

**CoRWM COMMENTS ON THE REPORT OF THE HOUSE OF LORDS
SELECT COMMITTEE ON SCIENCE AND TECHNOLOGY ON
NUCLEAR RESEARCH AND DEVELOPMENT CAPABILITIES
AND THE GOVERNMENT RESPONSE**

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Executive Summary

1. This paper contains CoRWM's comments on the report of the House of Lords Select Committee on Science and Technology (HoLSTC) on nuclear research and development (R&D) capabilities (published in November 2011) and the Government response to that report (published in February 2012). The main purpose of the paper is to provide input to the further work by Government and the Government Chief Scientific Advisor outlined in the Government response.
2. The comments in the paper relate only to those aspects of the HoLSTC report and the Government response that are relevant to CoRWM's remit, that is to R&D related to the long-term management of higher activity wastes, spent fuels and nuclear materials from existing and new nuclear facilities. The comments are about:
 - the Advisory Board for nuclear R&D that is to be created by Government, chaired by the Government Chief Scientific Advisor
 - the nuclear R&D roadmap, the development of which is to be led by Government, using the results of a review of existing R&D programmes, facilities and resourcing
 - facilities for research with highly radioactive materials
 - coordination of R&D for the long-term management of higher activity wastes, spent fuels and nuclear materials
 - skills.

Introduction

3. This paper contains CoRWM's comments on:
 - the November 2011 report of the House of Lords Select Committee on Science and Technology (HoLSTC) on nuclear research and development (R&D) capabilities (HoLSTC, 2011)
 - the February 2012 Government response to the HoLSTC report (HoLSTC, 2012).
4. The paper is intended to provide input to further work by Government and the Government's Chief Scientific Advisor on capabilities for and coordination of UK nuclear R&D.
5. A draft of the paper was provided to the Department of Energy and Climate Change (DECC). That draft contained a preliminary indication of the views likely to be expressed by some members of CoRWM on the HoLSTC report and was produced so that those views could, if DECC considered it appropriate, be taken into account in drafting the Government response. However, CoRWM played no role in drafting the response.
6. The comments in the paper relate only to those aspects of the HoLSTC report and the Government response that are relevant to CoRWM's remit, which is to provide independent scrutiny and advice to UK Government and devolved administration Ministers on the long-term management, including storage and disposal, of higher activity radioactive wastes (HAW). The remit covers existing and committed waste

(sometimes called “legacy waste”) and waste from new nuclear power stations (“new build waste”). It includes waste-related aspects of the management of spent fuels and nuclear materials.

7. Much of the HoLSTC report is about R&D to keep the UK’s nuclear energy options open over the next few decades. In this connection, it should be noted that CoRWM is entirely neutral on the questions of whether new nuclear power stations should be built and whether new reactor types or advanced nuclear fuel cycles should be developed. CoRWM scrutinises how HAW issues are considered in making decisions on such questions and provides advice as appropriate, particularly on the formulation of plans to ensure that, if created, new wastes will be safely and securely managed (CoRWM docs. 2749, 2867).
8. For brevity, related HoLSTC recommendations are grouped together in the following sections. Each section begins with a summary of the HoLSTC recommendations and the Government responses; it then gives CoRWM’s comments on both the recommendations and the responses.
9. Further details of CoRWM’s comments on the recommendations and suggestions in the HoLSTC report are in Annex A. The comments take into account discussions that CoRWM has held with various organisations since it submitted its evidence to the HoLSTC inquiry (CoRWM docs. 2927, 2947). Many of the results of these discussions are summarised in a CoRWM paper for the DECC Chief Scientific Advisor, David MacKay (CoRWM doc. 2973).

