

NDA Research Board

10th May 2017 10:00 – 16:00

**Royal Horseguards and One Whitehall Place, 2 Whitehall Court,
London, SW1A 2EJ**

MINUTES – Issue 1

Attendees

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| 1) Chair of NDA Research Board, Independent | 2) Research Manager, NDA – Technical Secretary |
| 3) Head of Research, Radioactive Waste Management Ltd (RWM) | 4) Director Strategy and Technology, NDA |
| 5) Radioactive Substances Principal Policy Officer, Scottish Environment Protection Agency (SEPA) | 6) Superintending Inspector, Office for Nuclear Regulation (ONR) |
| 7) Principle Investigator (PI) – Nuclear Champion, Research Council Energy Programme (RCEP) (Part-time) | 8) Chief Technologist, Atomic Weapons Establishment (AWE) |
| 9) Co-Chair, Nuclear Waste and Decommissioning Research Forum (NWDRF), Sellafield Ltd (SL) | 10) Director of Engineering & Technology – Rolls-Royce, Civil Nuclear |
| 11) Chief Scientific Advisor, Scottish Government | 12) Decommissioning Programme Manager, Environment Agency (EA) (Part-time) |
| 13) Head of Decommissioning and Synergies, EDF Energy Generation | 14) Director, Nuclear Innovation and Research Office (NIRO) – Observer |
| 15) Committee on Radioactive Waste Management (CoRWM) Member – Observer | 16) Strategy Implementation Manager, NDA – Invited (Part-time Item 4 only) |
| 17) Director of Enabling and Emerging Technologies, Innovate UK – Invited | 18) Technical Assurance Manager, NDA – Technical Secretary (Part-time Items 14 & 15 only) |

Main Purposes of the Meeting

- To discuss NDA's response to the recommendations in the Research Board's Review of NDA approach to technical underpinning of plutonium storage at Sellafield.
- To hear from other organisations on their approach to Horizon Scanning and to review the NDA's approach.
- To hear from the ONR and EA on their approach to R&D.
- To review and approve the Board's Annual Report for FY 2016/17.

[1] Welcome & Apologies

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- 1.1 Chair welcomed the Members and Observers to the 13th meeting of the NDA Research Board (NDARB) and referred attendees to the full agenda for the meeting.
- 1.2 A number of apologies had been received prior to this meeting:
 - Head of Nuclear Energy, Transport, Decommissioning & Waste Management, Directorate for Energy, European Commission
 - Director of Engineering – Nuclear Generation, EDF Energy
 - Government Chief Scientific Advisor
 - Chief Scientific Advisor, Department for Business, Energy and Industrial Strategy (BEIS)
 - Chief Scientific Advisor, Ministry of Defence (MOD)
 - Radioactive Substances Regulation Manager, EA
 - Head of Technology, NDA
- 1.3 Members of the Board introduced themselves.
- 1.4 The Chair invited any relevant declarations of interest – none were received.

[2] Agenda

- 2.1 The agenda was agreed.
- 2.2 Any Other Business (AOB) items – Topic for the next Board discussion
- 2.3 The date and location for the next NDA Research Board meeting was agreed: 28th November 2017 in Central London.

[3] Review of 12th Meeting

- 3.1 Minutes of 12th Meeting

The minutes were approved with minor edits suggested.

- 3.2 Outstanding actions from previous meetings:

The Chair reviewed the outstanding actions list which was distributed prior to the meeting. An update was given on the following (and only) outstanding action.

Action 10/16: NDA to publish the NWDRF Forward Plan and Annual Report on the NDA public website by 18th March 2016 – Ongoing.

Draft NWDRF Annual Report for the previous three financial years have been circulated for comment along with the forward plan. The Annual Reports will be subject to NDA approval before publication.

