

## NDA Annual Research Board Report Stan Gordelier, Independent Chair, April 2017

### Executive Summary.

This report summarises the activities of the Research Board for the year and includes its key observations and recommendations. Despite its title, the Research Board has terms of reference<sup>1</sup> which cover the Research and Development (R&D) interests for waste management and decommissioning of the UK, not just that of the NDA. Given the scale of the NDA's work in this sphere however, much of its time is dedicated to the NDA's own programme.

The Board forms an important part of the governance arrangements for the NDA's R&D strategy and programme. The Broad membership of the Board, comprising relevant governmental organisations, , regulatory bodies and senior representatives from industry, is one of its strengths, bringing diversity of experience and outlook and enabling best practice to be shared to the benefit of the NDA and of the organisations of its members. Where possible the Board publishes Position Statements on each of its topics of investigation and the NDA publishes its response to the observation and recommendation they contain.

During the year the Board has concentrated on the NDA's key R&D management process, the Technical Baseline underpinning Research and Development (TBuRD), the Integrated Waste Management (IWM) R&D programme (focusing on Pre-Disposal Treatment of Higher Activity Wastes R&D) and the technical programme underpinning the continued safe storage of the UK's civil plutonium stockpile. .

With respect to its examination of the TBuRD process, its importance is abundantly clear, given the scale of both the NDA's estimated remediation programme costs (between £98B to £218B) and the costs of R&D intended to underpin it (£800M over the next 20y). The Board was of the opinion that the TBuRD approach was soundly based; indeed the process is a commendable success, having been considered by external reviews as best in class.

In its review of IWM pre-disposal treatments R&D, the Board was again of the opinion that the approach was soundly based. The Board was pleased to see the derivation of the programme came from an analysis of the TBuRD returns from the implementation sites and was impressed with by the highly interactive nature of the relationship with the user representatives from those sites.

At the final meeting of the year the Board began its exploration of the R&D underpinning the continued safe storage of the UK's plutonium stocks.

The Board is independent of the NDA; the topics that it can choose to examine do not need to be agreed with the NDA and the conclusions that it reaches and any observations and recommendations are matters for the Board only. The Board is nevertheless pleased to report that, without compromising its independence, it has found its relationship with the NDA to be highly constructive, greatly assisting its work.

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<sup>1</sup> The terms of reference and the modus operandi of the Research Board can be found at:  
<https://www.gov.uk/nda>

## 1. Introduction and Background.

The terms of reference, the modus operandi and the membership of the Research Board (RB) have remained the same during the year. As indicated in the last Annual Report, the Director of NIRO now attends as an observer, helping to ensure that the activities of the RB and NIRAB are coordinated and not in conflict. Similarly, the deputy chair of CoRWM also regularly attends as an observer.

The Board has continued its approach of exploring the R&D programmes via appropriate sub-sets of the NDA strategic themes<sup>2</sup> and also via the work of the Nuclear Waste and Decommissioning Research Forum (NWDRF). As indicated in the last annual report, where appropriate the RB ask a similar set of questions for each theme sub-set examined, namely in brief, “Is the R&D programme soundly based?”; “Are the mechanisms for review appropriate?”; “Are there gaps or areas for further exploration?”; “Is the R&D adequately communicated?” and “Is the programme robust to change?” These questions are modified slightly as necessary to fit each subject matter. This process has evolved so that, inter alia, the information provided by the NDA in advance of Board meetings tries to respond directly to these questions.

Following each of the reviews the RB agrees and publishes a Position Statement, in which it sets out its responses to the review questions and any observations or recommendations. NDA responds formally to these, discusses the responses with the RB and publishes the outcome on the NDA website.

It is important to note that the RB is independent of the NDA. While it seeks to work cooperatively with the NDA, the topics that it can choose to examine do not have to be agreed with the NDA and the conclusions that it reaches and any observations and recommendations are matters for the Board only. The role of the Board is advisory and it is not mandatory that the NDA has to accept the Board’s advice and recommendations, but again the NDA seeks to work cooperatively with the RB in its responses.

