

NuSAC/RG6/08/M1

**HEALTH AND SAFETY EXECUTIVE
NUCLEAR SAFETY ADVISORY COMMITTEE
REVIEW GROUP 6 (RESEARCH)**

**Minutes of the 2nd Meeting of the
Nuclear Safety Advisory Committee Review Group 6 (Research)
22nd April 2008 at HSE, Redgrave Court, Bootle**

Present:

RG6 Members

HSE

Dr P Manning (Chair)

Dr P Storey

Dr R Taylor

Dr H Starkie (Secretary)

Dr R Dolby

Mr R Lewis (For HSE Chief Scientist)

Prof R Bloomfield

Dr A Muir

Prof R Grimes

Dr P Haigh

Dr D Horsley

Licensees

Others

Dr R Ainsworth, BE

Dr N Smart, NDA

Dr P Harston, Sellafield Ltd.

Dr M Brownridge, NDA

Dr M Tearle, Magnox North Ltd.

Mr S Walsgrove, DBERR

Dr D Buckley, Magnox South Ltd.

Dr R Streatfield (Chair NWRF)

Ms A Halle, Dounreay Restoration Ltd

Apologies:

Dr I Giles, MoD

1. Introductions and Apologies for Absence

1.1 Dr D Horsley, Ms A Halle, Dr D Buckley, Dr M Brownridge and Mr R Lewis, were attending RG6 for the first time.

2.1 Chairman's Remarks

2.1.1 The meeting observed a one minute silence in memory of Gordon Munro who died shortly after the last meeting of NuSAC/RG6.

2.1.2 The Chair of RG6 remarked on the timeliness of the meeting, given that NuSAC has to give the HSE Board its opinion on the status of the Nuclear Safety Research programme.

2.2. Approval of the Minutes of the 1st Meeting of NuSAC/RG6

2.2.1 Subject to an amendment to paragraph 5.13, these Minutes were approved.

2.3 Matters Arising

2.3.1 Actions 07/1 to 07/4 were complete or were on the Agenda of this meeting. Under Action 07/5, Neil Smart reported that there were no problems with SLCs collaborating with overseas Waste Management Organisations apart from the coordination of finance. Action Closed. Action 07/6 has been brought forward as a fresh action. Under Action 07/7, Bob Ainsworth reported that any work deferred from the 2007-08 programme would be put into this year's programme. Also, this year's programme would contain some speculative work. Action Closed.

3. Members' Reports on Technical Exchanges

3.1 One member reported attending the structural integrity R5 and R6 panels. He reported that these were a good mix of technical and administrative discussions and presented a well coordinated programme of research. He had attempted to attend a fuel storage pond water meeting and was advised that there is no specific pond water chemistry and corrosion forum. These issues are discussed at other fora. Roger Streatfield offered to provide the RG6 member with the name of a contact with whom he could have discussions on pond water chemistry research (Action 08/1).

3.2 The member had been invited to attend another structural integrity forum (Civil Engineering) but the meeting was subsequently cancelled. He has attended a workshop on the regulation of a waste repository and would be providing notes.

3.2 Paul Harston asked for clarification of the reasons why RG6 members had started attending technical exchange fora. The Chair of RG6 explained that although RG6 could not claim full expertise in all of the fields of research being undertaken, it wanted to sample some of the programme in order to inform its advice to NuSAC.

3.3 Another Member reported that he had been engaged with Bev Littlewood of City University in a Review of the Control and Instrumentation programme. This review was an in-depth look at the quality of the programme rather than how the programme is defined. Although the report is not yet complete, he reported that the research programme was a good balance between academic and applied research and there would be suggestions made that it should interact with other programmes, such as EPSRC funded research and the Human Factors programme. The Chair of RG6 placed an action upon HSE to make this report available to members when it is complete (Action 08/2).

3.4 A third Member reported that he had visited Dr Jim Reed of British Energy to discuss the Graphite Research Programme. This is a major

programme with the main concerns being graphite oxidation and block monitoring. The member commented that several universities were involved in the programme and that it was subject to good peer review through the Graphite Core committee chaired by an academic. HSE obtains independent advice on the programme through the Graphite Technical Advisory Committee (GTAC).

