

## NDA Research Board

23<sup>rd</sup> April 2014 10:00 – 16:00

John Tudor Room, Central Hall Westminster, Storey's Gate, Westminster,  
London SW1H 9NH

### MINUTES – Issue 1

#### Attendees

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| 1) Chair of NDA Research Board, Independent  | 2) Director Strategy & Technology, NDA  |
| 3) Head of R&D, NDA  | 4) Head of Research, Radioactive Waste Management Ltd (RWM)                                       |
| 5) Chair of RWM Technical Advisory Panel, Independent  | 6) Head of Research and Business Management Systems, Office for Nuclear Regulation (ONR)          |
| 7) Radioactive Substances Regulation Manager, Environment Agency (EA)                        | 8) Radioactive Substances Principal Policy Officer, Scottish Environment Protection Agency (SEPA) |
| 9) R&D Manager, Nuclear Generation, EDF Energy   | 10) Chief Technologist, Atomic Weapons Establishment (AWE)  |
| 11) Head of Technology – Civil Nuclear, Rolls-Royce plc                                      | 12) Director Assistant, Nuclear Energy Directorate – Clean up Division, CEA                       |
| 13) Chief Scientific Advisor, Department of Energy and Climate Change (DECC)                 | 14) Chief Scientific Advisor, Department for Business, Innovation & Skills (BIS)                  |
| 15) Chief Scientific Adviser for Scotland  | 16) Co-Chair, Nuclear Waste Research Forum (NWRF), Sellafield Ltd                                 |
| 17) Principal Investigator (PI) - Nuclear Champion, Research Council Energy Programme (RCEP) | 18) Head of Nuclear Fuel Cycle, NDA – Invited   |
| 19) Director Science & Technology, Radioactive Waste Management Ltd (RWM) (Part) – Invited   | 20) Member of Committee on Radioactive Waste Management (CoRWM) – Observer                        |
| 21) Director, Nuclear Innovation and Research Office (NIRO) – Observer                       | 22) Technical Assurance Manager, NDA – Secretary  |

#### Main Purposes of the Meeting

- To confirm members' view of the RWM R&D programme
- To understand the UK's Spent Fuels R&D programme and, as appropriate, make recommendations or endorse the approach.

#### [1] Members Only Discussion

- 1.1 Chair provided an update to members on his recent meeting with the Chair of CoRWM and Director Strategy & Technology, NDA.

**Action 07/01:** Review Terms of Reference of NDA Research Board (NDARB) to highlight independence of NDARB from NDA control – Chair by Meeting 8

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Members also discussed the progress of the Nuclear Innovation and Research Advisory Board (NIRAB) and any implications for the NDA Research Board. Members agreed to continue to monitor the progress of NIRAB (Full discussion covered under Item 6).

### [2] Welcome & Apologies

2.1 Chair welcomed everyone to the 7<sup>th</sup> meeting of the NDARB.

2.2 A number of apologies had been received prior to this meeting:

- Head of Nuclear Energy, Transport, Decommissioning & Waste Management, Directorate for Energy, European Commission
- Head of Radioactive Substances Regulation, EA – Radioactive Substances Regulation Manager attending as nominated representative
- Chief Technical Officer – Existing Nuclear, EDF Energy – R&D Manager attending as nominated representative
- Government Chief Scientific Advisor
- Chief Scientific Advisor, MOD
- Chair of CoRWM – Member of CoRWM attending as nominated representative

1.3 Members of the Board introduced themselves.

1.4 The Chair invited any relevant declarations of interest. None were reported.

### [3] Agenda

3.1 The agenda was agreed.

3.2 No Any Other Business (AOB) items were identified.

3.3 A provisional timeframe and location for the next NDA Research Board meeting was agreed: 15<sup>th</sup> October 2014 in Central London. The location to be proposed by NDA.

**Action 07/02:** Confirm attendance at Meeting 8 of NDARB – All by 31/07/14

### [4] Review of 6<sup>th</sup> meeting

4.1 Minutes of 5<sup>th</sup> Meeting

Minor addition to Appendix 1 was identified and the minutes were approved with the suggested change included.