Two meetings of the Research Board have been held during this period, in April and November 2015, see sections 2 and 3 for brief reports of these meetings and appendices 1 and 2 for the full agendas.

## 2. April 2015 Meeting.

The main purposes of the April meeting were to:

- Discuss NDA’s responses to recommendations in the RB’s review of the Radioactive Waste Management Directorate’s<sup>3</sup> R&D Programme.
- Confirm members’ views of the UK’s Integrated Waste Management R&D programme with respect to the pre-treatment of higher activity wastes (HAW) and agree the RB’s Position Statement.

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<sup>2</sup> The NDA strategic themes are: Site Restoration, Spent Fuels, Nuclear Materials, Integrated Waste Management, Business Optimisation and Critical Enablers.

<sup>3</sup> At the time of the review this title was correct; it was only later that the Radioactive Waste Management Directorate became Radioactive Waste Management Ltd.

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- Review the NDA's Technical Baseline and underpinning R&D process and associated programme of analysis and assurance.

The Board also agreed the Annual Report for the period FY 2014/15, was updated on NIRAB activities and was briefed on and discussed the NDA's updated R&D strategy. The full agenda for the meeting is presented in Appendix 1. The full minutes of the meeting are published on the NDA website<sup>4</sup>.

Also for this meeting the Chair and the Secretariat had developed an Introduction Pack as a briefing for new members, which had been used for the first time. Those members attending for the first time confirmed that this had been very useful.

### **2.1. Position Statement on the IWM Pre-Disposal Treatment R&D Programme.**

The Board agreed the majority of the Position Statement but requested some areas of rewording for the final version. The Position Statement was subsequently agreed by correspondence. The final conclusions, observations and recommendations of the Board were as follows:

#### **General.**

Recommendation. The NDA should consider carefully the relationship between the NDA Strategy sponsored R&D tasks and the Radioactive Waste Management Ltd. (RWM) Upstream Options programme, particularly at a time when RWM has recently become a wholly owned subsidiary of the NDA.

#### **Q1, Is the Programme Soundly Based?**

The derivation of the IWM R&D programme from the analysis of the Site Licence Companies (SLC's) TBuRD returns gives confidence that it is soundly based. This is further reinforced by the cross-industry workshop held as part of that process. The Theme Overview Group (ToG) enables external input from the regulators and Government departments and the NDA's internal review process also examines the programme, bringing in expertise from outside the immediate IWM team. The Board was also impressed by the highly interactive nature of the relationship with the NWDRF Waste Packaging and Storage Group (WPSG), which continues to engage those at the "coal face" with the R&D programme.

The Board was therefore of the opinion that the programme was soundly based.

#### **Q2, Are the Mechanisms for Review Adequate?**

The NDA's review processes include scrutiny of the programme internally and with external input via the ToG and the NWDRF WPSG. The end users are kept fully engaged via the WPSG.

The Board concluded that NDA's processes were effective for reviewing the continuing appropriateness of the programme and the validity of the output products.

- Observation. Where a significant guidance document is a result of the programme, international peer review, as used for the Industry Guidance on the Interim Storage of HAW Packages, is an excellent way to draw on international experience to validate the guidance content.

#### **Q3, Is the Programme Adequately Communicated to Stakeholders?**

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<sup>4</sup> NDA Research Board Minutes can be found at <https://www.gov.uk/nda>

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The NDA goes to great lengths to provide stakeholders with information on its programme and the outcome results. The Board was satisfied that the programme and its results were adequately communicated to stakeholders.

- Observation. The Board commended:
  - The use of workshops when appropriate to aid the wide dissemination of R&D results.
  - The practice and intention of providing documents summarising R&D outcomes and/or guidance documents when the work on specific topics has matured to an appropriate stage.
- Recommendation. Where R&D results indicate a significant benefit could be gained to NDA but SLCs are reluctant to adopt the technology, NDA could consider an incentive payment, as has been employed by the French CEA.

