

Minutes

NIRAB second meeting

March 26th 2014, 11.00 – 16.00

Royal Academy of Engineering, London

Attendees:

MEMBERS

Dame Sue Ion	Chair	Malcolm Joyce	Lancaster University
Tim Abram	University of Manchester	Bill Lee	Imperial College
Andrew Carlick	DBD Ltd	John Lillington	AMEC
Steve Cowley	CCFE	John Molyneux	Rolls-Royce
Graham Fairhall	NNL	Andrew Sherry	University of Manchester and NAMRC
Mick Gornall	Springfields Ltd	Neil Thomson	EdF Energy
Paul Harding	Urenco	Laurence Williams	CORWM
Neil Hyatt	Sheffield	Peter Wylie	Sellafield Ltd

OBSERVERS

John Jenkins	ONR	John Perkins	BIS
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David Mackay	DECC
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OFFICIALS

Paul Hollinshead	DECC	Jenny Moore	GOScience
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Si Dilks	DECC	David M ^c Crossen	DECC
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Dominic Scullard	BIS
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SECRETARIAT

Gordon Bryan	NIRO	Simon White	NIRO
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Andy Howarth	NIRO
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Apologies:

MEMBERS

Richard Clegg	Lloyd's Register
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Paul Stein	Rolls-Royce
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Mike Tynan	NAMRC
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OBSERVERS

Sir Mark Walport	GOScience
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Derek Allen	TSB
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Melanie Brownridge	NDA
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Jason Green	EPSRC
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Robin Grimes	FCO
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Agenda item 1 - Welcome and introductions

The Chair set out the aims and objectives for the meeting as being to consider the outputs from the three sub-groups and to provide guidance on the priorities for the work to be done to develop and underpin the prioritised recommendations due to be submitted to Government. DECC advised that the aim is to provide advice to Ministers before the House rises for the summer recess on July 18th. It was agreed that draft recommendations would be provided in June prior to ratification or amendment by NIRAB on July 1st. DECC agreed to provide a business case template to NIRO as a guide to the information that would be required by Government officials.

- **Action 1:** DECC to provide a business case template to NIRO as a guide to the information that needs to be included with recommendations

Minutes from the previous NIRAB were accepted.

Agenda item 2 – NIRO update

The main activity since the first meeting has been associated with the work of the sub-groups. Two further secondees to NIRO have been recruited, bring the complement to four. They will take up positions in early April. Meetings have been held with a number of stakeholders. These generally fall into the following categories.

Funding organisations – meetings have been held with representatives of several major R&D funders (TSB, NDA, Sellafield Ltd and EPSRC) to discuss the scope of research interests and coordination mechanisms.

Research organisations / national labs – Meetings have been held with representatives of CCFE at Culham and arrangements are in hand to arrange a meeting with the National Physical Laboratory.

Organisations wanting to engage with the activities of NIRAB – meetings have been held with representatives of Atkins and the Energy Technologies Institute (ETI) to explain the remit of NIRAB and NIRO. In both cases this has led to participation in NIRAB sub-groups. An equivalent discussion has been held with the AWE, though the form of AWE involvement has not yet been agreed. A meeting was also held with representatives of the Snowdonia Enterprise Zone.

Organisations or individuals seeking advice – meetings have been held with two individuals to discuss potential research priorities and, in some instances, potential routes for accessing research funds. Meetings have also been held with representatives of two organisations to discuss molten salt reactors.

An R&D update has been prepared and submitted to the Nuclear Industry Council (NIC) on behalf of the Chair. In preparing this update NIRO has become formally engaged in the NIC Delivery and Monitoring Group.

Agenda item 3 – Introduction to sub-group work

The NIRO Director gave an outline of the process by which NIRO and the NIRAB sub-groups developed their initial recommended priority research areas.

Agenda item 4 – Report from the Advanced Systems Sub-Group

Graham Fairhall presented the output from the Advanced Systems Sub-Group which has been considering the research that needs to be done in the near term to identify and evaluate fuel cycle options that could be adopted by the middle of the century. The key points from the presentation were:

- The sub-group recommends a balanced portfolio of research, consistent with a progression of the outcomes of recent DECC funded R&D. This should address:
 - **Fuel fabrication** – accident tolerant fuel in the near term; prototype pins for test reactors, e.g. Jules Horowitz Reactor, in five years.
 - **Spent fuel recycling/management technologies** – both aqueous reprocessing, in which the UK have leading capability, and pyrochemical reprocessing. This should also consider conditioning of spent fuel in the absence of a GDF.
 - **Reactor technologies** – The initial focus should be R&D relevant to more than one reactor type.
 - **Strategic assessments** – to build up evidence and develop communication tools that enable an integrated view to be taken on various reactor and fuel cycle systems.
- Programmes need to include both academic and applied research.
- Opportunities for international collaboration should be identified in areas which offer synergies to all parties. Both France and the USA have programmes in relevant technical areas and are open to collaboration with the UK. It was also suggested that in addition to pursuing any specific collaborations a watching brief should be maintained for additional opportunities for collaboration, for example with India or China.
- The research portfolio needs to address the bounding case of a 75 GW closed fuel cycle, as well as addressing technical issues associated with an open fuel cycle,
- It was agreed that following any initial investment in research a significant programme would be required to deliver the ambitions set out in the Nuclear Industrial Strategy.

