

NDA Research Board

10th November 2015 10:00 – 16:00

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

MINUTES – Issue 1

Attendees

- 1) Chair of NDA Research Board, Independent
- 2) Director, Strategy & Technology, NDA
- 3) Head of Technology, NDA
- 4) Head of Research, Radioactive Waste Management Ltd (RWM)
- 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) Director of Engineering and Technology – Rolls-Royce, Civil Nuclear
- 9) Radioactive Substance Regulation manager, Environment Agency (EA)
- 10) Chief Technologist, Atomic Weapons Establishment (AWE)
- 11) Head of Nuclear Fuel Cycle, NDA - Invited
- 12) Technical Assurance Manager, NDA – Invited
- 13) Research Manager, NDA - Technical Secretary
- 14) Director, Nuclear Innovation and Research Office (NIRO) – Observer
- 15) Head of Nuclear Innovation Policy and Coordination, Department of Energy and Climate Change (DECC)
- 16) Principle Investigator (PI) – Nuclear Champion, Research Council Energy Programme
- 17) Deputy Chair of Committee on Radioactive Waste Management (CoRWM) – Observer
- 18) Head of Technical - Product Plants, Sellafield Ltd - Invited
- 19) Co-Chair, Nuclear Waste and Decommissioning Research Forum (NWDRF), Sellafield Ltd
- 20) Programme Manager, Nuclear Energy Directorate – Clean Up Division, CEA
- 21) Engineer, Science and Innovation, Department of Energy and Climate Change (DECC)

Main Purposes of the Meeting

- To discuss NDA's response to recommendations in the Research Board's Review of NDA's Spent Fuels R&D Programme.
- To confirm members' view of the NDA's Technology Baseline Underpinning Research and Development (TBuRD) Process and agree the Research Board Position Statement
- To review the NDA's approach to technical underpinning of plutonium storage at Sellafield.

[1] Members Only Discussion

- The Chair updated the Board on his attendance at the main NDA Board Meeting in June 2015.

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[2] Welcome & Apologies

- Chair welcomed everyone to the 10th meeting of the NDA Research Board (NDARB).
- A number of apologies had been received prior to this meeting:
 - Head of Nuclear Energy, Transport, Decommissioning & Waste Management, Directorate for Energy, European Commission
 - Chief Technical Officer – Existing Nuclear, EDF Energy
 - Government Chief Scientific Advisor
 - Chief Scientific Adviser for Scotland
 - Chief Scientific Advisor, Department for Business, Innovation & Skills (BIS)
 - Chief Scientific Advisor, Ministry of Defence (MOD)
 - Director Assistant, Nuclear Energy Directorate – Clean up Division, CEA – Programme Manager, Nuclear Energy Directorate – Clean Up Division, CEA attending as nominated representative
 - Chief Scientific Advisor, Department of Energy and Climate Change (DECC) - Head of Nuclear Innovation Policy and Coordination, and Engineer, Science and Innovation, Department of Energy and Climate Change (DECC) attending as nominated representatives
- Members of the Board introduced themselves.
- The Chair invited any relevant declarations of interest – none were received.

[3] Agenda

- The agenda was agreed.
- Any Other Business (AOB) items – Future topics for the Board was identified as an AOB item.
- A provisional date and location for the next NDA Research Board meeting was agreed as 4th May 2016 in Central London.

[4] Review of 9th meeting

- Minutes of 9th Meeting – The minutes were approved with no amendments.
- Outstanding actions from previous meetings:

An actions status list was distributed prior to the meeting. The Research Manager, NDA reviewed the status of the outstanding actions from the previous meetings.

- **Action 03/05:** Board Members to review draft Technical baseline report when circulated and provide comments back to the NDA within one month

Draft Technical Baseline document has been shared with NDA Research Board members (30/3/15) and comments were requested from members by email (2/4/15). Comments from Board Members are being incorporated into latest version of the report and the document is also being updated to align with latest NDA Strategy. The revised version draft Technical

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Baseline document was discussed at the NWDRF TBuRD Working Group in October 2015. Publication is planned for this financial year.

