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HEALTH AND SAFETY EXECUTIVE

NUCLEAR SAFETY ADVISORY COMMITTEE

REVIEW GROUP 6 (RESEARCH)

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ACCESS TO INDEPENDENT TECHNICAL CAPABILITY

Paper by HSE

Introduction

1 Part of the strategy for managing the HSC Co-ordinated programme of Nuclear Safety Research (NSR) is an arrangement for maintaining independent technical capability (ITC) by HSE, in accordance with the DTI guidelines for the HSC NSR programme. This capability includes both experienced technical staff as well as experimental research facilities. The function of the independent capability is to provide HSE (NII) with a source of technical advice, in addition to its own staff, that is as far as is possible, independent from sources of advice used by licensees. This advice is used to support HSE (NII's) own research purposes and regulatory activities. Support for essential research capability (ERC), including experimental research facilities, is managed by the nuclear reactor licensees to support their own safety case needs.

2 This paper provides an update on the review of independent capability reported in NuSAC/SCR/07/09 at the February 2007 meeting.

Assessment

3 HSE (NII) has carried out this assessment of Independent capability across all the technical areas of the programme. It should be noted that when HSE (NII) needs to actively maintain this Independent capability, the Levy element of the NSR programme is used. This is done in discussion with licensees who will meet the costs. When the capability is required for regulatory purposes, the Nuclear Safety Studies (NSS) support budget is used. For issues with underlying generic science, NII may use the same advisor as the licensees, but for issues specific to a safety case, NII needs to be able to obtain advice from capability that has been independent of the licensee's thinking.

4 There are various degrees of independence, and it is acknowledged that most experts in the field will have or will have had some association with the licensees. A balance is struck between the level of expertise that comes through working for the industry and the independence from specific plant evaluation.

Status of Current ITC arrangements

5 Presently there is in general an adequate level of Independent capability available to HSE (NII) through the traditional nuclear safety contractors, Universities and HSE's Health and Safety Laboratory. However the situation is currently under review due to the increasing demands being placed upon the nuclear contractor community resulting from an upturn in the nuclear industry. It is uncertain what effect the current nuclear skills shortage will have on the expertise which will continue to be available to NII. The current availability of ITC varies between different technical areas:

- PSA – There are adequate sources of independent advice available in the UK and overseas

- Civil Engineering – No problems as most advice needed is not specific to the nuclear industry
- Structural Integrity – Independent advice can be obtained from TAGSI (Technical Advisory Group on Structural Integrity) and TWI (The Welding Institute) if required. For independent advice on NDT (Non-Destructive Testing) we can use ESR (formerly AEA Technology National Centre of NDT) and TWI. Serco are also available for both NDT and Structural Integrity Assessment provided the Licensee has not used them.
- Graphite – NII's source of ITC is the Graphite Technical Advisory Committee (GTAC). This Committee consists of representatives from the Universities of Manchester, Birmingham and Leeds as well as consultancy organisations. This ITC arrangement continues to work satisfactorily. The Graphite team at Manchester University is receiving enough work through NSS contracts to ensure its viability without the need for intervention from the levy programme. Because of regulatory concerns over future graphite weight losses in AGRs, funding for the graphite oxidation part of the programme of the Harwell-based Nexia Solutions Radiation Chemistry Key Team has been transferred from British Energy Essential Research Capability to an NII NSS contract. NII is also taking the initiative of funding an Eng.D, in cooperation with HSL, for a student at the University of Manchester to conduct research into micro-structure/property relationships in irradiated Graphite and therefore secure further ITC in this area.
- Waste management and decommissioning - this is a growth area, so there are no problems of access to independent advice. However NII is considering funding an Eng.D student at the University of Manchester, to characterise and investigate options for the treatment and disposal of irradiated Graphite, to support its assessment efforts for when the dismantling of Magnox stations requires permissioning. This Eng.D programme will benefit from the University of Manchester's participation in the EU FP 7 CARBOWASTE programme.
- Nuclear Systems and Equipment - most work is done by the licensees themselves, so independence is not relevant
- Radiological protection - independent advice is provided by Health Protection Agency -Radiological Safety Division