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[4] Discussion on NDA's response to the recommendations in the Research Board's Review of NDA's approach to technical underpinning of plutonium storage at Sellafield

- 4.1 The Chair reviewed the NDA's response to the recommendations in the Research Board's Review of NDA approach to technical underpinning of plutonium storage at Sellafield and requested comments and feedback from the Board. The following comments were received.
- 4.2 The Chair suggested that NDA should revise the wording to response to recommendation 1 to indicate that NDA had carefully considered the recommendation before preparing their response.
- 4.3 That NDA should carefully consider communications regarding the storage of plutonium. The wording of the response to recommendation 7 should be revised to fully reflect the consideration given. The NDA agreed to redraft the recommendation to reflect openness and transparency whilst taking security aspects into consideration. The vocabulary for the response will also be changed from Noted to Accepted.

Action 13/01: Strategy Implementation Manager, NDA and Research Manager, NDA, to reword the NDA Response to Recommendation 7 made in the Research Board's "Review of NDA's R&D Programme in Support of the Continued Safe Storage of the UK's Civil Plutonium Stock" – by 7th July 2017.

- 4.4 The Board was content with the NDA Responses to all other recommendations, 2-6 and 8-9 and all observations.

[5] Update ONR Research Activities

- 5.1 A presentation on ONR Regulatory Research was given by Superintending Inspector, Office for Nuclear Regulation (ONR) covering:
- Regulatory research objectives;
 - The type and number of research proposals;
 - Mechanisms for communication of research interests;
 - Areas of possible research interest for NDA; and
 - Steps taken to ensure coordination and collaboration with other relevant bodies.
- 5.2 It was noted that, where possible, research is funded by the site licensees.
- 5.3 A discussion was held on how ONR address the potential lack of diversity in underpinning R&D, e.g. in specialist fields where there is a limited pool of research teams. The possibility of ONR investing in research in specific key areas, to ensure diversity, was covered. It was noted that ONR do engage with overseas research programmes. Mechanisms for engagement with the academic community were suggested e.g. dissemination of the research register and engagement via Nuclear Universities Consortium for Learning, Engagement and Research (NUCLEAR) meetings.
- 5.4 Further discussions were held on ONR Regulatory Research:

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- Peer review process for research outputs;
- Horizon Scanning activities; and
- Research topic identification process.

5.5 The Board agreed that it would be beneficial for members to review the ONR Regulatory Research Annual Report for 2016.

Action 13/02: Superintending Inspector, ONR, to provide a copy of the ONR Regulatory Research Annual Report for 2016 to Research Manager, NDA, for distribution to the Board – by 29th June 2017.

[6] Update on EA/SEPA/NRW Research Activities

6.1 A presentation on EA, SEPA and NRW collaborative research activities was given by Decommissioning Programme Manager, EA. It was noted that research is carried out to generate knowledge to deliver outcomes; research does not solely focus on new technologies but also includes using the most appropriate approach at the correct time. The EA presentation covered the following themes:

- What do the environment agencies mean by research?
- Why research is of interest to the environment agencies
- Best Available Techniques and evidence base;
- How nuclear R&D priorities were determined; and
- Research priorities.

6.2 It was noted that the environment agencies research is currently not screened against ongoing external research. The agencies would therefore benefit from attending the Nuclear Universities Consortium for Learning, Engagement and Research (NUCLEAR) meetings to engage the academic community and disseminate their research activities.

6.3 The Board expressed an interest in reading “Environment Agencies: Nuclear Research & Development Interests” paper.

Action 13/03: Decommissioning Programme Manager, EA, to provide a copy of the “Environment Agencies: Nuclear Research & Development Interests” paper to Research Manager, NDA, for distribution to the Board – by 29th June 2017.

[7] Update on NIRO Activities

7.1 A presentation on the recent update (February 2017) to the Civil Nuclear Landscape report was given by Director, NIRO. It was noted that the update used data from financial year 2015/16.

7.2 The key findings from the February 2017 update report are:

- Total funding (public, private and overseas) for civil nuclear R&D (fission and fusion) in the UK in 2015/16 was around £217 million;
- Overall there has been an increase of approximately 19% in the number of Full Time Equivalents (FTEs) engaged in civil nuclear research in the UK since the last

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landscape review in 2013, with the greatest increase in those conducting research related to decommissioning; and

- The total FTEs working on R&D related to advanced reactor systems and fuel fabrication remains very low.