A Nuclear R&D Board

10. HoLSTC recommends that a “*Nuclear R&D Board*” be created, with advisory and executive functions, to assist the Government in the development and implementation of a long-term strategy for nuclear energy and a nuclear R&D roadmap (Recommendation 3 in HoLSTC, 2011). It also recommends that the Nuclear R&D Board should have the responsibility for “*coordinating overlapping nuclear R&D capability requirements across Government*” (Recommendation 14 in HoLSTC, 2011).
11. The Government response (paras 18, 24-26 in HoLSTC, 2012) states that it will set up an “Advisory Board” under the auspices of the Government Chief Scientific Advisor, Sir John Beddington. The Advisory Board will assist Government in the development of a long-term strategy for nuclear energy and a UK nuclear R&D roadmap to 2050 and beyond. The Advisory Board will also be asked to suggest approaches to a number of recommendations and suggestions made in the HoLSTC report, including those about improved strategic coordination of nuclear R&D in the UK. The Government will keep the role of the Advisory Board under review and will decide in due course whether a different body is required to advise on the “delivery and running” of the nuclear R&D programme.
12. CoRWM welcomes the establishment of the Advisory Board. However, it notes that the Advisory Board is neither the executive Nuclear R&D Board recommended by HoLSTC (Recommendations 3 and 14 in HoLSTC, 2011), nor the high level R&D coordinating body envisaged by CoRWM in its evidence to HoLSTC (CoRWM doc. 2927). From CoRWM’s point of view, the main difference is that the Advisory Board will not be set up on a permanent basis to carry out strategic coordination of nuclear R&D but will consider how existing strategic coordination can be improved.
13. As indicated in Annex A, CoRWM believes there will be an on-going need for a body to be responsible for high-level coordination of nuclear-related R&D and for second level bodies to be responsible for more detailed coordination (paras 31-36 and Figure A1 in

Annex A). CoRWM considers that one of these second level bodies should be the Nuclear Decommissioning Authority's (NDA's) Research Board, which should coordinate all decommissioning and clean up R&D, including all R&D on the management, including the disposal, of legacy and new build radioactive wastes. The NDA Research Board should report to Government through the top level body.

14. CoRWM notes that the creation of the nuclear R&D Advisory Board may have implications for the membership of the NDA Research Board. Attendees at the latter currently include the Government Chief Scientific Advisor, the DECC Chief Scientific Advisor and the Ministry of Defence (MOD) Chief Scientific Advisor. Some or all of these may wish to confine their activities to the Advisory Board. If this is the case, CoRWM suggests that they be replaced by suitably senior representatives of the Government Office for Science, DECC and MOD, respectively.

A Nuclear R&D Roadmap

15. HoLSTC recommends that a "*nuclear R&D roadmap*" be developed and implemented (Recommendations 2, 4 and 5 in HoLSTC, 2011). It appears from the main text of its report that HoLSTC intends the nuclear R&D roadmap to focus on the capabilities and expertise to keep a range of nuclear energy options open up to 2050 and beyond (Recommendation 2), and to give considerable emphasis to research on new technologies, including international collaborations for such research (Recommendation 5). Only in the Summary of the HoLSTC report is it stated explicitly that the roadmap should cover capabilities for R&D on topics such as geological disposal and plutonium disposition.
16. The Government response (paras 17, 20-22 in HoLSTC, 2012) states that Government will lead the development of a UK nuclear R&D roadmap to 2050 and beyond. The basis for the roadmap will be provided by a review, led by the Government Chief Scientific Advisor, in collaboration with the Chief Scientific Advisors of DECC and the Department for Business, Innovation and Science (BIS)¹. The review will cover existing nuclear-related R&D facilities and programmes, existing and potential resources for these programmes, and international engagement and opportunities. It is stated that the review will provide a "comprehensive picture of the current nuclear R&D landscape".
17. CoRWM notes that a number of its documents are relevant to the review of nuclear R&D. These include CoRWM's 2009 report to Government on R&D (CoRWM doc. 2543), its evidence to HoLSTC (CoRWM docs. 2927 and 2947) and its paper for the DECC Chief Scientific Advisor (CoRWM doc. 2973). Also relevant are the comments made in paras 44-59 of Annex A.
18. While the R&D review is to be comprehensive, the Government's intentions for the scope of the roadmap as far as R&D related to radioactive waste management is concerned are not entirely clear. CoRWM takes the view that these parts of the roadmap should deal mainly with R&D related to management of wastes from new types of reactors and advanced nuclear fuel cycles (para 38 in Annex A). It believes that current arrangements are adequate for planning and implementing R&D for managing wastes from existing nuclear facilities and facilities of similar types (e.g. the new pressurised water reactors currently planned for the UK).

¹ Presumably the review will be form part of the work of the Advisory Board, but this is not stated explicitly in the Government response.

