

NDA Research Board

22nd November 2016 10:00 – 16:00

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) Research Manager, NDA – Technical Secretary |
| 3) Head of Technology, NDA | 4) Director Strategy and Technology, NDA |
| 5) Chair of RWM Technical Advisory Panel, Independent | 6) Superintending Inspector, Office for Nuclear Regulation (ONR) |
| 7) Radioactive Substances Principal Policy Officer, Scottish Environment Protection Agency (SEPA) | 8) Chief Technologist, Atomic Weapons Establishment (AWE) |
| 9) Head of Research, Radioactive Waste Management Ltd (RWM) | 10) Principle Investigator (PI) – Nuclear Champion, Research Council Energy Programme (RCEP) |
| 11) Co-Chair, Nuclear Waste and Decommissioning Research Forum (NWDRF), Sellafield Ltd (SL) | 12) Radioactive Substances Regulation Manager, Environment Agency (EA) |
| 13) Head of Generation Decommissioning, EDF | 14) Chief Scientific Advisor, Scottish Government |
| 15) Director of Engineering & Technology – Rolls Royce, Civil Nuclear | 16) Chief Technologist, Nuclear Innovation and Research Office (NIRO) – Observer |
| 17) Committee on Radioactive Waste Management (CoRWM) Member – Observer | 18) Head of Nuclear Fuel Cycle, NDA - Invited |
| 19) Head of Technical - Product Plants, Sellafield Ltd - Invited | 20) Decommissioning Strategy Manager, NDA - Invited |

Main Purposes of the Meeting

- To discuss NDA's response to recommendations in the Research Board's Review of NDA's Technology Baseline Underpinning Research and Development (TBuRD) Process
- To confirm members' view of the NDA's Approach to Technical Underpinning of Plutonium Storage at Sellafield
- To confirm members' view the NDA's Approach to Robotics R&D in the context of Decommissioning Strategy.
- To confirm members' view on the NDA Research Board Annual Report for 2015.

[1] Members Only Discussion

A Members only discussion was held.

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[2] Board Member time for reading of draft Research Board Position Paper on the NDA's approach to technical underpinning of plutonium storage at Sellafield

- 2.1 This paper was not circulated to the Board in advance of the meeting due to the associated security requirements. This also meant that this item of the agenda was restricted to members and directly related NDA and SL staff only. It was therefore being taken in advance of the main agenda for the meeting.
- 2.2 The draft Research Board position paper was circulated in hard copy and the members allowed time to read the paper and form an opinion.

[3] Research Board's view on the NDA's approach to technical underpinning of plutonium storage at Sellafield and discussion of the draft Research Board Position Paper

- 3.1 The Board held a short discussion on the draft position paper before the invited attendees from NDA and Sellafield Ltd (SL) joined the meeting.
- 3.2 The process for reviewing the draft position paper was outlined by the Chair and was as follows
- Discussion of Members overall comments on the draft position paper
 - Discussion of NDA and SL opinion on the draft position paper
 - Discussion of the Board recommendations and observations

Members Overall Comments on the Draft Position Paper

- 3.3 The Board noted that there is a need to understand the historical context for why previous decisions were made regarding the storage of plutonium at Sellafield, including the scope and constraints of the decision making process. The Board should also consider the likelihood of whether a new review of plutonium storage, as suggested in the draft recommendation 1, would raise the possibility of new storage technology introduction or result in only marginal gains. The Board should also consider that a new review could bring forward ideas that are contrary to current storage policy.
- 3.4 In reality any repackaging programme may run for 30 years or so and any technology developments during this timeframe may be taken into consideration.
- 3.5 The Board discussed the implications of Brexit regarding the UK's membership of Euratom in relation to the topic of safe storage of plutonium. It was noted that equivalent arrangements via the IAEA would be expected to be put in place if the UK were to leave Euratom. A footnote should be included in the position paper to clarify this.
- 3.6 The draft position paper should be considered in the context of R&D and not the strategic approach to plutonium storage, but the Board recognised that, for this topic, it was difficult to disentangle the two.