7.3 A discussion was held on the future of NIRO/NIRAB. NIRO currently has funding in place until end of September 2017 to enable a replacement for NIRAB to be devised. It was noted that Government valued the work carried out by NIRO. Maintaining Government access to expert advice in this area was also felt to be important.

7.4 The Board expressed their appreciation of the Director NIRO's involvement with NDA Research Board as an observer.

[8] NDA Update on IRID (International Research Institute for Nuclear Decommissioning)

8.1 Director Strategy and Technology, NDA, gave a presentation on NDA's interaction with IRID on behalf of Head of Technology, NDA. IRID is the research body established in Japan following the earthquake and tsunami damage to the reactors at the Fukushima Daiichi plant. Its aim is to gather knowledge and ideas from around the world and conduct R&D in the area of nuclear decommissioning. Head of Technology, NDA, currently sits on the international advisory panel for IRID. The presentation gave background to IRID, the benefits that NDA has received from participation with IRID and the types of issues discussed at the international advisory panel.

8.2 The Board held further discussions on IRID's approach to Horizon Scanning, accident investigation studies and the benefits of the interaction to UK and EU decommissioning programmes.

[9] Update on NDA/SL/Innovate UK Integrated Innovation for Nuclear Decommissioning Call

9.1 A presentation on the NDA/SL/Innovate UK collaboratively funded Integrated Innovation for Nuclear Decommissioning Call was given by Research Manager, NDA on behalf of Head of Technology, NDA.

9.2 The presentation covered background and scope of the call. The call is intended to provide an opportunity for the supply chain to develop and demonstrate integrated innovative solutions collaboratively with the end-user. The aim is to introduce a step change in safety, productivity and waste optimisation.

9.3 NDA has agreed to provide at least £2.5 Million and Innovate UK £0.5 Million funding to the call. The competition was launched in December 2016. Proposals are currently undergoing assessment and the response from the supply chain has been excellent.

9.4 Director of Enabling and Emerging Technologies, Innovate UK, added that the call was a SBRI (Small Business Research Initiative) and successful consortia would therefore receive 100% funding rather than a grant award.

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[10] Review of draft Annual Report with a view to agreement.

- 10.1 The Chair presented the NDA Research Board's draft Annual Report FY 2016/17 and invited comments from the Board.
- 10.2 The following comments were received from the Board. The conclusions section was thought to be repetitious. The comments on security, regarding the Pu storage topic, should be reworded. The Board were also of the opinion that the underpinning science, in relation to the Pu storage topic, should be reworded and some of the information moved into an appendix. The executive summary should also be revised to note that the view of the NDA Research Board is that NDA's R&D is appropriate.

Action 13/04: The Chair to amend the draft NDA Research Board Annual Report for FY2016/17 in line with the comments received from the Board – by 27th July 2017.

Action 13/05: Research manager, NDA, to circulate the updated draft of NDA Research Board Annual Report for FY2016/17 for comment and approval – by 3rd August 2017.

[11] Introduction to review of the NDA's Approach to Horizon Scanning.

- 11.1 The Chair introduced the Board to the discussion topic for Meeting 13. The Chair noted that NDA had prepared a discussion paper and possible options for the approach to Horizon Scanning and now requests the Board's advice on the most suitable way forward.
- 11.2 There was also a change from the Board's standard review questions. For this topic the proposed framing questions were as follows:
 - "Should NDA take a more proactive role in Horizon Scanning with a view to identifying new technologies suitable for nuclear decommissioning?"
 - "What is best practice for effective Horizon Scanning?"
- 11.3 The Chair thanked the Director of Enabling and Emerging Technologies, Innovate UK and Director of Engineering & Technology, Rolls Royce, Civil Nuclear, for agreeing to present their organisations' approaches to Horizon Scanning to the Board.

[12] Approach to Horizon Scanning at Innovate UK

- 12.1 Director of Enabling and Emerging Technologies, Innovate UK (IUK) gave a presentation on IUK's approach to Horizon Scanning. Horizon Scanning at IUK is split into scanning for technologies and scanning for trends.
- 12.2 Emerging technologies were covered first as follows. Widespread consultation was carried out when developing the long list of technologies, including universities, learned societies, government departments and bodies and research councils. The technology longlist was then prioritised, based on market opportunity, UK capacity and added value. IUK have also developed a scoring matrix for the prioritisation process. Shortlisted technologies are communicated using briefing sheets and industry workshops are held to identify candidates for technology programme areas.