- **Action 03/08:** Chair and NDA to undertake a comparison with the TBuRD output and report back to the Board on its conclusions.
- The original intention had been to compare members' views on necessary UK R&D in this field with the output from the TBuRD process. Time has moved on since the action was placed and the NDA and Chair will review of this is still a meaningful action once the final TBuRD report is available.
- **Action 08/04:** Compare the Research Board Terms of Reference with the NWDRF Terms of Reference (ToR) to ensure compatibility – Head of Technology, NDA and Co-Chair of NWDRF, Sellafield Ltd by 31/12/14.

This action was completed prior to the Board meeting. The ToRs were found to be broadly compatible. The NDA Research Board ToR are more strategic than the NWDRF ToR as expected. The NWDRF ToR cover key NDA strategic theme areas for Integrated Waste Management and Site Restoration. The NDA Research Board ToR also refers to decommissioning, radioactive waste management and disposal. Spent Fuels and Nuclear Materials are not explicitly mentioned in the ToR. However, the ToR should and does cover the entirety of the NDA's remit which includes Spent Fuels and Nuclear Materials. The ToR for the NDA Research Board and NWDRF are reviewed on an annual basis.

Action 10/01: Research Manager, NDA to circulate the output of the review of NDA Research Board and NWDRF Terms of Reference to the Board by email – by 7th January 2016.

- **Action 09/14:** Approve, if appropriate, redrafted version of "Review of NDA's Higher Activity Waste Pre-Disposal Treatment R&D" Position Paper – NDA Research Board Members.

Draft 2 of "Review of NDA's Higher Activity Waste Pre-Disposal Treatment R&D" Position Paper was circulated to the Board by email on 14/10/15, for approval. Final comments requested by 12/11/15. Comments have been received from NDA requesting a minor wording change.

Action 10/02: Research Manager, NDA to circulate the revised "Review of NDA's Higher Activity Waste Pre-Disposal Treatment R&D" to the Board by email – by 17th December 2015.

[5] Discussion on NDA's Response to the Research Board's Position Statement on the Review of NDA's Spent Fuels R&D Programme

- The Board held a discussion on the NDA's responses to the Research Board's position statement on the review of NDA's spent fuels R&D programme. The Chair noted that the NDA's responses to Research Board position statements are published in the public domain and therefore need to be discussed with the Board to ensure there is no misunderstanding. The Board agreed that a consistent vocabulary for NDA responses to recommendations was required so that it was clear what was accepted or otherwise by the NDA. It was noted that some of the recommendations in the Research Board's Position Statement on the "Review of NDA's Spent Fuels R&D Programme" read as if they are

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comments on strategy rather than recommendations regarding R&D. The Board agreed that the recommendations in the "Review of NDA's Spent Fuels R&D Programme" should be reviewed and clarified where appropriate and that amended NDA responses to the revised recommendations should be discussed with the Chair and circulated to the Board.

Action 10/03: Research Manager, NDA to circulate proposed vocabulary for NDA responses to Position Papers to the Board by email – by 7th January 2016. The Board to respond by email with any proposed changes – by 21st January 2016.

Action 10/04: Chair to review and clarify the recommendations in Research Board's Position Statement on the "Review of NDA's Spent Fuels R&D Programme" – by 15th January 2016.

Action 10/05: Chair to review NDA's responses to the recommendations in the NDA Research Board's Position Statement on the review of NDA's Spent Fuel R&D Programme with Head of Technology, NDA and Head of Nuclear Fuel Cycle, NDA and circulate to the Board by email – by 26th February 2016

[6] Research Board's view on the NDA's Technology Baseline Underpinning Research and Development (TBuRD) Process and discussion of draft Research Board Position Statement

- The Chair thanked the Technical Assurance Manager, NDA, Co-Chair NWDRF, Sellafield Ltd and Co-Chair NWDRF TBuRD Working Group, Magnox Ltd for their discussions during the preparation of the draft position statement. The Chair invited feedback on the draft TBuRD position statement from the Board.
- Clarification of the definition of liability costs against technical area, as stated in recommendation 8 (page 10). Liability costs were defined as costs by activity, e.g. retrievals costs rather than costs for specific projects. It was noted that NDA costs are currently broken down by project into life cycle stage. The Board agreed that wording of recommendation 8 should be clarified.