### **Q4, Is the Programme Robust to Future Change?**

The close engagement of the WPSG in the establishment, prioritisation and ongoing monitoring of the programme means that the NDA should be very quickly aware of the impacts of any previously unforeseen change. The NDA had informed the Board that the HAW R&D programme was “live” and although it is based on the five year plan it was also adapted in response to fresh proposals and task findings. In this way the programme remained current and was less vulnerable to adverse impacts.

The Board concluded that the programme was robust to future change.

### **Q 5, Are there Areas where Members would like Further Investigation?**

The manner in which the R&D programme was built up from the TBURD submissions and then reviewed internally, via the ToG with its external members and via the NWDRF WPSG made it unlikely that any significant element was missing. However, the Board would like to see consideration of the insertion points for positive R&D outcomes in the overall restoration programme, alongside assessment of the future value of the results. This, together with assessment of the Technology Readiness Levels (TRLs), should show whether the work will deliver in time for real benefits to be gained.

The Board would also like to see an assessment of whether there is any benefit in R&D on retrieval technology, leading to a guidance document. The Board recognises that such technology may be too site specific and again timeliness of any results needs to be part of the assessment.

- Observation. The Board supported the NDA’s work to examine the merits of:
  - Moving the UK’s management approach for wastes to one that is based on the hazard that the waste presents.
  - Employing decay storage where appropriate.
  - Employing near surface disposal and disposal at or near site when appropriate and
  - The Board encouraged the development of a factual basis for a rational debate amongst all interested parties at national level, recognising that some of these matters may prove contentious.
  - The Board noted that some of these issues may require R&D to develop and implement future strategies.
- Recommendations:

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- The evaluation of the life cycle costs of a unit of waste is a key input to evaluating the potential value of R&D and should be prioritised by NDA.
- The NDA and SLCs should assess and publish Technology Readiness Levels for the technologies under development in the R&D programme.
- The NDA should assess the possible insertion points for new technologies into the overall programme to establish whether they will be available in time to be of real benefit. This would help prioritise R&D spend. This is of generic relevance, not just the IWM programme, but it appears to the Board that IWM opportunities may be closing fast.
- The NDA should continue to sponsor R&D tasks that support the effective implementation of the waste hierarchy including characterisation techniques, segregation and pre-treatment methods.
- The NDA should consider whether there is merit in adding some work on waste retrieval, collecting and refining the evidence accumulated, with a view to producing a guidance document on best practices.

Readers of this Annual Report who are interested in more detail are referred to the full Position Statement and to NDA's response to the observations and recommendations for further information<sup>5</sup>.

### 2.2. TBuRD Process.

For the second main purpose of the April meeting, the Board had received advance documentation and had presentations and discussions at the meeting with the NDA Head of Technology, the NDA Technical Assurance Manager and the Co-chair of the NWRDF TBuRD Working Group. The Board then discussed its preliminary conclusions with a view to the preparation of a Position Statement on the TBuRD process.

### 3. November 2015 Meeting.

The main purposes of the November meeting were to:

- Discuss the NDA's response to the recommendations in the Research Board Position Statement on the review of NDA's spent fuel R&D programme (see FY 2014-15 Annual Report or NDA RB016).
- To confirm members' view of the NDA's Technology Baseline Underpinning Research and Development Process and agree the Research Board's Position Statement.
- To review the NDA's approach to technical underpinning of plutonium storage at Sellafield.

The Board also received an update on:

- The Nuclear Innovation and Research Advisory Board (NIRAB) progress from the Director of the Nuclear Innovation Research Office (NIRO),
- The RWM Technical Advisory Panel (TAP) progress and the Panel's Annual Report from the Chair of the TAP,
- The Office of Nuclear Regulation's (ONR) developing Research Strategy from the Superintending Officer, ONR,
- NWRDF forward work programme from the Co-chair and

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<sup>5</sup> Copies of the Research Board's Position Statement (NDARB020) and the NDA's Response the Research Board's Recommendations (NDARB024) can be found at <https://www.gov.uk/nda>

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- NDA's reduced strategy consultation process from the NDA Director of Strategy and Technology.