**Action 07/03:** Update minutes and publish on NDA website – Secretary by 31/05/14

4.2 Outstanding actions from 6<sup>th</sup> meeting:

Actions 06/01, 06/02, 06/03, 06/05, 06/06, 06/07, 06/08, 06/09, 06/12, 06/13, 06/14, 06/15 and 06/16 had been completed. The Secretary reviewed the status of the outstanding actions from the 6<sup>th</sup> meeting.

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- **Action 03/05:** Board members to review draft report when circulated and provide comments back to NDA within one month  
  
Resource to complete the NDA Technical Baseline Report has now been recruited and preparation of the report will start shortly. Action ongoing.
- **Action 03/08:** Chair and NDA to undertake a comparison with the TBuRD output and report back to the Board on its conclusions.  
  
The latest NDA Site Licence Company Technical Baseline and underpinning Research & Development (TBuRD) were submitted at the end of March. Resource to complete this comparison has now been recruited and comparison will start shortly. Action ongoing.
- **Action 04/03:** Share R&D Communications Plan with NDA Research Board members – Head of R&D, NDA  
  
NDA R&D Communications Plan has been updated, reviewed by the Chair and minor comments addressed. Final version will be distributed to members shortly for information only. Action to be closed once NDA R&D Communication Plan distributed.
- **Action 04/05:** Present AWE's experience of engagement with US – Head Technologist, AWE  
  
Agreed to include as future agenda item when international aspects are re-addressed. Action closed.
- **Action 05/03:** Circulate final forward programme – Chair  
  
Members agreed that the previously prepared forward programme was appropriate. It was agreed that Meeting 8 would focus on concluding the review of R&D associated with Spent Fuels (SF) and a review of R&D associated with Integrated Waste Management (IWM) and the work of the NWRf Waste Packaging & Storage Working Group. It was also agreed that Meeting 9 would focus on either R&D associated with Nuclear Materials or the NDA's TBuRD process. Action closed.
- **Action 05/04:** NDA to provide report on NDA activities as a result of the Nuclear Industrial Strategy – Director Strategy & Technology, NDA  
  
NDA provided a brief update on NDA activities as a result of the Nuclear Industrial Strategy. Key R&D related activities included attending as an observer the NIRAB meeting, attending the NIRAB sub-groups and continuing to support supply chain and skills activities. Further updates will be included within relevant agenda items. Action closed.
- **Action 05/05:** Determine how to include Nuclear Research Needs (NRN) in future meetings – Chair  
  
Head of Research and Business Management Systems, ONR, reported that ONR are currently reviewing their approach to research and this may impact on the NRN. An update will be provided at a future meeting. Action closed.

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**Action 07/04:** Provide update on ONR approach to research – Head of Research and Business Management Systems, ONR by Meeting 8

- **Action 05/12:** Share full list of common research topics identified by the Decommissioning Working Group with members – Chair of NWRf Decommissioning Working Group, Sellafield Ltd
- **Action 05/14:** Working Groups to share with NDA Research Board key priorities for FY2013/14 – Working Group Chairs
- **Action 05/15:** Working Groups to report to NDA Research Board key outputs for FY2013/14 – Working Group Chairs

Co-Chair of NWRf, Sellafield Ltd, provided an update on the progress of NWRf. New Co-Chairs for the Decommissioning Working Group were being appointed in order to reinvigorate the group. Additional secretarial support was also being provided. Key priorities and outputs for the Working Groups were included in the public minutes of the NWRf meetings and available from the NDA website. Actions closed.

- **Action 06/04:** Raise lack of information on organisations representing UK at international forum with NIRAB – Head of Energy and Earth Resources, GO-Science by Meeting 7

Head of R&D, NDA, stated that the issue had been highlighted with the Chair of NIRAB during their recent meeting. Action closed.

- **Action 06/10:** Respond on implications of report for individual organisations – All by Meeting 7
- **Action 06/11:** Respond on current situation in NDA estate – Head of R&D, NDA by Meeting 7

Head of R&D, NDA, gave an update on the implications of the report for the NDA's R&D programme. A similar exercise is planned through the NWRf TBuRD Working Group. A summary of the conclusions will be prepared. Actions ongoing.

Chair provided an overview of the 3<sup>rd</sup> NDARB Annual Report. No comments were received from members and the report will be issued to the NDA Board.