Action 10/06: Chair and Technical Assurance Manager, NDA to discuss wording for Recommendation 8 (page 10) in the NDA Research Board's Position Paper "Review of NDA's Technology Baseline Underpinning Research and Development (TBuRD) Process" by 18th January 2015.

- A discussion was held regarding the suitability of technology road maps to Sellafield Ltd. It was noted that the TBuRD Working Group is looking at new approaches to road mapping. This presents an opportunity for TBuRD working group to put forward alternative approaches to technology road mapping from other sectors and industries both nationally and internationally. The Board agreed that consideration of alternative approaches to technology road mapping should be included as a recommendation in the position statement.

Action 10/07: Chair and Technical Assurance Manager, NDA to discuss possible additional recommendations for NDA Research Board's Position Paper "Review of NDA's Technology Baseline Underpinning Research and Development (TBuRD) Process" by 18th January 2015.

- The Co-chair NWDRF, Sellafield Ltd noted that he had sent specific comments and edits on an early version of the paper to the Chair by email.

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- The following specific edit was noted by the Board. The observation 1 on page 6 should be reworded from “universally recognised” to “recognised by Cogentus”.
- The Board agreed that the position statement is substantially appropriate and answers the standard questions posed by the Board.

Action 10/08: Chair to review comments received by email from Co-Chair NWDRF, Sellafield Ltd, update NDA Research Board's Position Paper “Review of NDA's Technology Baseline Underpinning Research and Development (TBuRD) Process” to take into consideration the Board's comments and circulate the revised draft to the Board for approval by email by 29th February 2016.

Action 10/09: The Board to approve, if appropriate, the Position Paper on “Review of NDA's Technology Baseline Underpinning Research and Development (TBuRD) Process” by email by 31st March 2016.

- A discussion was held regarding horizon scanning activities in relation to the identification of technologies from outside of the nuclear sector. The Board agreed that NDA should update the Board on their horizon scanning activities.

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

[7] Update on NIRAB/NIRO Activities

- The Director, NIRO gave an update on the NIRAB/NIRO activities.
- The NIRAB key themes for research were presented to the Board.
- It may not be possible for all of the research programme recommended by NIRAB to be delivered. Therefore NIRAB have carried out a review of the current funding landscape to determine if there are any areas where funding could be diverted rather than requesting additional funds from Government.
- The review of current public nuclear R&D funding showed that funding is dominated by NDA Site Licence Companies (77% of funding). Site Licence Companies funding is dominated by needs driven late stage technologies to support decommissioning and clean up. Site Licence Company spending was found to be the minimum required to support the NDA mission. It was also noted that availability of SLC TBuRDs greatly facilitated the review process.
- A significant proportion of Research Council funding aligns broadly with NIRAB or NDA priorities. Research Council funding was dominated by EPSRC with a smaller quantity from NERC. Other funding sources included NDA, Innovate UK and National Nuclear Laboratory.
- The review concluded that there are no appropriate opportunities for the re-direction of funds. In addition current public funding is at the minimum level required to deliver current programmes of work, therefore additional funding is necessary for work envisioned by NIRAB. Therefore NIRAB has prioritised its objectives to take the above conclusions into account.

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- NIRAB has considered the consequences of a range of budgets – post spending review and priorities have been identified taking into consideration the minimum and the recommended budget levels.
- It was noted that the output of the NIRAB report is testimony to Industry, NDA, the academic community and Innovate UK working together.
- DECC are currently analysing drivers for nuclear R&D and plan to maximise international leverage; the NIRAB report will be use to aid this task.
- It was noted that it would be difficult produce comparable private sector nuclear funding data due to commercial sensitivities.

