

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

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) Radioactive Substances Principal Policy Officer, Scottish Environment Protection Agency (SEPA) – Part-time | 6) Professional Lead, Chemistry and Chemical Engineering and Research Delivery Lead, Office for Nuclear Regulation (ONR) |
| 7) Co-Chair, Nuclear Waste and Decommissioning Research Forum (NWDRF), Sellafield Ltd (SL) | 8) Director Science, Engineering & Technology, Atomic Weapons Establishment (AWE) |
| 9) Waste and Decommissioning R&D Programme Manager, EDF Energy Generation | 10) Director of Engineering & Technology – Rolls-Royce, Civil Nuclear |
| 11) Director, Nuclear Innovation and Research Office (NIRO) – Observer | 12) Radioactive Substances Regulation Manager, Environment Agency (EA) |
| 13) Committee on Radioactive Waste Management (CoRWM) Member – Observer | 14) Central R&D Manager, SL - Invited |
| 15) Director of Enabling and Emerging Technologies, Innovate UK – (Invited Part-time items 7 -10) | 16) Technical Assurance Manager, NDA – Invited (Part-time Item 5 only) |

Main Purposes of the Meeting

- To discuss NDA's response to the recommendations in the Research Board's "Review of NDA's Approach to Robotics and Autonomous Systems (RAS)".
- To discuss the NDA's Preferred Options Paper on "Robotics and Artificial Intelligence1 Research and Development".
- To further discuss the NDA's Approach to Horizon Scanning.
- To receive updates on NIRO and New Structure for NIRAB.
- Update on EDF's Decommissioning and Related R&D.
- To discuss potential changes to NDA Research Board's Terms of Reference.

[1] Welcome & Apologies

- 1.1 Chair welcomed the Members and Observers to the 14th meeting of the NDA Research Board (NDARB) and referred attendees to the full agenda for the meeting.

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

- 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
 - Government Chief Scientific Advisor
 - Chief Scientific Advisor, Department for Business, Energy and Industrial Strategy (BEIS)
 - Chief Scientific Advisor, Ministry of Defence (MOD)
 - Chief Scientific Advisor, Scottish Government
 - Principle Investigator (PI) – Nuclear Champion, Research Council Energy Programme (RCEP)
 - Programme Manager, Nuclear Energy Directorate – Clean up Division, (CEA)
- 1.3 Members of the Board introduced themselves. The Chair welcomed new members from EDF, ONR and AWE.
- 1.4 The Chair invited any relevant declarations of interest – none were received.

[2] Agenda

- 2.1 The agenda was agreed following a re-ordering of items in order to maximise Board member attendance.
- 2.2 Any Other Business (AOB) items – Topic for the next Board discussion, NWDRF Nuclear Frontiers Conference and NDA Research Board Annual report format.
- 2.3 The date and location for the next NDA Research Board meeting was agreed: 9th May 2018 in Central London.

[3] Review of 13th Meeting

- 3.1 Minutes of 13th Meeting
- The minutes were approved with minor edits suggested.
- 3.2 Outstanding actions from previous meetings:
- There were no outstanding actions from the previous meeting.

[4] Board member feedback on EA's Nuclear Research & Development Interests and ONR's Regulatory Research Annual Report for 2016

- 4.1 The Board held a discussion on the EA Nuclear Research & Development Interests report and the ONR's Regulatory Research Annual Report for 2016, both of which had been circulated to members following actions from the last meeting. The following specific points were noted.
- An updated version of the EA report is now available and contains a prioritised list of R&D topics and aligns with EA's regulatory interests.

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

- ONR engages with licensees regarding R&D to support regulatory decision making.
- SL engages with the ONR R&D programme via the SL Chief Scientist.
- The NWDRF TBUrd Working Group provides a forum for the discussion of ONR's regulatory R&D needs.
- ONR contribute to international programmes (e.g. via NNL) and have a cost effective programme maximised by gearing.

Action 14/01 Radioactive Substances Regulation Manager, Environment Agency, to circulate an updated version of the "Environment Agencies: Nuclear Research & Development Interests" report which includes a prioritised list of R&D topics – by 29th November 2018.

Action 14/02 Professional Lead, Chemistry and Chemical Engineering, ONR, to determine if ONR's prioritised list of R&D topics can be shared and circulate to the Board (via the Technical Secretary) if possible – by 12th January 2018.