Facilities for Research with Highly Radioactive Materials

19. HoLSTC recommends that a business case be developed to commission Phase 3 of the Central Laboratory operated by the National Nuclear Laboratory (NNL) (Recommendation 6 in HoLSTC, 2011). It also recommends that Government extends the remit of NNL to enable it to carry out a programme of applied long-term R&D of national strategic need (Recommendation 13 in HoLSTC, 2011).
20. The Government response (paras 35, 36, 59 in HoLSTC, 2012) states that NNL is already working with potential users of Phase 3 to ascertain whether a business case to commission it can be developed. The response goes on to state that, subject to the outcome of this NNL work, Government will “consider further the business case, technical challenges and options” for commissioning Phase 3. With respect to NNL’s remit, the response indicates that Government’s consideration of how to ensure that the UK’s nuclear R&D capability is maintained will include considering the role of NNL.
21. CoRWM notes that the Government response does not address the strategic need to expand NNL’s facilities for research with highly radioactive materials, nor the desirability of enabling NNL to compete effectively with national laboratories in other countries (paras 40-42 in Annex A). CoRWM believes that it is essential to take both these factors into account in decisions on the future of NNL and its facilities, and expects the Advisory Board to do so in making its recommendations to Government.

Coordination of R&D for the Long-Term Management of HAW, Spent Fuels and Nuclear Materials

22. HoLSTC recommends that “*NDA, the Natural Environment Research Council (NERC) and other relevant funders ensure that sufficient R&D capabilities and expertise are maintained over the longer term to manage legacy and existing systems waste*” (Recommendation 7 in HoLSTC, 2011). It then goes on to make a number of more specific suggestions (paras 190 and 278 in HoLSTC, 2011). There is a separate recommendation on new build waste, which is about clarifying NDA’s responsibilities (Recommendation 12 in HoLSTC, 2011).
23. The Government response (paras 37-41, 55-58 in HoLSTC, 2012) mentions NERC’s plans for its Radioactivity and the Environment research programme, UK participation in the European Implementing Geological Disposal Technology Platform and the importance of the UK contributing to international work on nuclear data. It goes on to say that Government will continue to work with NDA, CoRWM, the Research Councils and others to ensure that R&D capabilities to manage legacy and existing systems waste are included in the development of its nuclear energy strategy and supporting workstreams. Government states that, to avoid any doubt, it will provide further clarification about responsibility for R&D capabilities for new build wastes.
24. CoRWM agrees with HoLSTC that it is necessary to have arrangements in place to maintain R&D capabilities and expertise in the longer term. It considers that such arrangements should cover legacy and new build wastes, spent fuels and nuclear materials, and that the arrangements it favours for coordination of R&D (para 44 and Figure A1 in Annex A) would also be suitable for maintaining capabilities and expertise.
25. CoRWM strongly supports the HoLSTC suggestion that Research Councils, working with NDA, should ensure that sufficient fundamental research is carried out on the long-term management of HAW, spent fuels and nuclear materials, particularly on geological disposal. CoRWM considers that NERC’s current plans do not adequately address the need for fundamental, independent research related to geological disposal, nor the need to expand UK skills to implement this disposal method.

Skills

26. HoLSTC recommends that “*Cogent should conduct a comprehensive assessment of the current provision of undergraduate, Masters and PhD courses relevant to the nuclear sector to determine whether they are sufficient to meet the future needs of the research community, the regulator and industry for both the current plans for new build and an extended programme up to 2050*” (Recommendation 9 in HoLSTC, 2011).
27. The Government response (paras 46-50 in HoLSTC, 2012) summarises the recent work of the National Skills Academy for Nuclear (NSAN), the Cogent Sector Skills Council and others. It notes that the Nuclear Energy Skills Alliance (NESA), which is chaired by NSAN, is overseeing a review of nuclear skills requirements and will report to BIS and DECC Ministers. NSAN, Cogent and NNL are also looking at skills for nuclear R&D and at how R&D can help to ensure that people with appropriate skills are available.
28. CoRWM has been in contact with Cogent and NSAN about skills for the long-term management of HAW, spent fuels and nuclear materials. Much of the Cogent and NSAN work to date has been about short-term skills needs for the operation and decommissioning of existing facilities and for new build. However, CoRWM understands that longer term skills needs are now being considered, including the underground engineering and geoscience skills required for the implementation of geological disposal. CoRWM will continue to monitor developments.

References

CoRWM Documents²

CoRWM doc. 2543. *National Research and Development for Interim Storage and Geological Disposal of Higher Activity Radioactive Wastes and Nuclear Materials*. Report to Government. October 2009.

CoRWM doc. 2749. *CoRWM Statement of its Position on New Build Wastes*. March 2010.

CoRWM doc. 2867. *Possible Changes to CoRWM Statement of its Position on New Build Wastes*. November 2010.

CoRWM doc. 2927. *CoRWM Submission to the House of Lords Select on Science and Technology Inquiry into Nuclear R&D Capabilities*. April 2011.