### [5] Research Board's View on the RWM R&D Programme

- 5.1 A draft Research Board report on the RWM R&D Programme had been prepared by the Chair based upon the members' discussion at the previous meeting, RWM's responses to additional questions posed by members and subsequent members' views.
- 5.2 Members discussed the status of the inventory of waste for the Geological Disposal Facility. Director Science & Technology, RWM, agreed to provide some additional clarification for the report.

**Action 07/05:** Provide clarification on the inventory for the GDF – Director Science & Technology, RWM by 30/06/14

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- 5.3 Members discussed whether the amount of money spent internationally on geological disposal R&D could be specified. It was agreed that it was difficult to extract R&D costs from programme costs but it was certainly several billion dollars.

**Action 07/06:** Update section on amount of money spent internationally on geological disposal R&D – Chair of NDA Research Board, Ind by 31/08/14

- 5.4 Members discussed how the chemotoxic aspects of geological disposal were being addressed.

**Action 07/07:** Propose update to report regarding chemotoxic aspects of geological disposal – Radioactive Substances Regulation Manager, EA, Director Science & Technology, RWM, Chair of RWM Technical Advisory Panel, Ind, and Chair of NDA Research Board, Ind by 31/08/14

**Action 07/08:** Distribute final version for approval by members – Chair of NDA Research Board, Ind by 31/08/14

- 5.5 Chair asked the CoRWM observer whether he had any observations regarding the approach NDARB had taken to reviewing RWM's R&D programme. He replied that he was supportive of the approach taken – questions posed, member discussion, agreed response. He was not aware of any specific issues missed.

- 5.6 Chair asked members whether they had any observations regarding the approach NDARB had taken to reviewing RWM's R&D programme. Director Strategy & Technology, NDA, commented that he was supportive of the approach taken for this review. He highlighted that it was important to ask the correct questions and that these may change depending upon the programme being reviewed. Director Science & Technology, RWM commented that he had found the approach very useful and RWM would now plan how to address the issues raised.

### [6] Update on Government's Response to the House of Lords Science and Technology Committee Inquiry into the UK's Nuclear R&D Capabilities

- 6.1 Director, NIRO, provided an update on NIRAB and NIRO covering their roles, membership, approach and lines of reporting.

**Action 07/09:** Distribute presentation on NIRAB and NIRO – Secretary by 30/06/14

### [7] Discussion on Implications for NDA Research Board

- 7.1 Chair provided an overview of his meeting with the Chair of NIRAB. The meeting which was also attended by the Director, NIRO, and Head of R&D, NDA, discussed the role of NDARB following the establishment of NIRAB.

- 7.2 The Chair of NIRAB believed the waste management and decommissioning area to be well coordinated and saw no need to modify the NDARB's terms of reference or membership. Neither did she see that there was a pressing need for NDARB to modify its near term activities to support NIRAB's needs.

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- 7.3 The conclusion of the meeting was that NDARB and NIRAB/NIRO should stay in contact and share all relevant information including NIRAB's completed R&D gap analysis. The opportunity to modify NDA's own R&D programme with respect to content and/or timescale to at least partially cover some of the gaps was identified but with recognition that this must not damage NDA's needs nor cut across NDA's vires. There was also a recognised need to improve the co-ordination of and the benefits from UK participation in international programmes and that here possible NDARB and NIRAB would work together to achieve this.
- 7.4 Members discussed the outcome of the meeting and how communication between the two boards could be strengthened. It was agreed that whilst there was already significant cross representation between the two Boards it would be beneficial to invite the Director, NIRO, to future NDARB meetings as an Observer.

**Action 07/10:** Add Director, NIRO, to NDARB invitation list as observer – Secretary by 30/06/14

### [8] Spent Fuels R&D Programme – Introduction

- 8.1 Chair provided an introduction to the session on Spent Fuels R&D. He highlighted that the review was limited to Spent Fuels R&D and therefore did not cover Nuclear Materials or strategy.
- 8.2 The Chair noted that an overview of the UK Spent Fuels inventory had been provided to members prior to the meeting. This information had been taken from the recently published 2013 UK Radioactive Waste Inventory<sup>1</sup>.

### [9] NDA's Spent Fuels R&D Programme

- 9.1 Head of Nuclear Fuel Cycle, NDA, noted that two reports had been provided to members to support their review of the NDA's Spent Fuels R&D Programme: NDA Research and Development Activities on Spent Fuels (NDARB013) and NDA Research and Development Activities on Advanced Gas-cooled Reactor (AGR) Fuel (NDARB014). He presented an overview of the two papers highlighting the key R&D themes and current issues.