[5] Discussion on NDA's response to the recommendations in the Research Board's "Review of NDA's Approach to Robotics and Autonomous Systems (RAS)" and NDA's Preferred Options Paper on "Robotics and Artificial Intelligence Research and Development"

5.1 The Board discussed the NDA's responses to the recommendations made in the Board's "Review of NDA's Approach to Robotics and Autonomous Systems (RAS)". The Board agreed to the NDA's responses to recommendations 1, 2, 4, 5 and 6.

5.2 The Board was of the opinion that the NDA's response to recommendation 3 did not address how the RAI (Robotics and Artificial Intelligence) programme would collaborate with AWE. The NDA clarified that the collaboration would be managed via AWE involvement in the programme steering group and via the relevant NWDRF working groups. NDA agreed to update the response to recommendation 3.

5.3 The Board queried whether the NDA's response to recommendation 7 is sufficiently proactive with regard to capturing prior robotics experience. A discussion was held on possible mechanisms to capture prior experience, for example cataloguing technologies that have previously been used. NDA noted that knowledge management will play a key role here. NDA will utilise the RAI Community of Practice interactions and the NDA's web based knowledge management tool (Crucible).

5.4 The Head of Technology, NDA, and Central R&D Manager, SL gave a short presentation to introduce the NDA's Preferred Options Paper on "Robotics and Artificial Intelligence Research and Development". The NDA's preferred option for RAI R&D strategy is that NDA maintain a strategic role with the R&D programme being SL led, NNL managed and delivered in partnership with RACE and other relevant organisations. This will enable NDA to take a strategic role in influencing and seeking broader funding opportunities. SL will lead on behalf of the NDA estate as the greatest opportunity for benefit can be realised there. NNL will manage R&D delivery due to their good understanding of deployment and end-user requirements at Sellafield but will use the skill and expertise of other organisations such as RACE.

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

- 5.5 It was noted that any new RAI technology must be implemented into the estate in a safe and timely manner. Therefore utilising a partner organisation that understands site challenges and needs along with an understanding of site safety concerns and procedures will be key to successfully deploying RAI technology. The NDA Preferred Options paper “Robotics and Artificial Intelligence Research and Development” covers how these issues will be addressed.
- 5.6 NDA and SL requested support from NDARB for the preferred option and to take the proposed programme of work forward and carry out further engagement to enable implementation.
- 5.7 The Chair invited comments from the Board on the NDA Preferred Options paper. The Board felt that a good range of credible options had been considered. The Board was not in favour of a national centre for nuclear robotics to cover the NDA’s needs as robotics is often very application specific and therefore general centralisation is not appropriate. Funding has also been made available in this area, via the recently announced EPSRC Robotics Hubs.
- 5.8 Engagement with existing R&D routes will be key to ensure adequate technology pull from the nuclear industry. The NDA’s preferred option would also give access to a diverse range of experience.
- 5.9 The Board had previously heard from AWE on their experiences in implementing robotic technologies, both technical and cultural. AWE experience would be integrated as appropriate via NWDRF and Working Group interactions.
- 5.10 NDA confirmed that NDA, SL and NNL have links to the recently announced EPSRC Robotics Hubs – (i) National Centre for Nuclear Robotics led by University of Birmingham and (ii) Robotics and Artificial Intelligence for Nuclear (RAIN) led by University of Manchester. NDA provided letters of support for both hubs to the EPSRC.
- 5.11 Board members requested more information be included in the NDA Preferred Options paper to recognise and adequately cover the wide ranging issues (e.g. cultural issues) surrounding deployment and implementation of RAI on sites.
- 5.12 Members raised the issue of the difficulty of a working arrangement with multiple interfaces. The preferred option could result in complex delivery and the Board queried if accelerated deployment of robotics would be viable via the preferred option? It was noted that SL and NNL have prior experience of working as part of an integrated team, for example on the Box Encapsulation Plant (BEP) robotics project.
- 5.13 The Board confirmed support for the NDA’s preferred option for Robotics and Artificial Intelligence Research and Development i.e. NDA maintain a strategic role with the R&D programme being SL led, NNL managed and delivered in partnership with RACE and other relevant organisations.

Action 14/03: NDA to progress with implementing the preferred option and update the Research Board on progress regarding their Robotics and Artificial Intelligence Strategy within two years – by end of November 2019.

Action 14/04: Technical Assurance Manager, NDA, and Central R&D Manager, SL, to revise the wording of the NDA’s response to Research Board’s recommendation 3 in “Review

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

of NDA's Approach to Robotics and Autonomous Systems (RAS)" to clarify how NDA will collaborate with AWE – by 19th January 2018.