NDA and SL Board Member and Invited Attendees Opinions on the Draft Position Paper

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- 3.7 NDA welcomed the Board's review of the approach to safe storage of plutonium at Sellafield.
- 3.8 It was noted that there are limited R&D options in this area due to existing facilities and the requirement to wait for new facilities to come on line.
- 3.9 The level of R&D currently carried out is thought to be proportionate given the current stocks of plutonium and the duration of storage. The current R&D programme covers many variables including mitigating the impact of potential delays to new plants.
- 3.10 Once re-canning activities are complete then inspection will become the R&D focus. It was noted that it is not economically possible to automate inspections in older storage facilities.
- 3.11 The following additional points were discussed by the Board.
- Mechanisms for bringing innovation to plutonium storage for example, the use of "innovation portals" and "Kickstart" programmes with academia as is done at Rolls Royce and AWE respectively. It was noted that there is a need for clear objectives when defining innovation programmes.
 - The applicability of the current design requirements for storage and if there is a need to consider additional functionality in the flowsheet.
 - The reduction of risk associated with stored material possibly by heat treatment of all of the material to stabilise the powder for storage. The current approach would simply repack over 80% of the cans. It was articulated that heat treatment of all material would have a major impact on the design, throughput and cost of facilities and would result in delays to the current programme of work. Delay would increase the near-term risk presented by the storage of materials whose package lifetimes would expire before treatment is available. Such treatment would also make utilisation of the material as MOX fuel more difficult, though this would not necessarily rule it out.
 - The skills pipeline to support R&D on the safe storage of plutonium with regard to the nuclear new build industry potentially leading to competition for technical skills. It was noted that SL maintains a Community of Practice in this area and works closely with the National Nuclear Laboratory to develop skills. NDA also develops skills in this area via its Direct Research Portfolio.

Position Paper Recommendations

- 3.12 Board discussed Recommendations 2 to 9 and then moved to discuss Recommendation 1.
- 3.13 Recommendation 2: The Board noted that the current wording implied a "filtering out" approach would be taken; as this is not intended to be the case the recommendation should be re-worded. The recommendation should also make explicit that R&D is required to support safety case requirements.
- 3.14 Recommendation 4: It was suggested that this recommendation could be combined with recommendation 2. It was proposed that the text should acknowledge the programme is planned to run for approximately 30 years. It should also be noted that stewardship of stored material also requires an understanding of the behaviour of that material.
- 3.15 The Board agreed with Recommendations 5 to 8.

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- 3.16 Alternative wording for Recommendation 9 was suggested by Radioactive Substances Principal Policy Officer, SEPA.

Action 12/01: Radioactive Substances Principle Policy Officer, SEPA, to provide reworded text for Recommendation 9 of the NDA Research Board draft position paper on the NDA's approach to technical underpinning of plutonium storage at Sellafield – by 6th December 2016.

- 3.17 Recommendation 1: This recommendation should be re-worded to start with the following text "Consideration should be given to....." rather than "A short, high level review should be carried out....."

- 3.18 The Board agreed with Observations 1 and 2.

- 3.19 The Chair agreed to amend the draft position paper in line with the Board's comments. The Research Manager, NDA agreed to circulate the revised recommendations to the Board for their approval.

- 3.20 The full position paper will not be published on the NDA public website due to the nature of the content. Therefore, a note detailing the Board's review process and recommendations will be published on the NDA website.

Action 12/02: The Chair to amend the NDA Research Board draft position paper on the NDA's approach to technical underpinning of plutonium storage at Sellafield in line with the comments received from Board members – by 1st February 2017.

Action 12/03: Research Manager, NDA to circulate the modified recommendations from the NDA Research Board draft position paper on the NDA's approach to technical underpinning of plutonium storage at Sellafield to the Board for final comment and approval – by 10th February 2017.

[4] Welcome & Apologies

- 4.1 Chair welcomed the Observers to the 12th meeting of the NDA Research Board (NDARB) and referred attendees to the full agenda for the meeting.

- 4.2 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 of Energy and Climate Change (DECC)
- Chief Scientific Advisor, Department for Business, Innovation & Skills (BIS)
- Chief Scientific Advisor, Ministry of Defence (MOD)
- Director, Nuclear Innovation and Research Office (NIRO)

- 4.3 Members of the Board introduced themselves.

- 4.4 The Chair invited any relevant declarations of interest – none were received.