[8] RWM Technical Advisory Panel (TAP) Annual Report & Progress Update following on from the Board's Review of RWM'S R&D Programme

- The Chair of RWM TAP gave a presentation covering the TAP Annual Report to the NDA Research Board. The presentation gave an overview of the RWM TAP Terms of Reference, background to the panel and its current membership. It was noted that a two yearly schedule has been developed to review the entirety of the RWM R&D programme. Major topics covered by RWM TAP in financial year 2014-2015 included:
 - Use of Modelling in the technical programme
 - National Geological Screening (NGS)
 - Waste Management Programme: progress in disposability assessments and fLoCs
 - High Level System and Safety Requirements
 - Business Planning Process: managing technical risks and opportunities
 - Draft Communications and Engagement Strategy (for NGS)
 - Progress with Integrated Project Teams (IPTs): 14-C; high-heat wastes; uranium
- The following topics will be covered in financial year 2015-2016 including in response to recent recommendations made by the NDA Research Board:
 - Progress with Integrated Project Teams (IPTs): 14-C; high-heat wastes; uranium
 - Approach to non-radiological, chemotoxic hazards in the Geological Disposal Facility (GDF).
- An update in the area of chemotoxic hazards and the Groundwater Daughter Directive (GDD) was provided. A discussion was held regarding the implementation of the GDD. It was suggested that the legislation was not written with a GDF in mind and that there is a need to establish an agreed position.
- An update on the societal aspects of geological disposal was also given as outlined below:
 - A RWM Status Report is currently in draft: RWM TAP considered that the report to be excellent.
 - Potential areas for further research have been identified regarding (i) the public's low level of understanding of radioactivity, in terms of exactly what the public understand and why and (ii) public attitudes towards natural hazards and risks.
 - RWM TAP has recommended that RWM consider the need for additional research into the area of public understanding – specifically in terms of hazard perception and risk.

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- The Chair of the NDA Research Board asked if there was anything further that the Research Board could do to help RWM TAP. It was felt that the NDA Research Board review of the RWM R&D programme was very helpful as was the discussion regarding the GDD at the current meeting.
- The NDA Research Board queried the status of work at RWM regarding R&D requirements for modelling and simulation for diagnostics throughout the GDF lifecycle. The engineering approach will be determined once site specific details are known. EPSRC and EU work-streams are currently funding R&D on monitoring and post-closure monitoring respectively.

[9] Update on Office for Nuclear Regulation (ONR) Research Strategy

- The Superintending Inspector, ONR gave a presentation on the ONR Research Strategy covering:
 - Strategy timeline
 - Research funding routes
 - Research coordination and collaboration
 - New Research Objectives
 - Regulatory research principles
 - Regulatory research criteria
- ONR's aim is for the majority of the research to be funded and managed by the Site Licensees, with ONR having access to the research output. However, there is also the option of the Licensees funding work with ONR managing the programme. Further options are available with ONR managing and funding work (e.g. graphite research programmes) or ONR managing programmes with DECC providing funding (e.g. R&D focused on new technology/new build).
- It is envisaged that research will be collaborative for example with Licensees, other regulators EA, SEPA, Natural Resources Wales (NRW), Defence Nuclear Safety Regulator (DNSR) or with other bodies e.g. NIRAB, NDA, NWDRF.
- ONR's research objectives and five regulatory research principles were defined. Relevant research topics were also outlined.
- It is ONR's intention to publish a research register. Work that is likely to be relevant to the NDA Research Board is in the area of waste packaging and GDF. The cost of the total programme of work is approximately £ 1.2 million; research related to decommissioning is a small portion of the total cost.
- The Board welcomed ONR sharing their research strategy.
- The ONR strategy has been shared with SEPA and the EA. The EA are developing a similar process and have developed their principles and priorities. The EA are in discussions with SEPA and ONR to articulate their views on research priorities and to identify research/knowledge gaps. The EA process will provide an improved platform for industry engagement and decision making regarding internal spending.
- The following actions were agreed.

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Action 10/11: Superintending Inspector, Office for Nuclear Regulation (ONR) to give an update to the Board at a future meeting with details of the ONR R&D programme – by November 2016.