3.5 RG6 remarked that more guidelines were needed for RG6 members conducting peer reviews of the research programmes. The Chair of RG6 replied that this was something he would be taking forward outside of the meeting. He stated that RG6 could not review the entire programme comprehensively and would therefore have to sample and form its views based upon this sample.

3.6 RG6 commented that peer review activities had to be commensurate with the document that has to be sent to NuSAC. A further comment by RG6 recommended that the review group look at the peer review processes and focus upon research achievements. A further recommendation was made by RG6 that their attention should focus upon those areas of the programme that represented high safety and technical risks. Roger Streatfield advised that his NWRF made use of position statements from independent experts to decide where to put in its effort. The Chair of RG6 offered to develop a list of the 'top twenty' topics for the review group to concentrate on, based upon the British Energy and NDA Risk Registers and asked for HSE to help him with this (Action 08/3).

3.7 RG6 commended the TAGSI approach of setting up specialist groups to provide focussed peer review and advice. RG6 added that there are historical precedents for this approach. The Chair of RG6 recommended that the members decide which areas they had expertise to cover outside the meeting.

3.8 The Chair of RG6 reported that he had attended two meetings of the NWRF and was pleased to see that representatives from across the industry were getting together to discuss issues that were common. Paul Harston

asked if there were any more technical contacts that RG6 still needed. The RG6 Chair replied that a contact for external events was required. Bob Ainsworth commented that the external events programme was considered as a subset of the Civil Engineering research programme.

3.9 Peter Storey suggested a set of questions related to the research programme that RG6 members could ask when attending technical exchange meetings to ensure a consistent scrutiny of research programmes in each technical area, to assist preparing their advice to NuSAC and provided some examples. The Chair also provided his own examples and requested that HSE drafts a list of questions for the next meeting (Action 08/4).

4.1 UK Nuclear Safety Research Programme: Update on 2007/08 programme and proposed HSE programme for 2008/09

4.1.1 Haydn Starkie reported that there were no problems with the commissioning and progress of the 2007/08 Levy programme. He added that the HSE Commissioned part of the programme for 2008/09 was significantly larger in budget and broader in scope than the Levy programme of previous years. This growth largely arises in the international part of the programme to provide access to codes and data and on Waste and Decommissioning, to develop independent technical capability for HSE.

4.1.2 RG6 remarked that the programme was strongly biased towards reactors and there was no mention of research from Harwell and Winfrith or a Human Factors programme. Haydn Starkie explained that HSE was not developing Human Factors Independent technical capability because it was already supporting such capability through its regulatory support programme. He added that judgement on the adequacy and balance of the Nuclear Safety Research Programme had to be made on the total programme, including the licensees' programmes, and not just the HSE commissioned part of the programme. He further explained that the purpose of the HSE commissioned part of the programme may look distorted because it was to enable the UK to participate in relevant international research programmes and to support

independent technical capability. Research on waste and decommissioning was funded by agreement through the SLC's programmes.

4.2 Licensees Proposed 2008/09 Programme

4.2.1 British Energy

4.2.1.1 Bob Ainsworth reported that British Energy had adopted a new approach to developing its 2008/09 research programme from previous years. He stated that the Company had started from a blank sheet and had reviewed all of the needs of each technical area against the company's risk register (both safety and business risks). The result was a proposed programme that was almost twice the value of last year's. Following a review of the proposals, the final 2008/09 research programme was produced and includes a substantial increase in the external spend in the company's strategic programme. The biggest increase in research spending was in the area of high temperature materials, where the driver was to be able to justify the safe extended operational lifetimes of such materials in operating reactors. The company's contribution to the Control and Instrumentation programme had also benefited from a substantial budget increase.

4.2.1.2 RG6 commented that the big increase in the structural integrity of steel components research budget was welcome before asking if the Tables in the British Energy paper could highlight where significant changes had taken place since last year, in particular the graphite programme. Bob Ainsworth replied that in the Graphite programme, the biggest change since last year was a shift between non-NRI and NRI research rather than a significant change in the amount of work undertaken. RG6 next remarked about those projects that had been identified as being needed but had dropped 'below the line' from the 2008/09 programme. Bob Ainsworth replied that these projects would be reconsidered in the 2009/10 programme. He added the spreading of some of the costs of HSE's programme to the new build requesting parties meant that the Levy demands upon British Energy would be lower than last year. Consequently, one proposed project had been bought back 'above the

line' for 2008/09 and others may be brought up. Peter Storey asked if the increase in the British Energy programme reflected a larger number of high-priority issues in the NRI. Bob Ainsworth replied that the company developed its programme to address issues in its risk log, many of which were also high priority NRI issues.