The Chair noted that he is no longer a Non-Executive Director for Magnox Ltd.

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[5] Agenda

- 5.1 The agenda was agreed with the following minor change: inclusion of the confirmation of members' views on the NDA Research Board Annual Report for 2015 in the main purpose of the meeting.
- 5.2 Any Other Business (AOB) items – Topic for the next Board discussion, RWM Technical Advisory Panel Annual Report and communication of R&D were suggested as topics for AOB.
- 5.3 The date and location for the next NDA Research Board meeting was agreed: 10th May 2017 in Central London.

[6] Review of 11th Meeting

6.1 Minutes of 11th Meeting

The minutes were approved with minor edits suggested.

6.2 Outstanding actions from previous meetings:

The Chair reviewed the outstanding actions list which was distributed prior to the meeting. Updates were given on the following outstanding actions.

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

The NWDRF Forward Plan has been received by the Research Manager, NDA. The NWDRF Forward Plan has not been published on the NDA website as changes were subsequently made to the NWDRF forward meeting plan. An updated version of the NWDRF Forward Plan will be published. Action Ongoing.

- **Action 10/10:** Head of Technology NDA to update the Board on NDA horizon scanning activities at a future meeting, by November 2016.

This agenda item has been postponed by the Chair until Meeting 13 (10th May 2017) due to a full agenda at Meeting 12. Action Ongoing.

- **Action 10/11:** Superintending Inspector ONR to give an update to the Board at a future meeting with details of the ONR R&D programme by November 2016.

This agenda item has been postponed by the Chair until Meeting 13 (10th May 2017) due to a full agenda at Meeting 12. Action Ongoing.

- **Action 10/12:** Radioactive Substance Regulation Manager, EA to give an update to the Board at a future meeting with details of the EA nuclear decommissioning related R&D interests by November 2016

This agenda item has been postponed by the Chair until Meeting 13 (10th May 2017) due to a full agenda at Meeting 12. Action Ongoing.

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- **Action 11/01:** NWDRF TBuRD Working Group to review the Technical Baseline Report and TBuRD output and report back to the Board with its conclusions – by 31st March 2017

The action will be started following publication of the NDA Technical Base on the NDA Website during week commencing 28th November 2016.

[7] **Research Board's view on the NDA's Approach to Robotics R&D in the Context of Decommissioning Strategy and discussion of the draft Research Board Position Paper**

- 7.1 The process for reviewing the draft position paper was outlined by the Chair and was as follows:
- Discussion of Members overall comments on the draft paper
 - Discussion of any specific comments
 - Discussion of the Board recommendations and observations
- 7.2 The Members noted that the draft Board Position paper correctly distilled the range of views expressed at NDARB Meeting 11.
- 7.3 The Co-Chair NWDRF SL noted that robotics and autonomous systems (RAS) are currently in use at Sellafield and this should be stated more explicitly in the paper.
- 7.4 The draft position paper is supportive of NDA taking a proactive approach in this area. The paper also makes it clear that NDA should consider its interventions in the RAS area carefully, e.g. interventions should be made when the benefits can be maximised and any resulting cross estate benefits should be captured.
- 7.5 The NDA gave an update on recent interventions in the RAS area e.g. (i) the Sellafield Active Demonstrator Programme and the learning from experience gained when demonstrating RAS technology and (ii) the forthcoming NDA and Innovate UK innovation call.
- 7.6 The NDA has taken on board the NDARB and Cabinet Office feedback and will develop a RAS R&D Strategy covering the next 5 to 10 years. NDA also gave examples of where RAS technology will enable NDA to carry out its decommissioning mission e.g. the remote characterisation of pipelines.
- 7.7 The Board requested advice from EDF and Rolls-Royce based on both organisations experience of utilising RAS Technology.
- 7.8 EDF noted that a group approach (joint UK and French) was taken to developing a RAS R&D plan. Decommissioning of AGR reactors will involve a fleet effect (repetitive similar tasks across the feet of AGR reactors) and the utilisation of RAS will potentially lead to productivity benefits. The key issues are (i) the approach to sharing developments with the RAS supply chain and (ii) obtaining the correct balance of information sharing to allow the supply chain to develop appropriate RAS tools.
- 7.9 Rolls Royce noted that organisations need to decide a position – should the organisation be RAS technology developers or should the organisation be RAS technology aware. Many RAS technologies are currently available for e.g. inspections, but that bespoke

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solutions and bespoke deployment of off the shelf solutions can be useful in certain applications. Rolls Royce utilise Communities of Practise and Innovation Portals to govern the use of RAS. There is no centralisation of RAS technology deployment and its use is driven by finding solutions to problems.