CoRWM doc. 2942. *CoRWM Meeting with Cogent and NSAN, 26 May 2011*.

CoRWM doc. 2947. *Letter to Lord Krebs from Deputy Chair of CoRWM*. 29 June 2011.

CoRWM doc. 2973. *Strategic Coordination of UK R&D for the Long-Term Management of Higher Activity Wastes*. CoRWM Paper for DECC Chief Scientific Advisor. December 2011.

Other Documents

DECC, 2011a. *Management of the UK's Plutonium Stocks. A consultation response on the long-term management of UK-owned separated civil plutonium*. December 2011.

DECC, 2011b. *Waste Transfer Pricing Methodology for the disposal of higher activity wastes from new nuclear power stations*. December 2011.

HoLSTC, 2012. *Government Response to the House of Lords Science and Technology Committee Report: "Nuclear Research and Development Capabilities"*. February 2012.

HoLSTC, 2011. *Nuclear Research and Development Capabilities*. House of Lords Select Committee on Science and Technology, 3rd Report of Session 2010-12, HL Paper 221. November 2011.

HSE, EA, SEPA, 2010. *Joint Guidance on the Management of Higher Activity Radioactive Wastes on Nuclear Licensed Sites* by the Health and Safety Executive, the Environment Agency and the Scottish Environment Protection Agency.

NDA, 2011. *Nuclear Decommissioning Authority Draft Business Plan 2012-2015*. December 2011.

² All available on the CoRWM website, www.corwm.decc.gov.uk.

ANNEX A

CoRWM's COMMENTS ON THE HoLSTC REPORT

29. Table A1 lists the recommendations in the HoLSTC report and indicates the paragraphs in this annex where CoRWM comments on them are given. The annex begins with comments on the HoLSTC recommendation that a Nuclear R&D Board be established. It goes on to comment on the recommendations on a nuclear R&D roadmap, on the R&D related to the long-term management of legacy and new build wastes, and on R&D skills.

A Nuclear R&D Board

30. The HoLSTC recommendation is that a "*Nuclear R&D Board*" be created, with advisory and executive functions, to assist the Government in the development and implementation of a long-term strategy for nuclear energy and a nuclear R&D roadmap (Recommendation 3 in HoLSTC, 2011). HoLSTC also recommends that the Nuclear R&D Board should have the responsibility for "*coordinating overlapping nuclear R&D capability requirements across Government*" (Recommendation 14 in HoLSTC, 2011).
31. CoRWM welcomes the recommendation for a body with an overall coordinating role³ for nuclear R&D. In its evidence to HoLSTC (CoRWM doc. 2927) expressed the view that such a body is needed. There are, however, differences between the Nuclear R&D Board recommended by HoLSTC and the top level R&D coordinating body envisaged by CoRWM.
32. The body CoRWM had in mind would focus on high-level coordination of nuclear-related R&D. Its role would include that outlined in HoLSTC Recommendation 14, particularly in respect of facilities for research with highly radioactive materials (para 40). Such facilities are needed for research on various nuclear topics, including those within CoRWM's remit (para 6).
33. CoRWM envisaged that second level bodies would be responsible for more detailed coordination of R&D. It considered that one of these should be the NDA Research Board, which should coordinate all decommissioning and clean up R&D, including all R&D on management of legacy and new build radioactive wastes. The NDA Research Board should report to Government through the top level body.
34. CoRWM notes that the NDA Research Board was reconstituted in 2011 and that its terms of reference would allow it to perform this role, although some additional members would be required (para 44 and CoRWM doc. 2973). Although it has only met twice, the NDA Research Board appears to be working in a satisfactory way and CoRWM considers that it should be allowed to develop further.
35. There could be other second level bodies for other areas of nuclear R&D, for example for safety, security and non-proliferation, and for Generation IV reactors⁴ and advanced nuclear fuel cycles. Figure A1 illustrates the arrangements that CoRWM had in mind.

³ In this context, CoRWM uses "coordination" to mean ensuring that the organisations that fund and commission R&D share their views on R&D requirements and cooperate to avoid gaps and overlaps. Each organisation remains responsible for its own R&D programme but there is joint funding of R&D where appropriate.

⁴ The various generations of reactors are defined in Box 1 in the HoLSTC report (HoLSTC, 2011). In brief, Magnox reactors are Generation I, Advanced Gas Cooled Reactors (AGRs) and the Sizewell B pressurised water reactor (PWR) are Generation II, the PWRs that it is proposed to build in the UK over the next 10-20 years are Generation III, and reactors being developed now (including fast reactors) are Generation IV.