4.2.2 Magnox Electric North and South Sites Programme

4.2.2.1 Mark Tearle explained that his paper covered both of the Magnox SLC programmes. He added that Magnox North was undertaking the majority of the generic research and shared its findings with Magnox South and the other NDA SLCs through the NWRF. He believed that the proposed establishment of specialist sub groups of the NWRF would further enhance the opportunities for technical exchange between licensees. The Magnox research programmes are presented in the companies' TBUrDs and developing these TBUrDs was influenced by ND's 'Research Strategy Statement for Decommissioning Licensees'. He added that there were still research activities in the Control and Instrumentation and Graphite technical areas to support the operation of Wylfa.

4.2.2.2 Mark Tearle noted that the Safe Secure Sites initiative that followed on from the cuts to the Magnox licensees decommissioning budgets, may give rise to further non-generic research needs. Roger Streatfield remarked that Magnox South would have to revisit its high priority safety research issues once the company's revised levels of funding for this initiative became clear. The company had looked at what other SLCs were doing to avoid duplication of effort and had dropped its lowest priority research issues from the programme.

4.2.2.3 RG6 asked what the safety issues associated with the delayed clearing of Magnox sites were. Mark Tearle and Roger Streatfield commented that there had been a recent Level 2 meeting with NII to discuss the situation on the Berkeley site and prepare a technical justification for the delayed clearing of the site. RG6 asked if all of the projects listed in the

Magnox paper were one year projects. Mark Tearle replied that some are but others, such as the Human Factors programme follow on from last year's programme. RG6 asked if the achievements of the programme were listed on a yearly basis. Mark Tearle confirmed that they were.

4.2.2.4 RG6 raised the question of whether the issue of decontamination techniques would be addressed this year. Mark Tearle replied that it would although a decision had to be made regarding the favoured technique. Roger Streatfield commented that Magnox had produced a Decontamination Techniques Manual.

4.2.2.5 RG6 asked if the Organic and Magnox debris wastes immobilisation handbooks that were being prepared under the Magnox South programme would show what the gaps in the knowledge were. Roger Streatfield replied that they would not expect there to be further R&D needs, once this Handbook was shared with contractors.

4.2.3 Sellafield Ltd.

4.2.3.1 Paul Harston presented an overview of the process that Sellafield Ltd. uses to develop its TBUrd and the contribution made from the NII Research Strategy Statements issued to Sellafield last autumn under the Nuclear Chemical Plants Research Arrangements. He pointed out that comments from stakeholders about the previous TBUrd had been taken on board and had resulted in a better TBUrd that was larger than last year (from 300 to 500 pages). Attempts had also been made to make the information it contained more readily available.

4.2.3.2 RG6 asked if there were any comments on the Sellafield TBUrd process before pointing out that four RG6 members would have an opportunity on Friday 25th April to see the Sellafield TBUrd in more detail at the NDA's Herdus House Office. RG6 remarked that it was difficult to see the scale of the work from this Paper. Neil Smart reported the value of the budget

for the Sellafield work before commenting that it was difficult to separate the research and support work that would be commissioned using this budget.

4.2.4 Dounreay Site Restoration Ltd. Programme

4.2.4.1 Audrey Halle remarked that the main point of the Dounreay Site Restoration (DRSL) research programme is to make sure that the site has the technology and equipment to deliver its life time plan. She added that 102 R&D projects had been identified across the range of safety research categories listed in the HSE Nuclear Directorate 'Research Strategy Statement for Decommissioning Licensees'. The site is working with partners and other SLCs to ensure the sharing of good practices and regularly sends delegates to meetings and Workshops to satisfy themselves that satisfactory progress is being made.