Action 10/12: Radioactive Substances Regulation Manager, Environment Agency (EA) to give an update to the Board at a future meeting with details of the EA nuclear waste and decommissioning related R&D interests – by November 2016.

[10] Introduction to the Review of NDA's Approach to Technical Underpinning of Plutonium Storage at Sellafield

- The Chair thanked Head of Nuclear Fuel Cycle, NDA and Head of Technical - Product Plants, Sellafield for their attendance at the Board.
- The Chair reminded the Board of the questions that would be used to review the NDA's approach to the technical underpinning of plutonium storage at Sellafield, which are as follows:
 - Is the approach soundly based?
 - Are the mechanisms for review adequate?
 - Is the R&D adequately communicated to stakeholders?
 - Is the programme robust to future change?
 - Are there areas where members would investigate further?
- The Chair also requested that the Board question and examine the R&D aspects of the technical underpinning of plutonium storage at Sellafield rather than focus on strategy aspects, which were outside the Board's remit.

[11] Review of Technical Underpinning of Plutonium Storage at Sellafield

- The Head of Nuclear Fuel Cycle, NDA gave an overview of the planned presentation to the Board in order to put the information into context. It was also noted that NDA is the formal owner of stored material on behalf of DECC and also manages some stored material on behalf of EDF as well as overseas customers. The key messages to be presented to the Board are that the subject matter is broad in area and requires a large amount of R&D. NNL Central Laboratory Phase 2 is required to carry out key R&D work. It was also noted that Sellafield's mission is to provide safe and secure storage of plutonium without foreclosing future options.
- Head of Technical - Product Plants, Sellafield Ltd and Head of Nuclear Fuel Cycle, NDA gave a presentation covering the following topics and issues:
 - Safe and secure storage of plutonium at Sellafield
 - Background information on stored plutonium at Sellafield
 - Storage can degradation mechanics
 - The current status of chlorine contaminated plutonium dioxide at Sellafield
 - The current status of the storage cans containing material originating from both Magnox and Thorp reprocessing
 - The current status of packages containing MOX residues and material originating from Dounreay
 - The Sellafield Product and Residues Store (SPRS)
 - Plutonium storage strategy including hazard and risk reduction

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- The proposed SPRS Retreatment Plant (SRP)
 - Sellafield Ltd programme of technical work
 - Research environment with respect to available resources and facilities
 - Current university interactions
- The Board discussed plutonium storage challenges including (i) the decision making process regarding re-canning and treatment and (ii) the R&D requirements for underpinning the decision making process. Key points to emerge were as follows:
 - The Sellafield Ltd technical programme seeks to understand life limiting features of packages and stores and provide support to retreatment. This is currently managed within a constrained environment due to lack of R&D facilities (i.e. NNL Phase 2).
 - The Sellafield Ltd technical programme requirements highlight the need for NNL's Phase 2 facilities as R&D is required to aid planning of the proposed SRP. Conservative technical choices have been made on SRP to avoid delaying the project due to delays in NNL Phase 2.
 - It was noted that the SRP will utilise cans with a much longer lifetime than currently used. Depending on can type all PVC and as much polythene as possible will also be removed from the storage packages in SRP. The use of heat treatment will be minimised as far as possible and primarily used on breathable overpacks rather than Thorp or Magnox product cans that make up the bulk of the stocks.
 - It was noted that laser gas sampling could be a useful tool to aid the investigation of can pressurisation. The condition of the packages, their evolution with time and the implications for nuclear safety were discussed.
 - The DISTINCTIVE university consortium and associated programme of work was highlighted as a successful collaboration.
 - International links with Los Alamos National Lab, via NNL, have been useful for the Sellafield Ltd plutonium storage technical programme. At present there are no links with Areva (via the Areva reach back arrangement) with regard to plutonium storage. Links between Sellafield Ltd and Areva are currently being developed for an unrelated area; if this is successful it may be possible to develop a link relevant to plutonium storage.
 - The Board queried the implications of not carrying out a programme of R&D work to support safe plutonium storage. If the intended approach was to re-can all suspect material, why was there a need for an extensive R&D programme? Much of the R&D work focusing on interrogating cans underpins the need for, the scope and timing of the SRP. R&D work enables the licensee to meet its obligation to technically understand the material it holds and hence maintain its safe storage. The output of the R&D allows potential deferment of work, the management of delays to SRP or adjustment of SRP production schedule to target priority materials. The output of the R&D may come too late to avoid the start of construction but will aid (i) risk identification, (ii) prioritisation of repackaging and (iii) programming plant construction, commissioning and production, as well as assuring the condition of the stockpile into the future.