Action 14/05: Technical Assurance Manager, NDA, and Central R&D Manager, SL, to update NDA's Preferred Options Paper on "Robotics and Artificial Intelligence Research and Development" to include more detail on:

- (i) The wide ranging issues (e.g. cultural issues) surrounding deployment and implementation of RAI on sites
- (ii) How prior experience on this will be further captured and
- (iii) How knowledge management will be included in the RAI programme – by 16th February 2018.

[6] Update on NIRO and New Structure for NIRAB

6.1 The Director, NIRO gave an update on NIRO and new structure for NIRAB and this is summarised below.

6.2 A new three year contract has been put in place for NIRO running from 2017 to 2020; this will removed the uncertainty previously caused by annual funding arrangements. NIRO will provide the secretariat for NIRAB. NIRAB will continue to provide advice to BEIS and oversight to NIRO. The new contract will enable NIRO to provide advice directly to BEIS. NIRO will also provide support to BEIS in the area of civil nuclear resilience. NIRO is in the process of recruiting to create a team of ten members of staff. Eight team members are currently in place.

6.3 It was queried if NIRO will coordinate the BEIS nuclear R&D programme. NIRO will not coordinate but will review the programme outputs and provide advice on opportunities and gaps in R&D for example.

6.2 It was noted that the new Terms of Reference (ToR) do not include coordination of international engagement; the loss of information sharing on international activities would be a missed opportunity. NIRO would query the removal of this task from the NIRO ToR.

6.3 There have been over a hundred applicants for membership of the new NIRAB and a Chair is still to be appointed. It is expected that NIRAB will include a core membership of consistent Board meeting attendees that have a broad knowledge of nuclear issues. However, NIRAB will have a larger pool of members who will be invited to attend as necessary with attendance based on subject matter.

6.4 An update was given on the Nuclear Innovation Programme with details provided on the lead organisations for each contract. The total value of the contracts is £20M with project durations ranging from 6 months to 2 years. Programme topics were identified by NIRAB and are in areas that require funding in order to support Government policy development.

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

7.1 The Chair introduced the Horizon Scanning discussion topic and reminded Board members that the subject was originally discussed at the May 2017 meeting.

[8] NDA's Approach Horizon Scanning

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

- 8.1 Research Manager, NDA, gave a presentation to the Board on the NDA's approach to Horizon Scanning covering the following:
- An overview of the Board's earlier discussions of the topic, noting that the Chair had previously prepared a letter of support from the Board on Horizon Scanning to the NDA.
 - The purpose of the current session is to (i) confirm that NDA agrees with the Board's letter of support; (ii) address the specific points raised by the Board in their letter and (iii) to ask the Board if the updated NDA approach to Horizon Scanning is sensible at this time and whether NDA should implement it?
 - Whilst NDA has been proactive in encouraging innovation in recent years through their collaborative programmes with Innovate UK, NDA's current true Horizon Scanning activities are limited and ad hoc in nature but have included, for example, a review of graphene research developments and a technology awareness survey.
 - The purpose of NDA's Horizon Scanning programme will be to raise awareness of and promote innovative and disruptive technologies and techniques within NDA and the Estate with a view to delivering the decommissioning mission more safely, quickly, cheaply and with less environmental impact. Horizon Scanning will have a whole estate focus and will form part of the process to bring external ideas into the NDA and the Estate at an early stage.
 - The Horizon Scanning programme would include
 - Open ended scouting investigations in both the nuclear and non-nuclear sector
 - Targeted technology reviews
 - Filtering and dissemination of the output of activities
 - Retention of information gathered
 - Exploitation / Implementation of the programme outputs – internally at NDA and externally Estate wide
 - Mechanisms to deliver overarching cultural change to ensure the whole organisation involvement
 - Programme benefits monitoring – Is the programme delivering the required benefits?
- 8.2 A range of credible options for delivery of the proposed Horizon Scanning programme have been identified and assessed against a range of criteria (based on previous NDA Research Board feedback and the NDA Value Framework) using a Red/Amber/Green (RAG) approach. The RAG approach identified three highest scoring options for delivery:
- 1st NDA led + SL + NDA Direct Research Portfolio (DRP) + Specialist Horizon Scanning Contractor
 - 2nd NDA led + SL + Specialist Horizon Scanning Contractor
 - 3rd NDA led + SL + DRP
- 8.3 NDA's preferred option is to establish a small NDA led team with a small SL team (on behalf of the NDA estate) in conjunction with the NDA's existing Direct Research Portfolio R&D contractors and a new specialist Horizon Scanning contractor. This option would have a relatively high start-up cost but provide a good balance of external insight and nuclear expertise. The option also helps to develop an innovative culture in SL, the Estate and Supply Chain. It also utilises the knowledge of the existing NDA R&D supply chain.