4.2.4.2 RG6 asked what the scale of the programme was. Audrey Halle replied that the detail of the programme is in the site's TBUrd. The chair of RG6 reminded the meeting that some RG6 members would have an opportunity on Friday 25th April to see the DRSL TBUrd in more detail at the NDA's Herdus House Office. An RG6 member remarked that he was impressed with the progress at Dounreay, following a visit last summer although there were still significant gaps in the programme such as the disposition of spent fuel, U and Pu. Audrey Halle answered that the site's responsibility was to ensure the safe storage of such materials, pending disposition. The Chair of RG6 added that RG6 needs to discuss with CoRWM what its remit is and where the boundaries of site and CoRWM responsibilities lie (Action 08/5)

4.2.4.3 RG6 summarised the discussions on the Licensee programmes by stating that Sellafield and Dounreay's papers gave comfort in the process of developing the R&D programme but light on technical detail whilst the others were light on the process but good on the technical details.

5. UK International Research Strategy – Coordinated approach

5.1 Peter Storey provided an overview on UK international research strategy from the perspectives of HSE, the Nuclear Licensees, NDA and Nexia Solutions. He added that the common reasons for participation in international collaborative research included access to key expertise, facilities and data; access to collaborative research programmes; engagement in jointly funded research; benchmarking UK methodologies; influencing international safety standards; and providing benefit to UK research community. Peter Storey remarked that for research related to LWR safety, the UK needed to tap into the World Community because it no longer had the indigenous research capability. Neil Smart outlined the advantages to the NDA of gaining access to international programmes such as seeing how well alternative methods and techniques operate.

5.2 RG6 asked if there was anyone in NDA responsible for the coordination of international work. Neil Smart replied that John Mathieson had that responsibility.

5.3 RG6 remarked that participation in bids for Euratom Framework programmes cannot be seen as strategic work because there was no guarantee that the work would be funded and given the go ahead. Peter Storey replied that the UK had a success rate of about 1:2.5 when making Euratom Framework bids. He added that the approach adopted by HSE and the NDA was to identify key areas where UK organisations could collaborate abroad and provide justification to the EC why they should form part of the programme. He added that this approach had been successful in the past and most of the UK's key research priorities were included. The CARBOWASTE irradiated graphite waste programme was cited as an example of this success. Peter then remarked that a longer term strategic approach was needed to EC research programmes. He stated that ND had taken the UK lead for participation in EC programmes but had worked hand-in-hand with the NDA to organise workshops to make sure the right UK companies participate in bids.

5.4 Neil Smart remarked that the NDA used a similar approach with the Research Councils to fund University work.

5.5 RG6 asked about collaboration for New Build, in particular with the Finns. Peter Storey replied that ND was talking to both VTT and STUK in Finland and taking full benefit of international collaboration in new build such as drawing on the knowledge of the overseas regulator including what research they had undertaken. He added that there is no new build research in the HSE programme at present so regulatory assessment of new build designs has to rely on the vendors' research programmes. However, Generic Design Assessment of new designs is relying on access through the programme to codes and data only available overseas. In the longer term, ND will have to give thought to building research capability to support the regulation of designs to be built in the UK.

5.6 The chair of RG6 commented that it was good to see the International Programme as a whole before asking HSE to look at its totality of work and give a view on what international research is actually being done (Action 08/6).

6. NDA TBUrD Production Process

6.1 Melanie Brownridge opened this discussion by giving a history of the development of the TBUrD process. She stated that the approach built upon practice in UK and US the defence sectors to make sure technology was available and fit for purpose. The TBUrD process has completed its third cycle and is established as an important tool at all 20 NDA sites, in which they can have confidence.

6.2 RG6 remarked that TBUrD was a very positive process with a clear requirement to show what the technology needs are and the process to deliver them. RG6 asked a further question about benchmarking such a

unique process. Melanie Brownridge replied that the application of the process on a site-wide basis is unique but the use of technology readiness levels within the process itself needed to be benchmarked. RG6 asked if the process addressed the skills issue. Melanie Brownridge explained that the TBUrDs highlighted some skills-related issues but these were captured in more detail in the site skills documents that were submitted in the Lifetime Plans. RG6 remarked that both quantitative and qualitative methods were involved. Melanie Brownridge answered that this facilitated the sharing of information.

