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**HEALTH AND SAFETY COMMISSION
NUCLEAR SAFETY ADVISORY COMMITTEE
SUB-COMMITTEE ON RESEARCH**

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BRITISH NUCLEAR GROUP – REACTOR SITES:

2007/8 PROGRAMME OF WASTE AND DECOMMISSIONING RESEARCH

PAPER BY MAGNOX ELECTRIC LTD

BACKGROUND

- 1 Magnox Electric Ltd is a Site Licence Company (SLC) currently owned by the Nuclear Decommissioning Authority's M&O contractor, British Nuclear Group. During 2006/7 Magnox Electric Ltd was the SLC for ten sites, consisting of all of the UK Magnox power station sites except for Calder Hall. Only Oldbury and Wylfa are still generating electricity with Oldbury due to cease generation in 2008 and Wylfa during 2010.
- 2 The NDA's draft strategy published during 2005 proposed the division of Magnox Electric Ltd into three, smaller, fully independent SLCs. The final NDA strategy published during 2006, which is currently being implemented, includes dividing Magnox into two, smaller, fully independent site license companies each being the licensee for five sites. This major organisational change is being implemented in phases, governed by the requirements of License Condition 36 (Management of Change). At present, Magnox Electric Ltd remains the single licensee for all ten sites but since October 2006 has been operating with an organisational structure based on two semi-independent regions (North and South). The intent is that from Summer 2007, the two Regions will operate independently for a period of formal 'Shadow Working' in order to demonstrate capability and processes, followed by legal separation and the formation of new site licence companies during 2008.
- 3 It has been agreed with the NII that the previous research arrangements relevant to large generating site license companies, which included the production of a Nuclear Research Schedule, are no longer relevant to Magnox Electric and these arrangements have been terminated. NII views on research requirements are now made known to all the

decommissioning SLCs through the “NSD Research strategy Statement for Decommissioning” which was published for the first time during 2006. Magnox has taken these views into account as the 07/08 research programme has been developed. In addition, the NDA also require that R&D needs are identified so as to demonstrate that the Technical Baseline for delivery of the decommissioning plans is secure.

- 4 Future R&D activities need to be structured to ensure significant gaps in the knowledge base are anticipated and relevant work is commissioned at an appropriate time. As the decommissioning programme progresses, priorities for R&D work may be expected to shift from the current waste retrieval, treatment, immobilisation, packaging and interim storage to the development and achievement of site delicensing criteria.
- 5 In response, Reactor Sites have identified those projects which are to be undertaken in 2007/08 and which underpin the stations’ technical baselines and responds to NII views. This paper provides a brief summary of the projects (Table 1). It should be noted that, at the time of writing (mid February 2007), the planning process is not finalised and some changes to the proposals may be required.

RESEARCH STRATEGY

- 6 The Magnox Electric Ltd research strategy continues to be influenced strongly by the ongoing programme of cessation of generation of the Magnox stations. Magnox will, however, continue to undertake all reasonably practicable research to support generation-related safety cases. An example of this is the still-significant programme of graphite-related research which continues to underpin the operational safety cases at both Oldbury and Wylfa. It should be noted that, despite this ongoing reduction in generation-related research activity, the existing Quality Management System will ensure that all staff engaged on work related to nuclear safety, such as the production of safety cases, will continue to be suitably qualified and experienced as required by Site Licence Condition 12. This paper deals only with Waste and Decommissioning related R&D.

SUMMARY OF THE MAGNOX RESEARCH PROGRAMME

- 7 → ←. All of this funding will be provided by the NDA as part of Magnox’s ‘Near Term Work Plans’ (NTWP) which form the basis of the contractual relationship between the NDA and their M&O Contractors. Details are provided in Table 1. A total of 38 generic projects are listed and these will underpin the stations’ technical baselines. The projects cover a variety of areas with considerable alignment with the topics highlighted in the NSD Research Strategy Statement for Decommissioning.

The three projects jointly funded by British Energy plus one other covering the MAGGAS computer model are on-going and covered by three year contracts to March 2009. There are other on-going projects either involving a three year PhD or monitoring existing test facilities. The

remainder of the 35 projects have arisen from discussions at the Radioactive Waste and Decommissioning Technology Group (RWDTG) consisting of all Magnox sites (including Wylfa and Oldbury) plus Sellafield. The projects therefore represent the sites view of the R&D required in order for them to complete their waste management and decommissioning plans. An example would be to support Letter of Compliance submissions to Nirex for the retrieval and packaging of waste. The proposals were then presented to the Radioactive Waste and Decommissioning Industry Group (RWDIG) in order to check for the potential for duplicated and related work with other UK. Finally, the agreed list of projects was subjected to further internal scrutiny and a process of prioritisation within Magnox.

On the issue of funding, and anticipating some funding cuts, Magnox has examined the 38 projects for the possibility of carrying out some of the work using internal staff. Currently the expectation is that the 38 projects will be completed in 2007-8 by a combination of external funding (contractors) and internal resource by the Northern and Southern Regions. Some of the self-funded projects will be joint activities by both Regions with a small amount of external input.

ESSENTIAL RESEARCH CAPABILITY

- 8 The previous research arrangements required some consideration of 'Essential Research Capability' (ERC). ERC was declared in circumstances when a future research requirement is identified and, unless some proactive measure is taken now, there is a significant risk that the team or facility will not be available when required. With respect to the W&D research programme, no such circumstances have been identified. It should also be noted that Magnox Electric, as a small site licence company delivering for the NDA, has no remit to consider wider 'national' issues such as 'Keeping the Nuclear Option Open'

TECHNICAL EXCHANGES

- 9 Technical Exchanges between Magnox, NDA, regulators, other SLCs and other stakeholders now take place under the Reactor Waste and Decommissioning Industry Group which meets regularly. The Committee is currently chaired by Magnox but the Terms of Reference and reporting of this Committee are under review. Magnox staff also attend some of the Technical Exchange groups relevant to generation-related topics such as Control and Instrumentation and contribute to the programmes, albeit with reducing involvement.