### **3.1. Position Statement on NDA's Technical Baseline Underpinning Research and Development.**

**3.1.1** The Board agreed that the Position Statement was substantially appropriate and provided answers against the Board's standard questions. It requested some additional clarification to the wording of one recommendation relating to the assessment of liability costs against technical area, and updating to address the comments received from the Co-chair of the NWDRF with particular reference to the Sellafield site. The revised Position Statement was subsequently agreed by correspondence. In order for the Observations and Recommendations to be understood by the reader of this Annual Report, some explanation of the background and of the TBUrd process is first presented here.

#### **3.1.2 The TBUrd Process**

Amongst NDA's top risks is that technical solutions adopted for key projects do not deliver the desired outcome. The total cost of the NDA's remediation programme is estimated to lie in the range of £95B to £218B. Research and Development is one key element in keeping the outturn to the lower end of this range, by ensuring that technological choices are appropriate and function as expected and also by introducing innovation to deliver at lower cost or to shortened timescale.

The estimated cost of the currently envisaged R&D programme is some £800M over the next 20 years. NDA's approach is that, where possible, R&D is undertaken by the SLCs who are under contract to the NDA to manage sites and deliver the remediation programmes. Where necessary, the NDA also carries out R&D under its own strategic R&D programme<sup>6</sup>. It also has in place a system to oversee the NDA estate's R&D programme to ensure, as far as possible, that the SLC programmes will successfully deliver the remediation<sup>7</sup> of the sites. This is the TBUrd process.

The importance of the TBUrd process is abundantly clear, given the scale of both the estimated remediation programme costs and the costs of R&D intended to underpin it. The RB first looked at this process during its meeting in April 2012. At its meeting in April 2015 the RB returned to the topic for a more in depth consideration, after a period in which the TBUrd process has been maturing. This current examination used the Board's now standard approach of assessing the position against a set of five questions.

The requirement on SLCs is that they report against the specifications of the TBUrd process annually. The TBUrd is not a single document but rather a suite of documents submitted over any one particular year. These documents are:

1. Process Wiring Diagrams (Delivered in March).
2. The R&D Table (Delivered in March).
3. The Technology Map (Delivered in March).
4. The Annual Technical Report (Delivered in September, covering the previous financial year)

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<sup>6</sup> This programme has three aims: informing strategy choices, innovation potentially impacting a number of sites and maintaining and/or developing technical skills.

<sup>7</sup> Remediation covers all activities necessary to achieve the desired site end state, hence, among other things, waste management, decommissioning, spent fuel management, management of special nuclear materials (uranium and plutonium etc.) and removal of ground contamination as necessary.

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5. The Technical Management Summary (Delivered in September, if there is significant change from the position reported in the previous year).

These above five outputs summate to a relatively complex suite of documents. In order to enable comparisons and “roll-up” to generate integrated information on the total NDA programme it is important that the documents are as consistent as possible in the detail of their presentation. Detailed guidance is provided in the NDA document EGG10.

The TBuRD process has been in use in NDA since 2006, with a major revision in 2010. There have been two main routes by which the NDA checks the health of the process and seeks to continuously improve it. These are:

- A Nuclear Waste and Decommissioning Research Forum<sup>8</sup> working group.
- Periodic independent external reviews. Two of these have been conducted, both by Cogentus Consulting Ltd, in 2011 and 2015. These reports were made available to the Board.

The Board was informed of two areas of further developments, the intentions to:

- Publish the NDA’s Technical Baseline Report (a report summarising the technologies to be used in the sites remediation programmes and their justification).
- Investigate the development of and potential use for System Readiness Levels<sup>9</sup> as a further supplement to TRLs.

It was clear from the Cogentus Consulting Ltd report and from the discussions held with the NWDRF working group co-chair that, understandably, Sellafield Ltd had the most difficulty in preparing the necessary responses to the TBuRD requirements. The Sellafield difficulties stem largely from the scale and complexity of the work on the site. For example, the second most demanding site, Dounreay, has only about 150 lines of entry on its R&D Table, whereas that for Sellafield approaches 1000 lines. For Sellafield Ltd, the resources needed to respond to the TBuRD requirements were significant, of the order of £400,000. However, given the size of the Sellafield R&D programme at approximately £85M/annum it did not consider this unreasonable (~0.5%) to manage such a large programme.