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

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

- 9.1 The Board queried why using a specialist Horizon Scanning contractor would result in increased costs compared to options where they are not used. The increased cost of using a specialist is associated with the competition process required to procure the work.
- 9.2 Innovate UK noted that there are numerous organisations providing specialist Horizon Scanning services. However it is possible for in-house staff to gain the necessary skills in a relatively short period of time. A key resource in any Horizon Scanning team is a competent information scientist to carry out the iterative process of systematic information searches coupled with rigorous questioning. An information scientist can help provide evidence for the technology prioritisation process and carry out information filtering tasks.
- 9.3 The Board queried the level of staffing required and the type of people to be involved in the preferred option. It is envisaged that the NDA and SL teams would each comprise one full time equivalent and would drawing upon the wider technical community in NDA and the SLCs. This would be done by utilising the depth and breadth of knowledge within the NWDRF and its Working Groups. The wider community would be used to disseminate information and raise awareness of the potential new technologies. The wider group would also be used in the scouting and filtering roles.
- 9.4 The Board agreed that the optioneering study had covered all of the credible options and the approach used was thorough and sensible. Having an in-house strategic lead will be fundamental to the programme success; the lead should also be informed by a broad-church.
- 9.5 The processes required for the delivery of the programme and the metrics for determining its effectiveness will be devised by the NDA lead in conjunction with SL to ensure buy-in and engagement with the process.
- 9.6 The Board noted that innovation portals can assist in the crowdsourcing of ideas and filtering of output; wide engagement will also result in increased diversity of thinking. Reward and recognition schemes can be used to drive broader engagement. However, experience has shown that monetary rewards are often not the most effect mechanism.
- 9.7 Further advice provided by the Board included:
- A Horizon Scanning process should be developed that is flexible and avoids conservatism when filtering out technologies during the early stages of the process. The process may need to be revised after an initial trial period.
 - Innovate UK noted that difficulty of implementation may be a more suitable criterion to use than time to market when filtering Horizon Scanning output.
 - A budget for information searching should be included in the programme.
 - The initial team should start small with the potential for growth if required.
 - Data analytics can be useful tool for trend spotting.
 - Technology watch-lists should be reviewed and refreshed on a regular basis to determine if an intervention is required now or at a later stage.
- 9.8 Innovate UK offered to provide further advice to NDA on establishing the Horizon Scanning process and programme.

[10] Summary of discussion regarding NDA's Approach to Horizon Scanning.

- 10.1 The Board confirmed that it was content with the NDA's analysis of credible options for the delivery of their proposed Horizon Scanning programme and the associated paper "NDA's approach to Horizon Scanning" [NDARB 031].

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

- 10.2 The Board confirmed its support for NDA's proposed preferred option of a small NDA led team plus a small SL team (on behalf of the NDA estate) in conjunction with the NDA's existing Direct Research Portfolio R&D contractors and a new specialist Horizon Scanning contractor for the delivery of a Horizon Scanning programme. The NDA should continue to develop its preferred option toward implementation.
- 10.3 In summary the Board recommended that the Horizon Scanning programme should include opportunities for smaller improvements in addition to disruptive technologies. A key feature for success of the programme will be well designed information searches. The programme should not just focus on identifying new technologies but should also include mechanisms to promote their deployment. The Horizon Scanning team should be small initially and grow when necessary and appropriate.
- 10.4 The Board agreed that a Position Paper was not necessary to record its views and advice for this particular topic; the earlier letter of support was sufficient along with the record from this meeting of their support to continue to develop and implement the approach.
- 10.5 NDA agreed to return to the Board to discuss progress regarding Horizon Scanning.

Action 14/08: NDA to update the Research Board on progress regarding their approach to Horizon Scanning – by end of May 2018.

[11] Update on EDF's Decommissioning and Related R&D.