### [10] EDF's Spent Fuels R&D Programme

- 10.1 R&D Manager, Nuclear Generation, EDF Energy, presented an overview of EDF's approach to management of spent fuels. He highlighted that following the closure of Sellafield Ltd's Thermal Oxide Reprocessing Plant (THORP) in 2018 any remaining AGR spent fuel will be stored at Sellafield until the geological disposal facility is available. Sizewell B Pressurised Water Reactor (PWR) spent fuel is stored on site. A new interim 'Dry Store' is being built. This will supplement the existing pool storage capacity from 2016 and will provide the additional capacity to take all SZB fuel which will ultimately be disposed of in the GDF. For new build spent fuel, the current assumption is localised storage followed by GDF disposal. Other storage options are being investigated. Any

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<sup>1</sup> <http://www.nda.gov.uk/ukinventory>

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potential for future reprocessing will depend on more favourable energy economics in the long term.

- 10.2 R&D Roadmaps developed through workshops are used to support the identification and communication of EDF's R&D programme. A waste and decommissioning workshop is planned for September 2014.
- 10.3 Members asked regarding the links between NDA and EDF with regard to Spent Fuels. Head of Nuclear Fuel Cycle, NDA, responded that NDA, EDF Energy, Sellafield Ltd and International Nuclear Services Ltd meet at the AGR Operating Plan Working Group, at least six times per year. This meeting is focused on the transfer of fuel from the AGR stations to Sellafield and includes the discussion of relevant R&D pertaining to AGR fuel.
- 10.4 Members asked what the principal reasons for the decision to close THORP in 2018 were. Head of Nuclear Fuel Cycle, NDA, responded that NDA's existing reprocessing contracts are due to complete in 2018 and that to extend the operating life of the facility would require significant capital investment due to the ageing nature of the facility. At the moment there is little or no prospect of significant new reprocessing business and hence very limited prospect of a return on any investment.

### [11] Academic Spent Fuels Research in the UK<sup>2</sup>

- 11.1 Principal Investigator (PI) - Nuclear Champion, RCEP made two presentations covering different academic collaborations relevant to spent fuels management:
  - Behaviour of UK Specific Spent Fuel Under Conditions Relevant to Geological Disposal (PI – Dr Ian Farnan – University of Cambridge)
  - Providing a Nuclear Fuel Cycle in the UK for Implementing Carbon Reductions (PACIFIC) (PI – Prof Tim Abram – University of Manchester; Prof Bruce Hanson – University of Leeds)
- 11.2 Both projects involve multiple UK universities and support from UK industry

### [12] RWM's Spent Fuels R&D Programme

- 12.1 Head of Research, RWM, noted that a report had been provided to members prior to the meeting to support their review of the RWM's Spent Fuels R&D Programme: Radioactive Waste Management Ltd. Research on Spent Fuel Disposal (NDARB015). He presented an overview of the paper highlighting key R&D studies (spent fuel leaching, container durability studies, criticality safety) and the work of the Integrated Project Team on High Heat Generating Wastes.

### [13] Spent Fuel Management in France

- 13.1 Director Assistant, Nuclear Energy Directorate – Clean up Division, CEA presented an overview of CEA's spent fuels strategy and programme. The CEA R&D programme is driven by a clear strategy for sustainable management of nuclear material and waste. This

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<sup>2</sup> The agenda item on Academic Spent Fuels Research in the UK was brought forward in the agenda due to the need for the Principal Investigator (PI) - Nuclear Champion, RCEP to leave the meeting early.

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results in the need for recycling technology (e.g. reprocessing technology, MOX fuel re-use, americium transmutation) and fast neutron reactors (e.g. ASTRID - Advanced Sodium Technological Reactor for Industrial Demonstration).

- 13.2 Members asked what relevant collaboration there was between NDA and CEA. Director Assistant, CEA responded that there was a bilateral agreement in place between NDA and CEA and that a number of meetings and exchanges of information had taken place over the last few years.