6.3 Neil Smart added that the Lifetime Plan can demonstrate the value of investing in technology. RG6 replied that some of the Lifetime Plan was based upon out of date funding assumptions. In particular it was argued that underlying R&D may not get funding because it would be too low a priority. RG6 commented that the TBUrD is a good declaration of intent but will fall apart if identified research work is not done, before asking if anyone in NDA was looking at this. Melanie Brownridge replied that the NDA was not there to direct work and the Lifetime Plan can be updated annually. Things that cannot be closed out by the SLC can be brought to NDA's attention. RG6 replied that if some of the identified research issues were not addressed, there would be problems in the future. Melanie Brownridge answered that there is a process for picking these issues up, such as using the NDA Direct research Portfolio. She added that the TBUrD process provides an auditable trail so issues cannot disappear without a trace and that RG6 members would be able to see for themselves on 25th April how the impact of budget cuts on some TBUrD items will be assessed.

6.4 Peter Storey remarked that the TBUrD process is at a level of maturity such that in the future we should spend less time looking at research needs but instead look at outcomes, their timing and how the results will be used. HSE will be exploring with SLCs and NDA how this can be achieved.

7. Human Factors Implementation

7.1 Haydn Starkie reported that the review of the Human Factors chapter of the NRI was now complete and had been agreed with the licensees. All of the issues listed addressed genuine gaps in knowledge. British Energy's Human Factors Nuclear Research Schedule had also been agreed. Bob Ainsworth reported that British Energy had a large Human Factors programme to improve human performance (Safety Culture). RG6 remarked that other industries must have a view of what is needed and best practice in plant operations and maintenance procedures. Peter Storey replied that there was a lot of sharing. In particular, HSL shares information across a whole range of industry sectors in HSE. RG6 asked if there was any sharing with the MoD and then asked (PM) where the HSE centre, through its Chief Scientist can help the nuclear industry. RG6 remarked on whether NII Site Inspectors look at their sites from the perspective of Human Factors following his awareness of the use of Human Factors Inspectors in some key inspections. Peter Storey agreed to pass this remark on to ND's Human Factors specialists, encouraging the use of these specialists in site inspections (Action 08/7).

7.2 Mark Tearle reported that there had been a major initiative in Magnox to roll out workshops to improve human performance. The company had collaborated with others to identify best practice in industries such as oil and gas. He reported that there were no big gaps in the company's Human Factors tools and methods but these tools were not being rolled out to the sites consistently. Neil Smart remarked that sharing good Human Factors practice is important to safety. Mark Tearle reported a project in Magnox to apply Human Factors knowledge in the training of Project Leaders.

7.3 Paul Harston reported that Sellafield was in the process of implementing a TBuRD work item to update its Human Factors Tools. RG6 remarked that the boundary between Human Factors and lack of technical understanding, as contributors to incidents, was not well-defined; failure to value technical understanding should not be seen as a Human Factors problem. Paul Harston remarked that there were some grey areas. Audrey Halle commented that Human Factors issues were found to be one of the factors behind the cementation plant incident at Dounreay but other factors were also

involved. RG6 remarked that dividing research programmes into different technical areas could lead to some topics that bridged technical areas being missed.

7.4 Audrey Halle stated that at Dounreay, human factors needs were considered at the beginning of the lifetime of projects. One of the site's initiatives was a training programme (SNOW) to make people aware of their responsibilities for the safety of themselves and others around them.

7.5 RG6 asked if we can identify research needs from accident investigation reports. Peter Storey replied that the Research Unit would not pick these up but would expect its regulatory assessors to do so when they reviewed the NRI and Research Strategy Statements. RG6 commented that when reports are published, others should be made aware of them and learn from them. The Chair of RG6 then thanked everyone for their contributions and stated that he recognised that much had been done to improve human factors research and that shortcomings in implementation were being addressed.

8 Safety Research Needs to support the Waste Repository

8.1 The Chair of NuSAC/RG6 opened the discussion by remarking that there were a number of areas where licensees were not getting on with waste processing because the requirements for the repository were not known and therefore the choice of waste packaging could not be made. The transfer of Nirex into the NDA had led to a change in its Terms of Reference that RG6 needed to highlight.

8.2 Neil Smart remarked that there were a number of fundamental questions that first needed to be answered. These included the NuSAC position on long-term safety issues, the wasteform specification for long-term storage, research needs to ensure packages meet performance criteria and the safety of a new nuclear facility. Other questions included what the balance between short-term and long-term risks should be for NDA and the roles of NuSAC and CoRWM.