- 11.1 The Waste and Decommissioning R&D Programme Manager, EDF Energy Generation, gave a presentation to the Board covering an EDF Energy Decommissioning Overview, an EDF Programme Development Approach and a Waste & Decommissioning R&D Programme overview.
- 11.2 It was noted that responsibility for discharging nuclear liabilities continues to rest with EDF Energy. EDF Energy remains responsible for managing EDF Energy waste & decommissioning liabilities. Funding for discharge of liabilities comes from three sources;
- Nuclear Liabilities Fund
 - Directly from Government
 - EDF Energy/EDF Group Accounts
- 11.3 Agreements are in place to manage these liabilities via the Nuclear Liabilities Funding Agreement and the Historic Liabilities Funding Agreement. NDA acts as agent for UK Government to administer Liabilities Management Agreements.
- 11.4 Decommissioning will involve defueling, Post Operational Clean Out (POCO) and preparation for care and maintenance, followed by around 70 years of care and maintenance. Reactor dismantling will take place as the final step.
- 11.5 EDF is currently looking to identify decommissioning R&D synergies within the current R&D landscape. EDF is also carrying out stakeholder mapping to identify areas for relationship strengthening. EDF is considering whether to adopt a TBoRD approach or a road mapping approach to decommissioning R&D.

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

- 11.6 EDF gave an overview of its decommissioning R&D programme. EDF engages with NDA and the estate via their interaction with NWDRF and its Working Groups.
- 11.7 The Waste and Decommissioning R&D Programme Manager, EDF Energy Generation thanked the Board for the opportunity to provide an update.
- 11.8 The Board held a discussion on the disposal route for graphite and the care and maintenance lifetime.

[12] Discussion on Potential Changes to NDA Research Board Terms of Reference

- 12.1 The NDA proposed revision of the Research Board Terms of Reference due to (i) the changes to RWM Technical Advisory Panel (TAP) and (ii) RWM's unique position having a permanent Board Member (the rest of the NDA Estate is represented on the Board by the NWDRF Co-Chair).
- 12.2 The Chair of RWM TAP has previously been a member of the Board. However, recent changes to the scope of the replacement panel for RWM TAP mean that it is no longer appropriate for the Chair of the TAP replacement to be a member of the Board. Therefore NDA proposed this position on the Board is removed. It was noted that RWM produce a TBuRD therefore RWM's R&D programme is subject to technical assurance by NDA. The Board agreed to the proposed change to its Terms of Reference.
- 12.3 NDA proposed that RWM no longer have direct representation on the Board and that RWM representation was carried out via the NWDRF Co-Chair as is the case for the rest of the NDA Estate. The NDA proposed inviting RWM to attend Board meetings when the meeting subject matter is of relevance.
- 12.4 The Board agreed to the proposed changes to the Terms of Reference with the caveat that RWM are invited to attend Board meetings when necessary. The Board's Terms of Reference should be updated to clarify the Board's governance role.

Action 14/09: NDA to update the Research Board's Terms of Reference to:

- (i) Clarify the role the Board plays in governance of NDA's R&D strategy,
- (ii) Update the Board membership in light of recent changes to RWM Technical Advisory Panel and
- (iii) Remove the RWM representation on the Board with RWM now to be invited attendees - by 19th April 2018.

[13] Observations on Meeting 14

- 13.1 The CoRWM Observer noted that the discussions on RAI and Horizon Scanning were interesting. The approach to and presentation of both topics provided comfort. The meeting demonstrated that sense of mission transcends parochial attitudes.
- 13.2 The CoRWM observer also provided an update on recent changes to CoRWM. The previous Chair of CoRWM ended his term in October 2017 and an interim Chair is currently in place. The process of appointing a new permanent Chair is underway.
- 13.3 CoRWM have recently provided input into Government consultation documents and have reviewed RWM's competency to function as an SLC for a national repository.

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

[14] Review of Actions

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

[15] Any Other Business

15.1 The Co-Chair NWDRF informed the Board that the NWDRF's annual Nuclear Research Frontiers conference would be held at Weetwood Hall, Leeds on 12th December 2017. This event is free to attend.

15.2 The Board considered topics for discussion at forthcoming Board meetings. It was agreed that the discussion topic for the next meeting will be a review of NDA's Thermal Treatment R&D programme.

Action 14/06: HAW Strategy Development Manager and Technical Secretary, NDA, to prepare an outline for Meeting 15 Thermal Treatment discussion topic including suggested invited attendees and circulate to the Board for comment – by 1st February 2018.

15.3 The Board discussed the possibility of a future topic focusing on the UK national laboratories.

Action 14/07: Head of Technology and Technical Secretary, NDA, to develop a proposal for the Board for consideration regarding the role of key R&D organisations involved in supporting decommissioning, for example NNL and other national laboratories – by 8th February 2018.