[12] Discussion regarding NDA's Technical Underpinning of Plutonium Storage at Sellafield

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- The Board held a discussion on plutonium can storage R&D which is summarised below:
 - Technical understanding of the behaviour of canned material has moved on from when materials were first canned. The use of storage cans that can be interrogated is now well recognised. The objective is to store material safely without prejudicing its re-use.
 - The Board questioned the impact of currently having no long term intent to dispose of or reuse the plutonium stocks. How much did this exacerbate the difficulties of establishing an appropriate R&D programme? Whatever the final intention for the material, it was clear that a very significant period of storage would be necessary.
 - It was noted that current strategy is to store the material as an oxide and any potential permutations for material re-use does not affect this strategy. If a decision is made not to re-use the material this will not affect the programme of work for storage at Sellafield as the lifetime of the current storage cans will be exceeded before a disposal facility becomes available.
 - Discussions were held regarding the use of compaction as an alternative treatment route for plutonium with the objective of achieving a much less dispersible product. It was noted that compaction methods, e.g. Hot Isostatic Pressing (HIP) at present can achieve at best a 50% incorporation rate which would result in an increase (doubling) in the number of cans in storage, this would subsequently result in an increase in operating and storage costs and would require a new retreatment plant and stores.
 - Discussions were held regarding out of specification material and related R&D. It was noted that a range of immobilisation technologies are being investigated for out of specification of materials (e.g. HIP and cement encapsulation). A large programme of work is ongoing regarding immobilisation but it was not presented to the Board as it is outside of the scope of work for plutonium storage at Sellafield. However, the Sellafield Ltd plutonium storage technical team maintain contact with disposal experts via NDA.
 - The NNL Phase 2 facility is required to carry out R&D that will influence decision making on the timings for re-treatment and the can types that require re-packaging. R&D that can be carried out in NNL Phase 2 will also support the safety case for SRP and ongoing storage of plutonium on the site.
 - There is an opportunity to carry out R&D on new container types e.g. the use of advanced materials, sensors and filters, and container surveillance and inspection. Work is currently ongoing at Sellafield Ltd with regard to non-destructive examination for stress corrosion cracking of cans and Sellafield Ltd has technology to remotely monitor can pressurisation. It was suggested that stronger communication links to AWE could be developed. However, it was noted that the material stored at Sellafield is different in nature to the AWE material and it is stored in different cans.

Action 10/13: Chief Technologist, AWE and Technical Manager Plutonium, Sellafield Ltd to exchange relevant contact details to facilitate the strengthening of communication links between both organisations – by 26th of February 2016.

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- The NDA fund innovative R&D work, that is wider in nature and complementary to work carried by Sellafield Ltd, on in-situ monitoring.
- It was noted that not all cans were manufactured to specification and that the 50 year can lifetime is not applicable to non-conforming cans.
- The Board held discussions on R&D in support of plutonium can storage facilities which is summarised below:
 - The issue of salt ingress into SPRS and the resulting corrosion to the building structure was discussed. Three distinct mechanisms have been identified. Sea salt corrosion of the aluminium (containment) extrusions is understood to be self-limiting on the basis of plant measurements, coupled with theory. Sea salt corrosion of the support steel work is understood to be primarily cosmetic, supported by recent plant measurements. However, there is an interaction between the components where steel corrosion products drip onto the extrusions. This 3rd mechanism is of more concern due to the potential for high corrosion rates and is the subject of urgent, ongoing work.
 - The Board queried whether there is sufficient R&D being carried out with regard to store design. The Board discussed the merits of a range of stores cooling technologies. It was felt that R&D on stores design, cooling and inspection could be beneficial for the extension to SPRS.
- The Board queried if there is any further R&D work that could be done to support safe storage of plutonium at Sellafield. More work is required in the area of can inspection as only a relatively small number of cans can currently be inspected in>NNL Phase 2.