The RB is aware that the resource necessary to complete the TBuRD requirements is significant. In its review the RB wanted reassurance that sites saw this as more than a bureaucratic burden. It was clear that, at working level, there was a great deal of enthusiasm and support for the process. There are indications, however, that its value may not always be fully appreciated at the most senior levels in the SLCs. Lack of enthusiasm at more senior levels is probably because, for those sites where the Lifetime Plan is more straightforward, senior management regard execution of the plan as mostly an exercise in project management, with little need for R&D. While there was some integration with programme management tools, better TBuRD integration with SLC programme management processes could be of value in encouraging more senior level support.

### 3.1.3 Conclusions of the Review.

The Board’s overall observation is that the TBuRD process is a commendable success. The external reviews show it to be best in class and that the degree of compliance by the SLCs with its

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<sup>8</sup> Information on the NWDRF can be found on the NDA website ([www.gov.uk/nda](http://www.gov.uk/nda))

<sup>9</sup> The NDA makes effective use of TRLs in the TBuRD process. However, it notes that TRLs relate to individual technologies/plant items. They do not indicate that individual plant items at appropriate TRLs can be integrated and will work together in an effective system. Clearly this is needed in a technically complex programme. The NDA is investigating System Readiness Levels (SRLs), which is a tool that may provide the necessary reassurance at system level.

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requirements has been steadily improving. The NDA and the NWDRF working group continue to develop the process in an effort to maintain its preminent position and ensure that it is fit for purpose, delivering the intended benefits at an appropriate cost.

### **Question 1: Is the approach soundly based?**

In 2011 the process was reviewed by the independent external consultant organisation Cogentus, under contract to the NDA to compare it against similar processes used by other organisations. This independent external review concluded, *“From a thorough review of a large number of published documents on R&D management and oversight, it is clear that the NDA TBUrd is an excellent methodology”*, that there was no parallel elsewhere and that it should be seen as best practice. Since that time the process has been updated on an annual basis using the NWDRF TBUrd working group as the discussion forum for any changes.

The Board is therefore of the opinion that the approach is soundly based. In response to the NDA’s search for continuous improvement of the process, the Board made the following observations and recommendations.

#### **Observations:**

- The DSRL TBUrd process seems to be widely recognised as best in class. The Board encourages the work of the NWDRF working group in general and the adoption of best practice from the DSRL approach where possible.
- As the most complex and difficult site, it is important that the TBUrd process delivers the maximum benefit possible to the Sellafield programme. The Board encourages the NDA and site teams to continue their work together to realise this objective.

#### **Recommendations:**

- The Cogentus Consulting Ltd assessment of areas of potential R&D collaboration should be provided to the NWDRF technical working groups for their assessment of the priorities for collaboration and integration into their forward R&D programmes.
- As in its 2012 review, the Board recommended an analysis of the NDA’s total liability costs against technical activities (e.g. sludge retrieval, sludge packaging, contaminated concrete removal etc.). Opportunity related R&D could then be directed at those technical activities that consume greatest cost in a search for improved or innovative techniques.

### **Question 2: Are the mechanisms for review adequate?**

The NDA has arranged for periodic independent external review of the process, comparing the approach to those used by other organisations, analysing the returns and making recommendations for further improvements. The Board also noted that NDA continues to investigate technology management tools in use outside of the nuclear industry for possible adoption as part of the process of continuous improvement. The process has also been updated on an annual basis using the NWDRF TBUrd working group as the discussion forum for any changes.

The Board therefore concludes that the NDA’s mechanisms for review of the process are excellent.

#### **Recommendations:**

- The NWDRF TBUrd WG should be asked to review the process improvements suggested by Cogentus Consulting Ltd and, where appropriate, include these in their forward programme.