36. CoRWM did not envisage that the top level body in Figure A1 would be a statutory Non-Departmental Public Body, with executive functions, nor that it would fund R&D (para 272 in HoLSTC, 2011). Various organisations have a legal responsibility to ensure that R&D is carried out (e.g. NDA under the Energy Act 2004, nuclear site licensees under the conditions in their nuclear site licences) and establishing a body with executive functions might lead to difficulties for them.

A Nuclear R&D Roadmap

37. HoLSTC recommends that a “*nuclear R&D roadmap*” be developed and implemented (Recommendations 2, 4 and 5 in HoLSTC, 2011). The nuclear R&D roadmap is to focus on the capabilities and expertise to keep a range of nuclear energy options open up to 2050 and beyond (Recommendation 2), and to give considerable emphasis to research on new technologies, including international collaborations for such research (Recommendation 5). It is also stated explicitly that the roadmap should cover capabilities for R&D on topics such as geological disposal and plutonium disposition.
38. CoRWM does not believe that it is necessary or desirable for the roadmap to cover all R&D related to managing wastes from existing nuclear facilities and from Generation III reactors, as well as R&D on wastes from Generation IV reactors and from advanced nuclear fuel cycles. CoRWM considers that current arrangements (para 44 in this paper) are adequate for planning and implementing R&D on managing wastes from existing facilities and Generation III reactors. It would therefore be preferable for the waste management parts of the roadmap to focus on R&D for wastes from Generation IV reactors and advanced nuclear fuel cycles.
39. There is an implication in the HoLSTC report that R&D for Generation IV reactors and advanced nuclear fuel cycles might be funded by reallocating money from NDA’s budget for decommissioning and clean up (Recommendation 4 in HoLSTC, 2011). The figure of 1% of NDA’s budget is given as an example. CoRWM considers that there should be stakeholder and public consultation on any proposed reallocation of funding. It notes that 1% of NDA’s current annual budget (*i.e.* about £30 million) is considerably more than NDA is spending on all its geological disposal work (about £20 million per year, of which about £4 million is for R&D) (NDA, 2011).

Facilities for Research with Highly Radioactive Materials

40. CoRWM considers that there is a strategic need to improve and expand NNL’s facilities for research with highly radioactive materials (CoRWM doc. 2973). This is because, with better facilities the UK could undertake a wider range of research and NNL could make a greater contribution to maintaining the UK skills base for HAW management. In addition, the NNL’s facilities would be more attractive to the international research community, enabling the UK to play a more substantial role in international research programmes and gain more from expertise in other countries.
41. CoRWM therefore welcomes the HoLSTC recommendation that a business case be developed to commission Phase 3 of the Central Laboratory operated by NNL (Recommendation 6 in HoLSTC, 2011). However, CoRWM notes that developing a business case is only the first step: it is then necessary to gain Government acceptance of the case, put the funding in place and carry out the commissioning. Furthermore, Phase 3 alone would not make NNL competitive with national laboratories in other countries, which would still have greater capabilities that are less expensive to access.
42. CoRWM also welcomes the HoLSTC recommendation that the Government extends the remit of NNL to enable it to carry out a programme of applied long-term R&D of national

strategic need (Recommendation 13 in HoLSTC, 2011), and the recommendation that the length of NNL's contract be extended (paras 253 and 286 in HoLSTC, 2011). However, CoRWM questions whether changes of remit and contract length will be sufficient. For NNL to be able to compete effectively with national laboratories in other countries, a more fundamental change to NNL's business model would be required. In particular, NNL would need to be less dependent on contracts from NDA and its Site Licence Companies (SLCs) and Government (through NDA) would need to fund decommissioning and clean up of NNL's facilities.

Coordination of R&D for the Long-Term Management of HAW

43. One of HoLSTC's recommendations is that "*NDA, the Natural Environment Research Council (NERC) and other relevant funders ensure that sufficient R&D capabilities and expertise are maintained over the longer term to manage legacy and existing systems waste*" (Recommendation 7 in HoLSTC, 2011). HoLSTC also makes a number of more specific suggestions (paras 190 and 278 in HoLSTC, 2011). In addition there is a recommendation about clarifying NDA's responsibilities for R&D capabilities and expertise related to new build waste (Recommendation 12 in HoLSTC, 2011).