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- 12.3 Horizon Scanning for trends uses a quasi-systematic approach that involves identifying topics for further evaluation, keeping an open scope, taking a view of global trends and challenges and taking on board numerous sources of input.
- 12.4 In summary, a variety of approaches to Horizon Scanning exist and quasi-systematic approaches are often best. A management system to capture ideas is required (this can be as simple as a spreadsheet). The main issue often is not the identification of topics but the prioritisation of those topics (IUK's opinion is that people are better at this task than computers) and their implementation.

[13] Approach to Horizon Scanning at Rolls-Royce

- 13.1 Director of Engineering & Technology, Rolls-Royce, Civil Nuclear gave an presentation on Rolls-Royce's approach to Horizon Scanning. Horizon Scanning activities are carried out by the Future Technologies group comprised of around 40 members of staff. This group sits outside of delivery focused business units and scans the horizon for 'disruptive' technologies and trends that could fundamentally alter the way the Rolls-Royce does business. The group then works out how Rolls-Royce can gain competitive advantage by assimilating these into its business. An overview of the role of the Future Technologies group was given. The Horizon Scanning process uses the Future Technologies group to identify and select technologies and Special Interest groups to assess ideas. Selected ideas (four per month) are then communicated to the whole business via newsletters. The Rolls-Royce Horizon Scanning programme is dominated by technology push as the aim is to be disruptive.
- 13.2 It was noted that a culture supportive of innovation, and support from business leaders, needs to be in place within an organisation to facilitate Horizon Scanning activities and to allow focus on areas other than existing programmes of work. Communication of the successes resulting from Horizon Scanning is also important in developing a supportive culture.

[14] NDA's approach to Horizon Scanning

- 14.1 Research Manager, NDA, gave a presentation on the NDA and the Estate's current Horizon Scanning activities and proposed options for NDA's approach to Horizon Scanning. The presentation covered:
- Why NDA is interested in Horizon Scanning - To raise awareness of innovative and disruptive technologies and promote their use with a view to delivering the Estate's decommissioning mission more safely, quickly and cheaply with reduced environmental impact.
 - The publicly available definitions of Horizon Scanning & Technology Intelligence.
 - Publicly available information on approaches to Horizon Scanning.
 - NDA Estate Horizon Scanning activities, including NDA directly led, RWM, Sellafield Ltd and NWDRF activities.
 - Options for delivery of a more pro-active NDA Horizon Scanning Programme as follows;
 - Maintain the status quo

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- Improve the coordination and dissemination of existing Horizon Scanning activities
- National Nuclear Laboratory or similar national organisation (e.g. Innovate UK) to take on this role on behalf of UK
- Develop and fund via the supply chain a Horizon Scanning programme
- Develop and fund a SLC led Horizon Scanning team
- Develop and fund an internal Horizon Scanning team
- Preliminary analysis of options using the NDA Value Framework.