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- For the process and the Technology Maps in particular to be of real value it may be necessary to provide even more guidance in EGG10 or supplementary documents on how to judge the entries, with a finer level of detail and examples. Unless the entries are on a consistent basis, the overall picture will be blurred or lost. Adding such additional detail must, of course, be balanced against the need for the guide to be pragmatic and fit for purpose.

### **Question 3: Is the Technical Baseline and underpinning adequately communicated to stakeholders?**

Some SLCs have published their TBuRD submissions on a regular basis and all are now required to do so. NDA has published on its website the earlier Cogentus Consulting Ltd independent review of the TBuRD process. The Board has recommended (see below) that a summary of the latest Cogentus Consulting Ltd independent review should also be published. The NDA is also preparing an “NDA Technical Baseline” report which aims to communicate, at a high level, the processes and technologies that are planned to be used to deliver the NDA mission.

The Board concludes that the TBuRD process and its outcome are adequately communicated and the future publication of the Technical Baseline Report will enhance this position.

#### **Observation:**

- The Board is very supportive of the production of the Technical Baseline Report. There is an excellent story to tell and the presentation should reflect this in the report and should be positive in tone.

#### **Recommendations:**

- A summary of the latest Cogentus Consulting Ltd review should be published. This should promote stakeholder confidence in the process and also allow the supply chain to contribute proposals in areas of R&D need.
- NDA should review the value of the Technology Maps to itself and the sites/SLCs. If this is confirmed it should engage with the sites/SLCs to persuade them of the benefit so as to encourage a quality return.

### **Question 4: Is the process robust to future change?**

The close working relationship with the NWDRF Working Group gives confidence that this is the case. The periodic external reviews are also a good practice that the Board commends and which should enable awareness of developments elsewhere.

The Board concludes that the process is robust to future change.

### **Question 5: Are there areas where members would like further investigation?**

#### **Research Board Position:**

The Board:

- Supports the NDA intention to explore the value of System Readiness Levels as to whether they can be a useful addition to the process.
- Would like to see the NDA explore the possibility for better integration of the TBuRD process with other programme management tools.
- Would like an exploration of the need for and benefit from including Technology Road Maps in the process, possibly just for the more complex sites.
- Would like to see a follow up to its earlier (2012 Review) recommendations on opportunities and risks.

#### **Observation.**

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1. The Board is supportive of:
  - The intent to investigate the development of SRLs,
  - The NDA's continuing efforts to survey the R&D management techniques used by other organisations, with the potential that they could be usefully incorporated into the process at some future date. Such investigations must obviously include consideration of the balance of cost and resource requirements against the benefits that could be delivered.

### Recommendations:

2. The NDA should consider, with the assistance of the NWDRF TBUrd working group, how better TBUrd integration with existing programme management processes can be achieved.
3. The NDA should explore the need for and benefit from adding Technology Road Maps to the TBUrd process. It may be that they are only a necessary addition for a complex site such as Sellafield.
4. The NDA should examine the causes of the "bow-wave" drift<sup>10</sup> of R&D needs with a view to understanding, if any, what actions should be taken and the impact on the Lifetime Plans.

### 3.2 Plutonium Storage.

In addition to reviewing the material provided in advance of the meeting, the Board took evidence from and held discussions with the Head of Nuclear Fuel Cycle, NDA and the Head of Technical – Product Plants, Sellafield Ltd. The Board then engaged in a discussion of its preliminary views, with the objective of producing a position statement on its findings in due course. The members recognised this as a sensitive area in terms of security and that its normal practice of publishing its Position Statements may not be possible for this topic.

## 4. Concluding Summary.

The Board is independent of the NDA; the topics that it can choose to examine do not need to be agreed with the NDA, the conclusions that it reaches and any observations and recommendations are matters for the Board only. The Board is nevertheless pleased to report that, without compromising its independence, it has found its relationship with the NDA to be highly constructive, greatly assisting its work.

The Research Board has continued its work during the year by what has now become a relatively standardised approach, which has been found to work well. The broad membership of the Board, comprising industry, regulatory bodies and relevant governmental organisations, is one of its strengths, bringing diversity of experience and outlook and enabling best practice to be shared to the benefit of the NDA and of the organisations of its members.

