoRWM how the funding for better facilities and access can be provided.

30. The NDA currently envisages that underground investigations at a potential geological disposal site will be carried out as part of the construction of the disposal facility. CoRWM thinks that this approach will not provide enough information for developing the design of the geological disposal facility and making a robust safety case. More underground research will be needed than can be carried out as part of facility construction.

31. CoRWM does not believe that underground research carried out in other countries, for their HAW and their geological conditions, will be sufficient to enable the UK to design and make the safety case for a geological disposal facility here. CoRWM is of the view that an underground research facility will be needed at the site of any proposed geological disposal facility in the UK. This research facility would operate before the disposal facility is constructed, while waste is emplaced and during any period when the disposal facility remains open after the end of waste emplacement.

Submitted by:
Robert Pickard, Chair of CoRWM

Prepared by:
Bill Lee Deputy Chair of CoRWM²
Marion Hill }
Fergus Gibb }
Simon Harley } Members of CoRWM³
Francis Livens }
Rebecca Lunn }
Andrew Sloan }
Mark Dutton }

² Lead author of CoRWM report on R&D (CoRWM, 2009c).

³ Contributors to CoRWM report on R&D (CoRWM, 2009c).

References

CoRWM, 2006. *CoRWM's Recommendations to Government*. CoRWM document 700.

CoRWM, 2009a. *Interim Storage of Higher Activity Wastes and the Management of Spent Fuels, Plutonium and Uranium*. Report to Government. CoRWM document 2500.

CoRWM, 2009b. *Geological Disposal of Higher Activity Radioactive Wastes*. Report to Government. CoRWM document 2550.

CoRWM, 2009c. *Report on National Research and Development for Interim Storage and Geological Disposal of Higher Activity Radioactive Wastes and Management of Nuclear Materials*. CoRWM document 2543. Consultation Draft, July 2009.

Defra et al, 2007. *A Framework for Implementing Geological Disposal*. A public consultation by Defra, DTI and the Welsh and Northern Irish devolved administrations.

Defra et al, 2008. *A Framework for Implementing Geological Disposal*. A White Paper by Defra, BERR and the devolved administrations for Wales and Northern Ireland. Cm 7386.

NDA, 2009. *The NDA's Research and Development Strategy to Underpin Geological Disposal of the UK's Higher Activity Radioactive Wastes*.

UK Government et al, 2006. *Response to the Report and Recommendations from the Committee on Radioactive Waste Management by the UK Government and the Devolved Administrations*.