44. CoRWM's comments on these HoLSTC recommendations and suggestions are made against the background of its views on coordination of R&D on the long-term management of HAW (CoRWM doc. 2973). In summary these are:

- the NDA Research Board should be responsible for promoting coordination of all UK R&D on the management, including the disposal, of legacy and new build wastes, spent fuels and nuclear materials
- to enable it to fulfil this role, the membership of the NDA Research Board should be expanded to include Urenco and all prospective new build operators
- the NDA Research Board should report regularly and formally to Government
- the Nuclear Waste Research Forum (NWRF) should continue its coordination of R&D on the treatment, packaging, storage and transport of HAW, reporting to the NDA Research Board (Figure A1)
- a group analogous to NWRF should be set up to cover R&D on legacy and new build spent fuels and nuclear materials, reporting to the NDA Research Board (Figure A1)
- the UK R&D programme on geological disposal should have three components:
 - the "needs-driven" R&D programme, funded by NDA's Radioactive Waste Management Directorate (RWMD)⁵
 - the regulators' R&D programme, funded by them through a levy on RWMD and waste producers
 - an independent, wider-ranging and more fundamental research programme, funded through the Research Councils (NERC, the Engineering and Physical Sciences Research Council (EPSRC) and others).
- a new group should be set up to promote coordination amongst the organisations funding the expanded geological disposal R&D programme, reporting to Government and, through its Chair, to the NDA Research Board (Figure A1).

Maintenance of R&D Capabilities and Expertise in the Longer Term

45. CoRWM agrees with HoLSTC that it is necessary to put arrangements in place to maintain R&D capabilities and expertise in the longer term (Recommendation 7 in

⁵ CoRWM recognises that RWMD's needs-driven R&D programme will become larger and more site specific as the implementation of geological disposal proceeds.

HoLSTC, 2011). It considers that such arrangements should cover legacy and new build wastes, spent fuels and nuclear materials.

46. CoRWM believes that separate, but related, arrangements are needed for R&D on treatment, packaging, storage and transport of wastes, R&D on management of spent fuels and nuclear materials, and R&D on geological disposal. CoRWM considers that the arrangements it favours for coordination of R&D (para 44, Figure A1, CoRWM doc. 2973) would be suitable for maintaining capabilities and expertise.

NDA Research on Geological Disposal and Plutonium Disposition

47. HoLSTC suggests that NDA “develops a long-term research programme outlining how it will ensure that there are adequate R&D capabilities and associated expertise to meet its future needs for geological disposal and disposition of the UK’s plutonium stockpile” (para 278 in HoLSTC, 2011). CoRWM notes that geological disposal and plutonium disposition are only two of the topics that will need to be covered in R&D funded by NDA and its SLCs. This is recognised in the SLCs’ Technical Baseline and underpinning R&D documents (TBuRDs) and in NDA’s R&D strategy and plans.
48. It is CoRWM’s understanding that NDA’s RWMD will be developing a revised and extended geological disposal R&D strategy and R&D programme over the next year or two, in consultation with a wide range of stakeholders. CoRWM expects this to meet HoLSTC’s suggestion for a long-term NDA research programme on geological disposal.
49. The recent Government statement of its policy on the long-term management of plutonium (DECC, 2011a) indicates that its preference is that as much of the UK’s civil separated plutonium as possible be re-used, by converting it to mixed oxide (MOX) fuel and using it in civil nuclear reactors. Any plutonium that cannot be re-used is to be immobilised and treated as waste for disposal. One of the reasons that Government has expressed a policy at this time is to allow R&D to be focused. CoRWM therefore expects NDA to adjust its R&D programme on plutonium disposition accordingly. It notes that R&D is needed on the long-term behaviour of spent MOX fuel and of immobilised plutonium in a closed geological disposal facility (GDF).

Research Councils

50. HoLSTC suggests that “the Research Councils, particularly NERC, work with NDA to ensure that sufficient fundamental research on radioactive waste management and disposal is commissioned to maintain R&D capabilities in this field and to ensure that research efforts are effectively coordinated across the Research Councils” (para 278 in HoLSTC, 2011). CoRWM strongly supports this suggestion.
51. CoRWM notes that, for geological disposal, some of the research required will fall within, or be closely related to, RWMD’s “needs-driven” R&D programme and will thus be suitable for full or partial funding by RWMD. However, there is also a need for independent research on geological disposal (CoRWM doc. 2973), to mitigate the risk that the programme will fail because of lack of public confidence. Such research is also needed for development of skills outside RWMD and its supply chain (e.g. to provide regulators with enough expertise).
52. EPSRC is already working with NDA and its SLCs in a number of ways, including jointly funding some geological disposal related research with RWMD. NERC has only recently engaged with RWMD on the possibility of jointly funding research and CoRWM understands that NERC intends there to be a few geological disposal related research projects within its small “Radioactivity and the Environment” (RATE) programme. The British Geological Survey, which is partly funded by NERC and partly by contracts, has

been involved for some time in geological disposal R&D but at present has a limited programme of work in this area.