8.3 The Chair of RG6 replied that we need a document equivalent to a TBUrd to spell out the research needs of the repository, unless the UK was prepared to simply follow the lead of Finland. Neil Smart replied that there was a Draft TBUrd for the repository and a RWMD Research Strategy. These would be published on the 11th May. The Chair asked Neil Smart to circulate the RWMD Research Strategy to RG6 members when it was available (Action 08/8).

8.4 Neil Smart reported that NDA proposed to have a second workshop to look at the feedback they had received from the public consultation on the Repository. RG6 commented that systems' thinking was needed to focus on research. Research on topics such as Magnox dissolution will contribute to repository safety if successful, by eliminating waste. Peter Storey took an action to ask within ND what our position on repository research was (Action 08/9).

8.5 The Chair remarked that Repository Research needs to be discussed in more detail at a future RG6 Meeting.

9 Access to Independent Technical capability for HSE

9.1 Haydn Starkie reported that good progress had been made in initiatives that addressed concerns over ND being dependent upon ageing consultants in water chemistry and Human Factors. RG6 commented upon the short-term nature of this report. Haydn Starkie replied that access to ITC was reviewed annually and no problems were expected in the year ahead although there would be problems in the longer term if new graduates with relevant qualifications were not produced in a timely manner to replace older specialists as they retire.

10 Position on Essential Research Capability at Nexia Solutions and the National Nuclear Laboratory

10.1 The Chair of RG6 remarked that the current position regarding Essential Research Capability (ERC) at Nexia Solutions was fragile and for the time being not a cause for concern. However, this topic needed to be picked up again and he suggested a meeting be set up with the appropriate parties to discuss skills needs and the current position. HSE accepted an Action to set up this meeting (Action 08/10).

10.2 Steven Walsgrove commented that the National Nuclear Laboratory (NNL) Project should be ready to move to the next stage. Under the proposed business model, the NNL would be a customer focused organisation competing in the market place. Neil Smart pointed out that Sellafield issues were going to be discussed at the NDA Research Board meeting on 13th May when a paper on the SLC's support needs and the NNL would be discussed. RG6 asked why there had to be competition when the NNL was the only source of a particular skill available. Steven Walsgrove commented that the NNL's unique capability should attract sufficient core work to support its key skills.

11 Any Other Business

11.1 The Chair invited RG6 members to raise any issues they wished to be discussed at a future meeting with the Secretary (Action 08/11).

11.2 The Chair of RG6 reported that he had commented positively to NuSAC on the state of the NRI and TBUrDs.

12 Date of Next Review Group Meeting

12.1 Tuesday 7th October 2008 in the Shakespeare Room, HSE Rose Court, London.

Actions

08/1 Roger Streatfield to provide RG6 (PH) with a contact name to discuss pond water chemistry. *Action complete.*

08/2 HSE to make Control and Instrumentation Research Report available to RG6 members by July 2008.

08/3 HSE and Chair of RG6 to put together a list of topics for RG6 to concentrate on based upon the British Energy and NDA Risk Registers by July 2008.

08/4 HSE to compile a standardised list of questions that RG6 members can use when they attend technical exchange meetings to ensure a consistent scrutiny of research programmes in each technical area and to develop a system of prioritisation for the topics RG6 scrutinise by July 2008.

08/5 Chair of RG6 to discuss with CoRWM where the boundary between CoRWM and site responsibilities lie, by the next RG 6 meeting in October 2008.

08/6 HSE/Licensees to report to the October 2008 meeting of RG 6 on the International Nuclear Safety Research that is being done.

08/7 HSE to feed back RG6 Chair's remark about ND Site Inspectors using Human Factors specialists in key inspections to give a Human Factors perspective. *Action Complete.*

08/8 NDA to circulate its Radioactive Waste Management Directorate Research Strategy to RG6 members by June 2008.

08/9 HSE to verify its position on repository research needs and report to the RG 6 meeting in October 2008.

08/10 NDA to set up a meeting with the appropriate parties, to discuss skills needs and the current position, during June 2008.

08/11 RG6 members to raise issues they wish to be discussed at future meetings or confirm that they have no issues, with the RG6 Secretary by August 2008.