Action 14/10: Head of Technology and Technical Secretary, NDA, to discuss with NNL feasibility of a visit to NNL Central Laboratory for the Research Board Members – by 1st March 2018.

15.4 The Chair asked for Board member feedback on the format and content of the Board's Annual Report on activities. This report is reviewed by NDA's main Board. The chair noted that the report served two purposes:

- To report to the main NDA Board on the RB's activities, recommendations and advice.
- To be used as a public document via the NDA's website to provide information to a much wider audience.

The chair wished to avoid two separate documents to meet these needs.

15.5 Director, Strategy and Technology, NDA, noted that the Research Board provides governance of the appropriateness of NDA's R&D programmes and the NDA Board read the Annual Report with interest and finds it beneficial. NDA would like the Annual Report to continue.

15.6 The Board suggested that a synopsis of the report could be circulated in advance of a full draft to allow members to provide feedback at an early stage. The report could possibly be condensed to cover the topics the Board has reviewed, the Board's opinions and any recommendations and observations.

NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

- 15.7 Radioactive Substances Regulation Manager, Environment Agency (EA) informed the Board that the NERC RATE programme is coming to a close and the project final science meeting will be held on 15th – 17th January

Action 14/11: Technical Secretary, NDA, to circulate a link to the NERC RATE project final science meeting on 15th – 17th January 2018 – by 29th November 2018.

- 15.10 The Chair expressed the Board's thanks to NWDRF Co-Chair (SL) for his valuable work as a Board Member. The NWDRF Co-Chair (SL) will be standing down from the role in 2018 after seven years in post.

CLOSE

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

APPENDIX 1 – New Actions

- Action 14/01** Radioactive Substances Regulation Manager, Environment Agency, to circulate an updated version of the “Environment Agencies: Nuclear Research & Development Interests” report which includes a prioritised list of R&D topics – by 29th November 2018.
- Action 14/02** Professional Lead, Chemistry and Chemical Engineering, ONR, to determine if ONR’s prioritised list of R&D topics can be shared and circulate to the Board (via the Technical Secretary) if possible – by 12th January 2018.
- Action 14/03:** NDA to update the Research Board on progress regarding their Robotics and Artificial Intelligence Strategy within two years – by end of November 2019.
- Action 14/04:** Technical Assurance Manager, NDA, and Central R&D Manager, SL, to revise the wording of the NDA’s response to Research Board’s recommendation 3 in “Review of NDA’s Approach to Robotics and Autonomous Systems (RAS)” to clarify how NDA will collaborate with AWE – by 19th January 2018.
- Action 14/05:** Technical Assurance Manager, NDA, and Central R&D Manager, SL, to update NDA’s Preferred Options Paper on “Robotics and Artificial Intelligence Research and Development” to include more detail on:
- (i) The wide ranging issues (e.g. cultural issues) surrounding deployment and implementation of RAI on sites
 - (ii) How prior experience on this will be further captured and
 - (iii) How knowledge management will be included in the RAI programme – by 16th February 2018.
- Action 14/06:** HAW Strategy Development Manager and Technical Secretary, NDA, to prepare an outline for Meeting 15 Thermal Treatment discussion topic including suggested invited attendees and circulate to the Board for comment – by 1st February 2018.
- Action 14/07:** Head of Technology and Technical Secretary, NDA, to develop a proposal for the Board for consideration regarding the role of key R&D organisations involved in supporting decommissioning, for example NNL and other national laboratories – by 8th February 2018.
- Action 14/08:** NDA to update the Research Board on progress regarding their approach to Horizon Scanning – by end of May 2018.
- Action 14/09:** NDA to update the Research Board’s Terms of Reference to:
- (i) Clarify the role the Board plays in governance of NDA’s R&D strategy
 - (ii) Update the Board membership in light of recent changes to RWM Technical Advisory Panel and
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NDA Research Board

28th November 2017 10:00 – 16:00

Herbert Morrison Room, Marriott County Hall, London, SE1 7PB

Action 14/10: Head of Technology and Technical Secretary, NDA, to discuss with NNL feasibility of a visit to NNL Central Laboratory for the Research Board Members - by 1st March 2018.

Action 14/11: Technical Secretary, NDA, to circulate a link to the NERC RATE project final science meeting on 15th – 17th January 2018 – by 29th November 2018.