[13] Summary of Discussion on NDA's Technical Underpinning of Plutonium Storage at Sellafield

Action 10/14: Chair to prepare a position paper on behalf of the Board to review the technical underpinning of plutonium storage at Sellafield – by 6th April 2016.

[14] Update on the Call for Evidence for the EPSRC Independent Review of Nuclear Fusion and Fission

- The Principle Investigator – Nuclear Champion, Research Council Energy Programme gave an update on the EPSRC's independent review of nuclear fusion and fission, which was held during September 2015 with the call for evidence carried out during August 2015. The EPSRC carries out periodic reviews of all areas within the Energy portfolio, although this was the first time that fission and fusion have been reviewed together. The review panel was made up of national and international stakeholders and a series of workshops was held by subject area. A two hour session has held on activities covering NDA's remit. The output of the review process will be published in January 2016 and will include a report with recommendations for funding by subject area.
- The NDA input to the review process was that EPSRC funding is extremely important to the nuclear decommissioning research. The investments made over recent years are bringing benefit and a significant change in funding would affect this. It could potentially take several years for the academic research community to recover from significant reductions in funding.

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[15] Update on NWDRF Forward Work Programme

- The Co-Chair of NWDRF gave an update on the NWDRF Forward Work Programme and added that the forward programmes for the NWDRF working groups are to be agreed. The NWDRF Co-Chair requested feedback from the Board on the Forward Work Programme. Following a discussion on monitoring measures the NWDRF Co-Chair agreed to include the total number of outputs from the Working Groups in the forward plan. A redacted version of the NWDRF forward plan will be published on the NDA website.

Action 10/15: Co-Chair NWDRF, Sellafield Ltd to update NWDRF Forward Plan to include a total number of outputs – by 26th February 2016.

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

[16] Update on NDA Strategy

- The Head of Technology, NDA gave an update on the NDA strategy. The NDA carries out a review of its strategy every five years. The NDA is currently engaging in a pre-consultation phase and the formal consultation process will begin in January 2016.

[17] Observations on Meeting 10

- No formal observations were made on behalf of CoRWM at the meeting other than that the meeting was interesting and productive.
- The Deputy Chair of CoRWM gave the following personal observation.
- There is a need to provide guidance for R&D stakeholders regarding where to focus research efforts e.g. the academic community could focus on long term innovation whereas stakeholders in operational roles could perhaps focus most effort on shorter term issues; this links with earlier Board discussions on horizon scanning activities.
- It was noted by the Board that NDA and the SLCs have structured links with academia with regard to skills maintenance. The NDA also dedicates time to the long term development of academic interactions.

[18] Review of Actions

- A review of actions was carried out by the Chair and Research Manager, NDA. An action list will be circulated to the Board by the Research Manager, NDA.

[19] AOB

- Head of Technology, NDA drew the Board's attention to the new NDA R&D brochure which focusses on SLC led R&D.

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- The Board held a discussion on the topic for the next Board meeting. It was agreed that the next topic for discussion will be NDA's Site Decommissioning and Remediation Strategy focusing on the cross cutting theme of robotics.

Action 10/17: Head of Technology, NDA to prepare a skeleton document on the proposed next topic for the Board (NDA Site Decommissioning & Remediation Strategy and the cross cutting theme of robotics R&D). The skeleton document will outline proposals for the Board discussion – by 29th January 2015.