An additional research area that was discussed was **Medical Isotope Production**. In the near future it is anticipated that there will be a shortfall in the worldwide capacity to manufacture Mo99. There is the potential for the UK to contribute to meeting this shortfall, however clarification is required as to whether this falls within the remit of NIRAB.

- **Action 2:** **John Perkins** to work with officials to consult within Government to determine whether medical isotope production should form part of the scope to be addressed by NIRAB

Agenda item 5 - Report from the Academic Sub-Group

Andrew Sherry and Bill Lee presented the output from the academic sub-group. It was noted that recent capital spend has been fully consistent with the recommendations of the Beddington review, but that funding would be required for programmes if the objectives set out in the Nuclear Industrial Strategy are to be met. The key recommendation was that a balanced portfolio of research needs to be commissioned which addresses:

- **Reactor systems** – SMRs, advanced reactors (including for medical isotope production), materials, fabrication methods and advanced reactor modelling and simulation
- **Fuel and fuel cycle** – advanced fuel fabrication, nuclear data and transport modelling and fuel recycle
- **Decommissioning, Waste and Disposal** – innovative waste treatment, robotics, sensing and monitoring, advanced disposal, and spent fuel storage

- **Cross-cutting issues** - safety, security, safeguards and public engagement/communication

The Chair noted that the cross-cutting topics included subjects that could appropriately be addressed by Research Councils other than EPSRC and NERC.

- **Action 3:** **NIRO** to speak to the Research Council representative about the potential for other Research Councils such as the Economic and Social Research Council (ESRC) to address some of the broader subjects such as public engagement.

Agenda item 6 – Report from the Industry Sub-Group

The NIRO Director presented the recommendations from the Industry Sub-Group on behalf of its Chair, who was unable to attend the meeting. The Industry Sub-Group identified gaps in the following areas:

- **Small Modular Reactors (SMR)** – a Government funded study is currently underway to identify and evaluate opportunities for engagement in SMR development which could generate value for the UK. No further work is proposed until the results of this study are made available.
- **Fuel fabrication** – as identified by both the Advanced Systems and Academic Sub-Groups.
- **Validation infrastructure** – test facilities are required to demonstrate capability within the supply chain, validating components, manufacturing and modelling techniques under realistic plant conditions (e.g. a thermal hydraulic facility to replicate reactor conditions). The sub-group recognise that there has been recent capital investment in infrastructure, and want to ensure that existing facilities are utilised. An initial exercise is required to map how existing facilities can be used in a coordinated manner and accessed appropriately, and to identify any requirements for additional programmes or infrastructure.
- **Control and Instrumentation** – Develop methods to future proof C&I systems to combat obsolescence. The Board were clear that it would not be appropriate to recommend Government funding to address issues associated with control and instrumentation in operating facilities. There could be a case to invest in the development of future technologies, but this has yet to be made.
- **Efficient construction of resilient structures** – to minimise cost and time of construction through more efficient modular/pre-fabrication techniques that are able to meet resilience requirements. The Cost Reduction workstream of the NIC is believed to be investigating this issue and a link needs to be made with this group.
- **Action 4:** **NIRO** to liaise with NIC Cost-reduction Workstream to establish what research has been identified through their work.
- **Knowledge management** - It was agreed that it will be important to ensure that historic information is archived in an accessible manner, ensuring that valuable information is not lost. It will be important therefore for all sub-groups to identify specific information that needs to be archived and how it might be collected. It was further proposed that a similar approach should be taken to secure or archive existing materials that might be valuable in future research programmes and which would be very expensive to produce if current samples are disposed of.
- It was also agreed that **advanced manufacturing** and **remote maintenance/handling** should be added to the list of topics to be addressed by the Industry sub-group.

- In the area of **decommissioning and waste management**, it was recognised that NDA has clear accountability to define and fund the research programmes necessary to support their mission.

Additional Key points

The following points were agreed during discussion:

- The sub-groups should propose specific mission objectives to frame any proposed research programmes. An ambitious mission that captures the imagination will be an important factor in attracting the next generation of researchers to work on nuclear power.
- It will be important to retain access to the NEA databank.

Agenda item 7/8 - Priority areas to take forward and next steps

Following discussion the Chair noted the degree of overlap between the recommendations from the sub-groups and the fact only a modest number of recommendations had been made. Taking this into account there was no immediate need to eliminate any research topic. Rather the sub-groups should focus on developing and prioritising more specific recommendations for consideration by the Board in July, noting that draft recommendations should be made available to the LCICG in early June.

In preparing these recommendations care must be taken to identify what needs to happen when in order to deliver specific objectives aligned with the Industrial Strategy, and it will be important to define what academia will do and what industry will do.

Fuel fabrication was considered a priority area by all three sub-groups and the Board.

Future meeting dates are:

- Tuesday 1st July - Manchester
- Tuesday 21st October – location to be confirmed