- 7.10 Co-Chair NWDRF SL noted that organisations need to consider the application and deployment of RAS and undergo a make versus buy analysis for both situations.
- 7.11 The Board noted the following specific comments on the Position Paper:
- The safety benefits of RAS should be made clearer in the position paper
 - Emphasis should be placed on the need for reliability of RAS technology to ensure nuclear safety
 - The benefit of RAS deployment for repetitive low skill tasks should be included in the paper in addition to the benefits of deployment in high challenge/high hazard scenarios
 - The inclusion of the barriers to the implementation of RAS technology was beneficial.
- 7.12 It was noted that the challenge in this area is the size of the market pull for the nuclear sector (i.e. relatively small).
- 7.13 The Board reviewed the position paper draft recommendations and agreed all recommendations.

Action 12/04: The Chair to amend the NDA Research Board draft position paper on the NDA's approach to robotics R&D in the context of decommissioning strategy in line with the comments received from Board members – by 25th February 2017.

[8] Discussion on NDA's response to the recommendations in the Research Board's Review of NDA's Technology Baseline Underpinning Research and Development (TBuRD) Process

The Chair reviewed the NDA's response to the recommendations in the Research Board's Review of NDA's Technology Baseline Underpinning Research and Development (TBuRD) Process and requested comments and feedback from the Board. The following comments were received.

- 8.1 The NDA should publish the vocabulary used for NDA responses to recommendations (i.e. Agreed, Accepted, Noted and Not Accepted)

Action 12/06: Research Manager, NDA to publish the NDA's vocabulary for responses to NDA Research Board recommendations on the NDA website – by 17th February 2017.

- 8.2 The Board was content with the NDA's responses to all recommendations.
- 8.3 The Board held a discussion on the NDA response to recommendation 8. The NDA noted that the currently available work and cost breakdown structures do not fully provide the information required to address the Board's recommendation. A large demand on resource would be required to review the available information sources and fully address the recommendation. An alternative approach would be to review SLC R&D spend by programme area and identify the three greatest areas of expenditure and carry out a check of these areas. The Board suggested that NDA reviews the "shape" of R&D expenditure

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within the SLC's and determine if the expenditure is appropriate with respect to the R&D carried out.

- 8.4 The Board thanked NDA for their detailed response to the recommendations and acknowledged that the NDA are taking appropriate consideration of the output from the Congentus review of the TBUrd process.

[9] Research Board's Annual Report FY 15/16

- 9.1 The Chair presented the NDA Research Board's Annual Report FY 2015/16. The Board approved the report subject to minor edits and the inclusion of the following items.
- An Executive Summary
 - A statement noting that NDA Research Board is a key part of NDA's governance

Action 12/07: The Chair to amend the draft NDA Research Board Annual Report for FY 2015/16 in line with the comments received from the Board – by 17th March 2017.

[10] Observations on Meeting 12

- 10.1 Chair welcomed the CoRWM member and asked whether he had any observations with regard to the meeting.
- 10.2 The CoRWM observer thanked the Chair for the invitation to the meeting and for the interesting discussions. It was noted that the Board has an efficient process of circulating papers in advance. The meeting was welcoming and cooperative and the process of agreeing Board papers was thought to be good.
- 10.3 The CoRWM observer updated the Board on the recent changes to CoRWM membership. The process of changing membership started in June 2016 and completes at the end on November 2016. The Chair's tenure has been extended by a year to ensure continuity. It was also noted that CoRWM's budget has been reduced by BEIS.