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<sup>10</sup> From the Cogentus Consulting Ltd analyses, in 2011 the peak of the R&D expenditure was at 2013, falling away rapidly after this. The 2015 report shows the peak of expenditure in 2018, again falling away beyond that date. Similarly, in the 2012 analysis there was a large number of tasks of low TRL that were needed to be completed by 2013. In 2015 there is now a large number of low TRL tasks needing completion by 2017.

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## Appendix 1

### Agenda for the 9<sup>th</sup> meeting of the NDA Research Board

#### Meeting 9 – 14<sup>th</sup> April 2015

##### Main purposes of the meeting

- To discuss NDA's response to the recommendations in the Research Board's Review of Radioactive Waste Management Directorate's (RWMD) R&D Programme.
- To confirm members' view of the UK's Integrated Waste Management (IWM) R&D programme with respect to pre-disposal treatment of Higher Activity Wastes and agree the Research Board's Position Statement.
- To review the NDA's Technical Baseline and underpinning R&D (TBuRD) process and associated programme of analysis and assurance.

##### AGENDA – Issue 1

No.	Agenda Item	Time	Lead
01	Members Only Discussion	10:00	Chair
	Arrival of Observers and Invited Presenters	10:10	
02	Welcome & Apologies <ul style="list-style-type: none"> <li>• Welcome and introductions</li> <li>• Any declarations of interest</li> </ul>	10:15	Chair
03	Agenda <ul style="list-style-type: none"> <li>• Agreement of Agenda</li> <li>• Notification of AOB if known at this point</li> <li>• Date, location and time of next meeting</li> </ul>	10:20	Chair
04	Review of 8 <sup>th</sup> Meeting <ul style="list-style-type: none"> <li>• Review and approval of minutes</li> <li>• Actions</li> </ul>	10:25	Chair
05	Research Board's Annual Report FY14/15 [NDA-Research-Board-Report-FY14-15-Draft1.docx]	10:40	Chair
06	Discussion on NDA's response to the recommendations in the Research Board's Review of Radioactive Waste Management Directorate's (RWMD) R&D Programme. [NDA-Response-RWMD-RD-Issue1.pdf]	11:00	ALL
07	Research Board's view on the the UK's Integrated Waste Management (IWM) R&D programme with respect to pre-disposal treatment of Higher Activity Wastes and discussion of draft Research Board Position Statement	11:20	ALL

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	[NDARB-Position-Paper-HAW-Pre-Disposal-Treatment-R&D-Draft.docx]		
08	Update on NIRAB/NIRO activities	11:50	Director, NIRO
09	Update on NDA's R&D Strategy	12:05	Head of Technology, NDA
	LUNCH	12:20	
10	<p>Introduction to review of the NDA's Technical Baseline and underpinning R&amp;D (TBuRD) process and associated programme of analysis and assurance.</p> <ul style="list-style-type: none"> <li>• Q1 – Is the approach soundly based?</li> <li>• Q2 – Are the mechanisms for review adequate?</li> <li>• Q3 – Is the technical baseline and underpinning R&amp;D adequately communicated to stakeholders?</li> <li>• Q4 – Is the programme robust to future change?</li> <li>• Q5 – Are there areas where members would like to investigate further?</li> </ul> <p>[Document 00]</p>	12:50	Chair
11	Role of TBuRD in NDA's approach to technical assurance	12:55	Head of Technology, NDA
12	NDA Technical Baseline – Updated approach [Document 04]	13:10	Technical Assurance Manager, NDA
13	<p>Technical Baseline and underpinning R&amp;D (TBuRD)</p> <ul style="list-style-type: none"> <li>• Process</li> <li>• Assurance</li> <li>• Analysis</li> <li>• Future developments</li> </ul> <p>[Documents 01, 02, 03, 06]</p>	13:30	Technical Assurance Manager, NDA
14	Nuclear Waste and Decommissioning Research Forum (NWDRF) TBuRD Working Group [Document 05]	14:15	Co-Chair of NWDRF TBuRD WG, RSRL
15	Discussion regarding NDA's Technical Baseline and underpinning R&D (TBuRD) process and associated programme of analysis and assurance	14:45	ALL
16	Observations on Meeting 8	15:30	CoRWM
17	Review of actions	15:40	
18	AOB	15:50	
	CLOSE OF MEETING	16:00	