- The Co-Chair NWDRF, Sellafield Ltd informed the Board of the Game Changer Programme that Sellafield Ltd is launching with Innovus and NNL. The programme will run for five years and will focus on horizon scanning. Updates on the programme will be given to Board at future meetings.
- As an example of the benefits of R&D, Head of Technology, NDA updated the Board on the recent change in strategy for the Magnox Swarf Storage Silo (MSSS) at Sellafield. Fundamental and applied research supported a change in strategy. SDP (Silos Direct Encapsulation Plant) will now be replaced with a much simplified approach that has the potential to speed up decommissioning and provide significant savings to the taxpayer.

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 09/14:** Approve, if appropriate, redrafted version of “Review of NDA’s Higher Activity Waste Pre-Disposal Treatment R&D” Position Paper – Ongoing.
- Action 10/01:** Research Manager, NDA to circulate the output of the review of NDA Research Board and NWDRF Terms of Reference to the Board by email – by 7th January 2016.
- Action 10/02:** Research Manager, NDA to circulate the revised “Review of NDA’s Higher Activity Waste Pre-Disposal Treatment R&D” to the Board by email – by 17th December 2015.
- Action 10/03:** Research Manager, NDA to circulate proposed vocabulary for NDA responses to Position Papers to the Board by email – by 7th January 2016. The Board to respond by email with any proposed changes – by 21st January 2016.
- Action 10/04:** Chair to review and clarify the recommendations in Research Board’s Position Statement on the “Review of NDA’s Spent Fuels R&D Programme” – by 15th January 2016.
- Action 10/05:** Chair to review NDA’s responses to the recommendations in the NDA Research Board’s Position Statement on the review of NDA’s Spent Fuel R&D Programme with Head of Technology, NDA and Head of Nuclear Fuel Cycle, NDA and circulate to the Board by email – by 26th February 2016.
- Action 10/06:** Chair and Technical Assurance Manager, NDA to discuss wording for Recommendation 8 (page 10) in the NDA Research Board’s Position Statement “Review of NDA’s Technology Baseline Underpinning Research and Development (TBuRD) Process” – by 18th January 2016.
- Action 10/07:** Chair and Technical Assurance Manager, NDA to discuss possible additional recommendations for NDA Research Board’s Position Statement “Review of NDA’s Technology Baseline Underpinning Research and Development (TBuRD) Process” – by 18th January 2016.
- Action 10/08:** Chair to review comments received by email from Co-Chair NWDRF, Sellafield Ltd, update NDA Research Board’s Position Paper “Review of NDA’s Technology Baseline Underpinning Research and Development (TBuRD) Process” to take into consideration the Board’s comments and circulate the revised draft to the Board for approval by email by 29th February 2016.
- Action 10/09:** The Board to approve, if appropriate, the Position Paper on “Review of NDA’s Technology Baseline Underpinning Research and Development (TBuRD) Process” by email by 31st March 2016.

NDA Research Board

10th November 2015 10:00 – 16:00

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

- Action 10/10:** Head of Technology, NDA to update the Board on NDA R&D horizon scanning activities at a future meeting – by November 2016.
- Action 10/11:** Superintending Inspector, Office for Nuclear Regulation (ONR) to give an update to the Board at a future meeting with details of the ONR R&D programme – by November 2016.
- Action 10/12:** Radioactive Substances Regulation Manager, Environment Agency (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.
- Action 10/13:** Chief Technologist, AWE and Head of Technical - Product Plants, Sellafield Ltd to exchange relevant contact details to facilitate the strengthening of communication links between both organisations – by 26th of February 2016.
- Action 10/14:** Chair to prepare a position paper on behalf of the Board to review the technical underpinning of plutonium storage at Sellafield – by 6th April 2016.
- Action 10/15:** Co-Chair NWDRF, Sellafield Ltd to update the NWDRF Forward Plan to include a total number of outputs – by 26th February 2016.
- Action 10/16:** NDA to publish the NWDRF Forward Plan and Annual Report on the NDA public website – by 18th March 2016.
- Action 10/17:** Head of Technology, NDA to prepare a skeleton document on the proposed next topic for the Board (NDA Site Decommissioning & Remediation Strategy and the cross cutting theme of robotics R&D). The skeleton document will outline proposals for the Board discussion – by 29th January 2016.