### [14] Discussion on Spent Fuels R&D

- 14.1 Members discussed the approach NDARB was taking with regard to the review of the UK's Spent Fuels R&D programme. The Chair raised a number of additional questions for members to consider:

- Is the programme soundly based?
- Are the mechanisms for review adequate?
- Are there areas where members would like to investigate further?
- Is the programme adequately communicated to stakeholders?
- Is the programme robust to future change?

- 14.2 Chair also asked members if they had any further questions they wished to raise.

**Action 07/11:** Additional questions on UK's Spent Fuels R&D programme – Members by 31/08/14

- 14.3 Chair stated that in addition he would like to understand the scale of the NDA estate's R&D programme on Spent Fuels over the next five years.

**Action 07/12:** Provide further information on scale of the NDA estate's R&D programme on Spent Fuels over the next five years – Head of R&D, NDA, Head of Nuclear Fuel Cycle, NDA and Head of Research, RWM by 30/09/14

- 14.4 Co-Chair of NWRF, SL, added that there was additional information that Sellafield Ltd could provide on their Spent Fuels R&D programme.

**Action 07/13:** Provide additional information on Sellafield Ltd's R&D programme on Spent Fuels – Co-Chair of NWRF by 30/09/14

Chair asked if copies of the presentations on could be distributed to members. No presenters objected.

**Action 07/14:** Distribute copies of Meeting 7 presentations – Co-Chair of NWRF by 31/07/14

### [15] Observations on Meeting 7

- 15.1 Chair asked the CoRWM member whether he had any observations with regard to the meeting. He responded that he was impressed by the level of knowledge of the attendees



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and the open and transparent manner of the meeting. He added that he had found the session very useful and noted that the proposed CoRWM forward programme will only contain a small amount of time dedicated to Spent Fuel storage and its relevance to disposal.

### **[16] Review of Actions**

16.1 The actions were reviewed.

### **[17] Any Other Business**

17.1 No any other business was identified.

**CLOSE**

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### APPENDIX 1 – Outstanding and New Actions

- Action 03/05:** Board members to review draft report when circulated and provide comments back to NDA within one month – Ongoing
- Action 03/08:** Chair and NDA to undertake a comparison with the TBuRD output and report back to the Board on its conclusions – Ongoing
- Action 04/03:** Share R&D Communications Plan with NDA Research Board members – Head of R&D, NDA – Ongoing
- Action 06/10:** Respond on implications of report for individual organisations – All by Meeting 7
- Action 06/11:** Respond on current situation in NDA estate – Head of R&D, NDA by Meeting 7
- Action 07/01:** Review Terms of Reference of NDA Research Board (NDARB) to highlight independence of NDARB from NDA control – Chair by Meeting 8
- Action 07/02:** Confirm attendance at Meeting 8 of NDARB – All by 31/07/14
- Action 07/03:** Update minutes and publish on NDA website – Secretary by 31/05/14
- Action 07/04:** Provide update on ONR approach to research – Head of Research and Business Management Systems, ONR by Meeting 8
- Action 07/05:** Provide clarification on the inventory for the GDF – Director Science & Technology, RWM by 30/06/14
- Action 07/06:** Update section on amount of money spent internationally on geological disposal R&D – Chair of NDA Research Board, Ind by 31/08/14
- Action 07/07:** Propose update to report regarding chemotoxic aspects of geological disposal – Radioactive Substances Regulation Manager, EA, Director Science & Technology, RWM, Chair of RWM Technical Advisory Panel, Ind, and Chair of NDA Research Board, Ind by 31/08/14
- Action 07/08:** Distribute final version for approval by members – Chair of NDA Research Board, Ind by 31/08/14
- Action 07/09:** Distribute presentation on NIRAB and NIRO – Secretary by 30/06/14
- Action 07/10:** Add Director, NIRO, to NDARB invitation list as observer – Secretary by 30/06/14
- Action 07/11:** Additional questions on UK's Spent Fuels R&D programme – Members by 31/08/14
- Action 07/12:** Provide further information on scale of the NDA estate's R&D programme on Spent Fuels over the next five years – Head of R&D, NDA, Head of Nuclear Fuel Cycle, NDA and Head of Research, RWM by 30/08/14
- Action 07/13:** Provide additional information on Sellafield Ltd's R&D programme on Spent Fuels – Co-Chair of NWRF by 30/08/14

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**Action 07/14:** Distribute copies of Meeting 7 presentations – Co-Chair of NWRF by 31/07/14