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## Appendix 2

### Agenda for the 10<sup>th</sup> meeting of the NDA Research Board

#### Meeting 10 – 10<sup>th</sup> November 2015

##### Main purposes of the meeting

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

##### AGENDA – Issue 1

No.	Agenda Item	Time	Lead
01	Members Only Discussion	10:00	Chair
	Arrival of Observers and Invited Presenters	10:10	
02	Welcome & Apologies <ul style="list-style-type: none"> <li>• Welcome and introductions</li> <li>• Any declarations of interest</li> </ul>	10:15	Chair
03	Agenda <ul style="list-style-type: none"> <li>• Agreement of Agenda</li> <li>• Notification of AOB if known at this point</li> <li>• Date, location and time of next meeting</li> </ul>	10:20	Chair
04	Review of 9 <sup>th</sup> Meeting <ul style="list-style-type: none"> <li>• Review and approval of minutes</li> <li>• Actions</li> </ul> [NDARB – Status of Actions.pdf]	10:25	Chair
05	Discussion on NDA's response to the recommendations in the Research Board's Position Statement on the Review of NDA's Spent Fuel R&D Programme. [NDARB016-Review-SpentFuel-Issue1.pdf and NDA-Response-Spent-Fuels-RD-Issue1.pdf]	11:00	ALL
06	Research Board's view on the the NDA's Technology Baseline Underpinning Research and Development (TBUrd) Process and discussion of draft Research Board Position Statement [NDARB-Position-Paper-TBUrd-Draft.docx]	11:20	ALL

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07	Update on NIRAB/NIRO activities	11:50	Director, NIRO
08	RWM Technical Advisory Panel Annual Report & progress update following on from the Board's review of RWM's R&D programme [TAP Annual Report for FY 2014-15.pdf]	12:05	Chair of RWM Technical Advisory Panel, Independent
09	Update on ONR Research Strategy [ONR-Research-Strategy.pdf]	12:20	Superintending Officer, ONR
	LUNCH	12:30	
10	Introduction to review of the NDA's approach to technical underpinning of plutonium storage at Sellafield. <ul style="list-style-type: none"> <li>• Q1 – Is the approach soundly based?</li> <li>• Q2 – Are the mechanisms for review adequate?</li> <li>• Q3 – Is the R&amp;D adequately communicated to stakeholders?</li> <li>• Q4 – Is the programme robust to future change?</li> <li>• Q5 – Are there areas where members would like to investigate further?</li> </ul>	13:00	Chair
11	Review of Technical underpinning of plutonium storage at Sellafield [Approach-Pu-Storage-RD-Sellafield.pdf and SL-PA16-Technology-Road-Map-2015.pdf]	13:10	Head of Fuel Cycle, NDA
12	Discussion regarding NDA's technical underpinning of plutonium storage at Sellafield	13:40	ALL
13	Summary of the discussion on NDA's technical underpinning of plutonium storage at Sellafield	14:40	Chair
14	Update on the call for evidence for the EPSRC Independent Review of Nuclear Fusion and Fission	14:50	Principal Investigator (PI) - Nuclear Champion, Research Council Energy Programme (RCEP)
15	Update on NWDRF Forward Work Programme [NWDRF-Forward-Work-Programme-Oct15.pdf ]	15:05	Co-Chair, NWDRF, Sellafield Ltd
16	Update on NDA's reduced Strategy Consultation Process	15:20	Director, Strategy & Technology, NDA
17	Observations on Meeting 10	15:30	CoRWM
18	Review of actions	15:40	
19	AOB	15:50	
	CLOSE OF MEETING	16:00	