[11] Review of Actions

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

[12] Any Other Business

- 12.1 The Chair of RWM TAP noted that RWM TAP is evolving because RWM is now moving into a siting programme. TAP's role will now include the strategic, stakeholder engagement and communication aspects of the siting programme. Consequently technical aspects will be a smaller fraction of the overall programme. The existing TAP will finish and a new advisory panel, with a broader membership, will be in place after spring 2017. The Chair of RWM TAP requested the RWM TAP Annual Report for 2016 is circulated to NDA RB members for comment.

Action 12/08: Research Manager, NDA to circulate Issue 1 of the RWM Technical Advisory Panel annual report to the NDA Research Board for review – by 31st March 2017.

- 12.2 Head of Technology, NDA, gave an update on recent NDA communication activities which have included the publication of:

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- R&D blogs on the NDA website
 - A video detailing the NDA R&D strategy on the NDA website
 - A new NDA Research Brochure detailing why the NDA and its estate carries out R&D and includes case studies on directly funded and SLC funded R&D. The case studies focus on high and low tech solutions and skills maintenance. Hard copies of the brochure are available on request.
- 12.3 Co-Chair NWDRF SL informed the Board that the recent NWDRF Nuclear Futures conference held in Birmingham on 11th October 2016 had been a success with ninety delegates attending. The conference will run again in 2017.
- 12.4 NIRO observer gave an update on NIRAB (Nuclear Innovation and Research Advisory Board) including:
- NIRAB welcoming the announcement by BEIS of the commitment of £20 million for an initial phase of a new nuclear research and innovation programme. The programme covers five major themes, which address priority research areas recommended by NIRAB (Advanced fuels, materials and manufacture, reactor design, advanced recycling and strategic toolkit).
 - Preparation of the NIRAB Annual report
 - An update of the Nuclear R&D Landscape, which is due to complete at the end of 2017.
- 12.5 The NIRO observer also noted that NIRAB has now come to an end and there are currently no plans for a follow on from NIRAB.
- 12.6 The Board agreed that the following items should be included on the agenda for the next meeting on 10th May 2017.
- An update on research activities from ONR and EA
 - A final update on NIRAB by NIRO
 - NDA's approach to horizon scanning

CLOSE

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APPENDIX 1 – Outstanding and New Actions

Action 10/10: Head of Technology NDA to update the Board on NDA horizon scanning activities at a future meeting, by November 2016 – Ongoing.

Action 10/11: Superintending Inspector ONR to give an update to the Board at a future meeting with details of the ONR R&D programme by November 2016 – Ongoing.

Action 10/12: Radioactive Substance Regulation Manager, EA to give an update to the Board at a future meeting with details of the EA nuclear decommissioning related R&D interests by November 2016 – Ongoing .

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

Action 11/01: NWDRF TBuRD Working Group to review the Technical Baseline Report and TBuRD output and report back to the Board with its conclusions by 31st March 2017 – Ongoing.

Action 12/01: Radioactive Substances Principle Policy Officer, SEPA, to provide reworded text for recommendation 9 of the NDA Research Board draft position paper on the NDA's approach to technical underpinning of plutonium storage at Sellafield – by 6th December 2016.

Action 12/02: The Chair to amend the NDA Research Board draft position paper on the NDA's approach to technical underpinning of plutonium storage at Sellafield in line with the comments received from Board members – by 1st February 2017.

Action 12/03: Research Manager, NDA to circulate the modified recommendations from the NDA Research Board draft position paper on the NDA's approach to technical underpinning of plutonium storage at Sellafield to the Board for final comment and approval – by 10th February 2017.

Action 12/04: The Chair to amend the NDA Research Board draft position paper on the NDA's approach to robotics R&D in the context of decommissioning strategy in line with the comments received from Board members – by 25th February 2017.

Action 12/05: Research Manager, NDA to circulate the revised NDA Research Board draft position paper on the NDA's approach to robotics R&D in the context of decommissioning strategy to the Board for final comment and approval – by 10th March 2017.

Action 12/06: Research Manager, NDA to publish the NDA's vocabulary for responses to NDA Research Board recommendations on the NDA website – by 17th February 2017.

Action 12/07: The Chair to amend the draft NDA Research Board Annual Report for 2015 in line with the comments received from the Board – by 17th March 2017.

Action 12/08: Research Manager, NDA to circulate Issue 1 of the RWM Technical Advisory Panel annual report to the NDA Research Board for review – by 31st March 2017.