53. CoRWM considers that NERC's current plans do not adequately address the need for fundamental, independent research related to geological disposal, or the need to expand UK skills to implement geological disposal. Much of the geosphere-related research and many of the skills required are similar to those for other aspects of energy provision (e.g. carbon capture and storage). CoRWM believes that these needs would be best addressed in NERC's climate change research programme, leaving RATE to focus on research and skills related to the aspects of geological disposal for which it is essential to take into account the radioactive nature of the wastes. It is also desirable to reconsider the resources devoted to geological disposal within BGS's work programme.
54. CoRWM is aware that NDA is in contact with the Biotechnology and Biological Sciences Research Council, the Economic and Social Research Council, and the Science and Technology Facilities Research Council. It understands that NDA engagement with these Research Councils is at an early stage and has focused on NDA explaining its remit and interests.

Review of UK R&D Capabilities

55. HoLSTC suggests that Research Councils UK (RCUK, the coordinating body for all the Research Councils) "*commissions an independent review of the UK's R&D capabilities and associated expertise in radioactive waste management and disposal*" (para 278 in HoLSTC, 2011). CoRWM does not think that such an independent review is necessary at present. The NDA's Research Board has similar work in hand, as part of its wider remit for R&D on nuclear decommissioning and clean up. The organisations represented on the NDA Research Board and on the groups that report to it (e.g. the NWRP) are better placed to assess R&D capabilities and expertise, and to identify gaps that need filling, than RCUK.

New Build Wastes

56. HoLSTC recommends that "*Government should clarify the NDA's responsibilities for dealing with new build waste and for commissioning and coordinating research and maintaining R&D capabilities and associated expertise in respect of new build waste*" (Recommendation 12 in HoLSTC, 2011). CoRWM does not understand why HoLSTC believes that such clarification is required.
57. NDA's responsibilities for new build wastes parallel those for other wastes owned by organisations outside the NDA estate (e.g. AGR wastes owned by EDF, uranic wastes owned by Urenco, Ministry of Defence wastes). In the case of HAW, waste owners are required to demonstrate to regulators that wastes will be storable and disposable (HSE, EA and SEPA, 2010). As part of this demonstration, the waste owners apply to RWMD for a "Letter of Compliance" (LoC), for which they pay. The waste owners also pay for any R&D needed to support their applications for LoCs. Eventually, they will pay RWMD to have their wastes placed in a GDF. RWMD commissions and funds any additional R&D required for geological disposal over and above that for LoCs. The price it will charge for disposal takes into account its R&D costs.
58. Prospective new build operators have paid RWMD for disposability assessments, which are a preliminary to LoC applications. In due course they will pay for LoCs, including R&D to support them, and, through Government, will pay for geological disposal of their wastes, at a price that takes into account RWMD's R&D costs (DECC, 2011b).

59. In CoRWM's view the more pressing need is for R&D on the management of new build HAW and spent fuels to be coordinated with that on legacy HAW, spent fuels and nuclear materials. That is why CoRWM has suggested that all prospective new build operators be represented on the NDA Research Board and that these operators join NWRf and the new group to coordinate R&D on spent fuels and nuclear materials (para 44 and Figure A1).