[15] Discussion regarding NDA's Approach to Horizon Scanning

- 15.1 The Board queried whether NDA's approach to Horizon Scanning included techniques as well as technologies. NDA confirmed that it does.
- 15.2 The Chair noted that NDA and the Estate carry out a wide variety of tasks to look for improvement and innovation, but at present there appears to be little overall coordination of activities.
- 15.3 The general consensus from the Board was that, whilst the NDA and the Estate's activities in searching for innovation and improvement are commendable in their own right, most of the activities cannot be classified as genuine Horizon Scanning. There was also a lack of discussion in the NDA paper (NDARB031) and presentation to the Board on the cultural aspects of Horizon Scanning and how technologies would be exploited or operationalised.
- 15.4 The Board discussed what Horizon Scanning really is, as innovation can range from commercial off the shelf technology to pure research.
- 15.5 The relationship between innovation and the current NDA business model was also covered.
- 15.6 The Board agreed that NDA should give further thought to its approach to Horizon Scanning in the light of the presentations from Innovate UK and Rolls-Royce and the discussion at the Board. NDA should then revise its discussion document (NDARB031) and should include:
- (i) the expected benefits of Horizon Scanning (where possible);
 - (ii) a consideration of the cultural issues surrounding Horizon Scanning; and
 - (iii) the exploitation and operationalisation of technologies.
- 15.7 It was suggested that the paper should capitalise on NDA's aim to deliver its mission quicker, cheaper and safer with reduced environmental impact.
- 15.8 The revised paper will be discussed at the next NDA Research Board meeting on 28th November 2017.
- 15.9 The Board agreed to send NDA any information held within their organisations on Horizon Scanning process, training courses and tool kits. NDA will then review the information provided with a view to facilitating the preparation of an updated issue of NDARB031.

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Action 13/06: NDA Research Board Members to provide Research Manager, NDA, with any relevant available information regarding Horizon Scanning processes, tools and training courses – by 11th July 2017.

15.8 As an interim statement, rather than a full Position Paper at this stage, the Chair proposed to write a letter on behalf of the Board, to Director Strategy and Technology, NDA, summarising the discussion and expressing the Board's support for the development of a more proactive NDA Horizon Scanning programme. The Board agreed.

Action 13/07: The Chair to prepare a letter to Director of Strategy and Technology, NDA, to summarise the output of the Research Board's discussion on NDA's presented approach to Horizon Scanning and circulate to the Board for comment and approval – by 20th July 2017.

[16] Observations on Meeting 13

16.1 This item was not carried out due to time constraints.

[17] Review of Actions

17.1 A review of actions was carried out by the Chair and Technical Secretary.

[18] Any Other Business

18.1 The discussion topic for the next meeting will be a continuation of NDA's approach to Horizon Scanning.

18.2 Head of Research, RWM, informed the Board that RWM has been coordinating the production of a Strategic Research Agenda for future joint research in the EU, which has recently completed its consultation. This has been a collaborative effort between Waste Management Organisations (WMOs), Regulatory Technical Support Organisations (TSOs) and Nationally Funded Research Entities (REs). The Strategic Research Agenda will provide the basis for a future European Joint Programme (EJP) in the area of waste management and disposal. The French WMO, ANDRA, are now leading the facilitation of a response to the future (March 2018) EU call together with a small group of representatives from the Swedish WMO, TSOs and REs.

CLOSE

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APPENDIX 1 – Outstanding and New Actions

- Action 10/16:** NDA to publish the NWDRF Forward Plan and Annual Report on the NDA public website by 18th March 2016 – Ongoing
- Action 13/01:** Strategy Implementation Manager, NDA and Research Manager, NDA, to reword the NDA Response to Recommendation 7 made in the Research Board's "Review of NDA's R&D Programme in Support of the Continued Safe Storage of the UK's Civil Plutonium Stock" – by 7th July 2017
- Action 13/02:** Superintending Inspector, ONR, to provide a copy of the ONR Regulatory Research Annual Report for 2016 to Research Manager, NDA, for distribution to the Board – by 29th June 2017
- Action 13/03:** Decommissioning Programme Manager, Environment Agency, to provide a copy of the "Environment Agencies: Nuclear Research & Development Interests" paper to Research Manager, NDA, for distribution to the Board – by 29th June 2017
- Action 13/04:** The Chair to amend the draft NDA Research Board Annual Report for FY2016/17 in line with the comments received from the Board – by 27th July 2017
- Action 13/05:** Research manager, NDA, to circulate the updated draft of NDA Research Board Annual Report for FY2016/17 for comment and approval – by 3rd August 2017
- Action 13/06:** NDA Research Board Members to provide Research Manager, NDA, with any relevant available information regarding Horizon Scanning processes, tools and training courses – by 11th July 2017
- Action 13/07:** The Chair to prepare a letter to Director of Strategy and Technology, NDA, to summarise the output of the Research Board's discussion on NDA's presented approach to Horizon Scanning and circulate to the Board for comment and approval – by 20th July 2017