- PWR Coolant chemistry - most capability is already taken up by the industry. For the past three years, independent advice has been obtained through employing a consultant (a former BE employee) under the Levy. This consultant is also employed separately by BE. If this consultant is working for both BE and ND on the same Issue, arrangements have to be made to make sure that he is giving both of us the same technical advice. In October 2007, NII let a Levy contract to enable this consultant to develop the plant chemistry and corrosion expertise of younger specialists employed by AMEC and Nexia Solutions, to provide two sources of ITC in this area for when the consultant retires.
- Chemical Processes Secondary circuit chemistry - a second consultant (also a former BE employee) is funded under the levy to maintain a watching brief on developments overseas and to provide advice to NII as and when required. This Consultant is also employed separately by BE and Magnox Electric. If this consultant is working for both BE and ND on the same Issue, arrangements have to be made to make sure that he is giving both of us the same technical advice. In October 2007, NII let a Levy contract to enable this consultant to develop the plant chemistry and corrosion expertise of younger specialists employed by AMEC and Nexia Solutions, to provide two sources of ITC in this area for when the consultant retires.
- Chemical processes Radiation chemistry & Radionuclides - there are experts at Harwell in radiation and radionuclide chemistry that are employed by Nexia Solutions. In previous years there was concern about this specialist team having to rely on the expertise of a key member that was not employed by Nexia Solutions. These concerns have now been resolved. This key team member is now employed by Nexia Solutions.
- Nuclear Science, PWR and AGR Plant modelling – There are at present no particular problems.
- Fuel and thermal-hydraulics modelling – Independent advice on fuel modelling can be obtained through NII's arrangements for access to the OECD Halden programme and including membership of the Studsvik Clad Integrity Project, the Cabri programmes and for LWR thermal-hydraulics, the ROSA programme and, although NII did not participate in 2007, the extended NEA PKL project which NII proposes to re-join in 2008. In the opinion of NII's Project officers, these programmes have delivered useful experimental results and analyses. However resource restrictions have

meant that NII Project Officers have not been able to attend meetings of these projects and so maintain access to potential sources of independent advice from overseas. This problem will be addressed in 2008 by asking contractors to attend on our behalf where NII specialists cannot attend.

Potential shortage areas for independent skills

6 The review identified some potential future shortage areas:

- Human factors - there is a potential difficulty ahead in that several of the key consultants will retire over the next 5 years (not unique to human factors). ND's first choice is to use in-house capability to assess human factors aspects of safety cases. When extra resources are needed, HSL has been used where they have the required expertise. Otherwise a specialist consultant is used. Specialist consultants with experience of nuclear and other high-hazard industries are in short supply. However, ND's human factors group have been pro-active and so far successful, in locating and supporting alternative, younger, sources of independent technical capability in this area, to replace the retiring consultants.
- Control & Instrumentation - There are plenty of sources of general Control & Instrumentation advice available in the UK and overseas. At present, nothing is actively being done to develop independent leading edge sources of advice, but it might be considered in the future. Control & Instrumentation Nuclear Industry Forum arrangements make sure that the current leading edge advisors (City and Bristol universities) give the same advice to both the industry and NII.
- Fire and Internal Hazards – Expertise in fire safety engineering in conventional plant is readily available. However, because of the need to contain radionuclides and prevent the spread of radiological contamination, fires in nuclear plant present particular fire safety engineering problems. Specialist expertise in this area of fire safety engineering is becoming scarce. The option of developing nuclear capability in conventional fire safety engineers is being explored. HSL will be considered as a possible source of advice to NII.

Possible future actions

7. The level of available advice has remained adequate since the previous review in February 2007. Since then initiatives have been taken to develop expertise in Graphite science, Graphite waste and PWR primary and secondary side water chemistry and corrosion. If the available expertise declines further, possibilities that might be considered include:

- Ring fenced teams within consultants
- Using capability in one licensee to assess the safety case of other licensees
- Tapping into more overseas capability where possible
- Growing more teams at universities to provide ITC in a manner analogous to the licensee University Research Alliances
- Where taking advice from the same source as the licensee are unavoidable, introducing arrangements to ensure that the advice given reflects the considered opinion of the advisor and not that of the licensee. The Control & Instrumentation Nuclear Industry Forum arrangements in the Control and Instrumentation technical area are an example of this.
- To date the ITC arrangements have been used principally to provide advice to support HSE (NII's) regulatory activities with the operating reactor licensees. However, the position will be kept under review to determine if such arrangements are necessary, to support regulatory activities with decommissioning, fuel cycle or defence licensees.
- Work on assessment of new designs of civil reactors commenced during 2007. Consideration is being given to independent technical capability needs for the generic design assessment of these new designs of reactors, for when the assessment process moves to the in-depth technical review stage.

Conclusions.

8. The review of access to Independent technical capabilities has confirmed that currently the position is generally secure and that adequate arrangements are in place to maintain teams and provide active support that are needed now. However there are clear indications that this situation is likely to change due to increasing industrial activity. Sources of advice that reside within Nexia Solutions are increasingly

needed to provide advice only on British Energy issues. In the plant chemistry and corrosion area this is being addressed by developing expertise in Amec. There is, in general, access to a number of teams in each technical area but in some technical areas, where available expertise is limited, NII has had to develop arrangements so it can satisfy itself that the advice given by a team that also advises the licensees reflects the advisors own considered opinion and not that of the licensee. The continuous monitoring of the situation by NII assessment staff remains effective. A further review will be carried out over the next 12 months and the results reported to NuSAC/RG6.

Action

9. The NuSAC/RG6 are invited to note the outcome of the review of access to Independent technical capability and comment on the information presented in this paper.