Skills

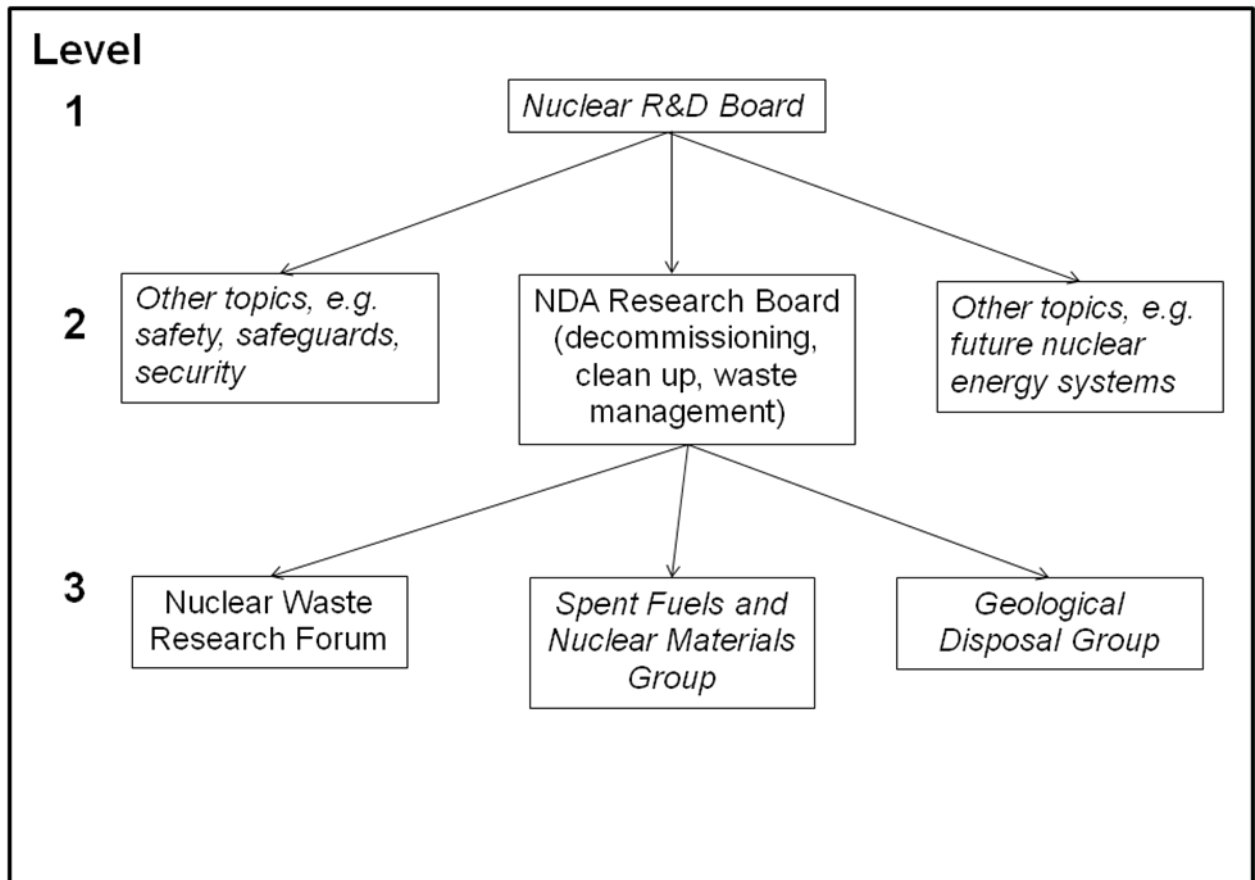
60. HoLSTC recommends that *"Cogent should conduct a comprehensive assessment of the current provision of undergraduate, Masters and PhD courses relevant to the nuclear sector to determine whether they are sufficient to meet the future needs of the research community, the regulator and industry for both the current plans for new build and an extended programme up to 2050"* (Recommendation 9 in HoLSTC, 2011). CoRWM questions whether such an assessment is needed.

61. Cogent, in cooperation with NSAN, has already assessed skills provision for current decommissioning and clean up and for current new build plans. These organisations have also recognised that an assessment is needed for the long-term management of radioactive wastes, including skills for geological disposal, and are in contact with RWMD (CoRWM doc. 2942).

Table A1 Locations in this Paper of CoRWM's Comments on HoLSTC Recommendations

<i>HoLSTC Recommendation</i>		<i>CoRWM's comments</i>
<i>No.</i>	<i>Topic</i>	
1	Long-term strategy for nuclear energy	no comments
2	Nuclear R&D roadmap	paras 37-39
3	Nuclear R&D Board	paras 30-36
4	Funding for implementation of nuclear R&D roadmap	para 39
5	Contents of nuclear R&D roadmap	paras 37-38
6	Research facilities	paras 40-42
7	Legacy and existing systems waste	paras 43-55
8	Nuclear safety research	no comments
9	Skills	paras 60-61
10	Role of DECC	no comments
11	R&D on advanced fuel recycling and reprocessing	no comments
12	Role of NDA for new build waste	paras 56-59
13	Role of NNL	para 42
14	Need for an integrated policy approach	paras 31-32

Figure A1 Arrangements Envisaged by CoRWM for Coordination of Nuclear R&D



Notes for Figure 1

- i) Names of new bodies are in *italics*.
- ii) NDA Research Board and all bodies at level 3 would deal with legacy and new build wastes, spent fuels and nuclear materials.