FUTURE DEVELOPMENTS

- 10 During 2006/7 Magnox Electric has seen a period of further significant change within the UK nuclear industry and it seems certain that this will continue, at increased pace, during 2007/8. However, despite these changes, the safety-related responsibilities of the site licensee remain largely as before. Research remains an option by which nuclear safety

might be enhanced and will continue to be undertaken where this is judged to be reasonably practicable.

- 11 It is likely that a significant proportion of the research required to support the decommissioning sites will be of relevance to several, if not all of the future NDA licensees, and it is clear that a framework is required to ensure this work is delivered in an efficient manner that does not involve duplication of projects and ensures knowledge is disseminated across the industry. Discussions on possible future arrangements have taken place with NDA and NII representatives during 2006/07; progress has been made but no final conclusion have yet been reached. Establishing an effective and open communications research framework, involving multiple stakeholders, within the anticipated competitive environment is still the goal sought by the NDA and it is likely that a reconstituted Reactor Waste and Decommissioning Industry Group will play a major role.

CONCLUSIONS

- 12 It can be concluded that
 - 12.1 Magnox Electric continues to recognise the requirement to undertake all reasonably practicable nuclear safety-related research as it undergoes a period of significant organisational change in preparation for division into two fully independent site licence companies.
 - 12.2 The Magnox Electric 2007/8 W&D research portfolio provides an adequate and balanced programme that takes into account the research required to enable delivery of the decommissioning strategy as well as NII views.
 - 12.3 No requirement to support any W&D related Essential Research Capability has been identified.
 - 12.4 Technical Exchanges related to W&D research continue under the direction of the Reactor Waste and Decommissioning Technical Group.

ACTION REQUIRED

- 13 The sub-committee is invited to note and comment on the paper.

REFERENCES

1. NSD Research Strategy Statement for Decommissioning Licensees 2006.

Table 1 – Reactor Sites 2007/8 W&D Research and Development Portfolio

Project Number	Title	→
01/07	Assessment of feasibility, cost and benefit of cementation trials on Magnox station radioactive sludge	
02/07	Sorption systems for encapsulation of radioactively contaminated oil and problem liquid wastes	
03/07	Optimisation of design, procurement and use of Nirex ILW containers	
04/07	Particulate science of magnesium hydroxide based materials in support of Magnox wet waste processing	
05/07	Supply chain workshop - review of waste sludge properties and processing	
06/07	Position statement on design and operational concepts for Magnox ILW stores	
07/07	Magnesium-hydroxide colloids in ponds wet wastes (e.g. filtration (SCRU), mobile AETP, MXD)	
08/07	Development of systems for Se-79 and Tc-99 ILW analysis in ILW to support LoC assessment	
09/07	The Disposal of neutron sources	
10/07	Development of a Specification and Strategy to Deploy Dummy ILW Packages in Support of the Long-term Storage Safety Case	
11/07	Long-term monitoring cemented wastes	
12/07	Application of MAGGAS model to cemented wastes	
13/07	Corrosion assessment of containers of cemented wastes	
14/07	Gamma irradiation of samples of cemented waste	
15/07	Effect of waste package movements on corrosion rates	
16/07	Further Work on the Long-term integrity of Lewatit DN Immobilised in a CSF/SRPC Matrix	
17/07	Preparation of supporting documentation for waste treatment	
18/07	Lifetime model for internal corrosion of ILW containers	
19/07	Review of alternative container materials	
20/07	Security of supply of strategic materials used to encapsulate and contain ILW	
21/07	Testing of long-term integrity of building cladding panels under UK severe weather exposure	
22/07	Review of Chemically Hazardous Wastes arising from decommissioning	
23/07	Monitoring, selection and storage of reactor archive samples including steels, graphite and construction materials	
24/07	Options for removal of reactor graphite installed sets (core moderator samples) during decommissioning	
25/07	Review of Care and Maintenance Arrangements	
26/07*	EPRI Decommissioning Technology Programme Membership (No longer applicable – NDA Direct Membership)	
27/07	Subscription to leading scientific and engineering journals to support WM&D R&D	
28/07	Approaches to determine the radionuclide concentrations in ILW streams in support of LoC Assessment and BPEO studies	

Project Number	Title	➔
29/07	Review of Future Needs for Radiochemical Analysis against Potential Supply Limitations	
30/07	Handbook of the processing and immobilisation of organic IX resin wastes	
31/07	Handbook of the processing and immobilisation of Magnox Fuel element Debris (FED)	
32/07	Handbook of the processing and immobilisation of desiccant waste	
33/07	Staff exchange with CIDEN to enhance technology development for early dismantling of Magnox/Gaz Graphite Reactors.	
34/07	Human factors – Operational experience Feedback Study on commissioning Activities	
35/07	Workshops to underpin resolution of generic issues at request of NDA	
36/07*	Technical support in the assessment of and further development of TB&RD (No longer a generic project)	
37/07*	Support for the Development of Integrated Waste Strategy (No longer a generic project)	
38/07	Attendance at Conferences to support WM&D R&D	
39/07	Handbook of sampling methods and techniques	
40/07	Review and Search for Unidentified Samples in Storage	
41/07	Study to Support Final Site Clearance - Technical Challenges (No longer a generic project)	
42/07	Human Factors - Scoping Future R&D Needs	
	TOTAL	
	Shared Cost with British Energy	
		←

- Projects in the original listing but now funded elsewhere and not considered as part of the generic portfolio

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