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HEALTH AND SAFETY COMMISSION

HSC Coordinated Programme of Nuclear Safety Research for 2005/06

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Issue

1. The HSC has responsibility for a Nuclear Safety Research (NSR) programme that is HSE coordinated and predominantly commissioned by the nuclear licensees. HSC's responsibilities are based on a policy agreed with DTI that aims to maintain an adequate and balanced level of NSR in the UK. This paper seeks approval for this programme and should be read in conjunction with HSC/05/43 which sets out advice from NuSAC.

Timing

2. Routine. Commission approval is sought to enable HSE and the nuclear licensees to commission the 2005/06 NSR programme.

Recommendations

3. The HSC is invited to approve the proposed outlined NSR programme which includes an HSE commissioned programme forming part of the HSE Major Hazards Research Programme. The costs of the HSE Programme including HSE's management charges are recovered from the nuclear licensees by means of a levy.

Background

4. Responsibility for nuclear safety research was transferred in 1990 from DTI (formerly Department of Energy) to HSC. With the agreement of HSC in 2002, the scope of the programme was expanded from one that focused only on civil nuclear reactor sites to one which in addition covered all civil sites being decommissioned and where radioactive waste is being managed; essentially the scope of the new Nuclear Decommissioning Authority (NDA). Primarily, HSC has a duty to ensure that adequate and balanced programmes of NSR continue to be undertaken in the UK. HSE uses its regulatory insights and interactions with the nuclear licensees to develop research strategies that ensure the research addresses relevant safety issues, contributes to safety standards and maintains important facilities and expertise.

5. At both strategic and operational levels, the NSR programme has been coordinated wherever possible with Major Hazards research commissioned under the Mainstream Programme in order to avoid duplication and share research outcomes on cross-cutting issues such as human factors, ageing plant, contractorisation. HSE applies the HSC Science Strategy for its Strategic Programmes by placing responsibility for financing and

undertaking the research on the nuclear industry. In keeping with other major hazards industries, safety research on nuclear power plants is declining as the technology matures, plants close and for the moment no new plants are being built.

Argument

6. Fundamental to the arrangements that HSE has agreed is a licensee's responsibility for identifying, commissioning and financing its own NSR needs. HSE's main role is in ensuring that the NSR is adequate and balanced across the risks and hazards of the nuclear activities. Through its coordination responsibilities and in dialogue with the nuclear licensees HSE sets the strategic direction and where necessary the safety drivers and safety issues that help determine what research is undertaken. HSE's production of the Nuclear Research Index (NRI) [Appendix 1] and research strategies continues to form a sound basis for defining the research needs and provides HSE with a measuring stick by which it can assess the adequacy and balance of the research commissioned by the nuclear licensees. The arrangements provide HSE with unfettered access to all research outcomes arising from the programme but in addition HSE undertakes its own research, the HSE Levy Programme, which provides it with independent advice, gives access to international research programmes and is there to address research issues which the licensees have declined to do.

7. The NSR programme consists of two parts. The first part focuses on operating power reactor sites and the second on nuclear plant decommissioning and radioactive waste. The power reactor site programme that covers the operating Magnox, AGR and PWRs has been in operation since 1990 and consists of detailed programmes (Annex 1), including the HSE Levy Programme which are costed out and agreed with HSC. The 2005/06 programme which includes management charges is estimated at £5.8m and is made up of an HSE Levy programme of £1.1m (Annex 2), a British Energy (BE) programme of £2.8m and a Magnox Electric programme of £1.9m (Annex 3). The programme represents a significant reduction on the 2004/05 programme expected to outturn at £9.3m. The size of the programme was expected to reduce due to the phasing out of the Magnox reactors, maturity of the AGR's and the review of waste and decommissioning research as a result of the formation of the NDA. A contributory factor has been the decision by BE to reduce the funding of its strategic programme which was done without consultation with HSE and had the effect of reducing funding on the 2004/05 and 2005/06 programmes. HSE is satisfied that in spite of these reductions the programme overall addresses all the high priority issues although it may have to fund one project through the HSE Levy Programme which Magnox Electric has declined to address and one which the licensees consider has been addressed by other methods (identified in Annex 2). However, HSE expects that work that has had to be deferred in this planned programme because of budget constraints will be commissioned either as licensees' funds become available during the year or in next year's programme. As a result of the unilateral action taken by BE, HSE will take steps to enhance its monitoring of the licensee's programme in order to provide assurance that the research is being commissioned to agreed timescales.

8. The second part in principle covers all nuclear sites where plant is being decommissioned and radioactive waste is treated and managed. These sites are owned and controlled by the NDA and the NDA provides the funding to their contractors (our nuclear licensees) to undertake safety research. Through the development of research strategies HSE has agreed an NSR programme with British Nuclear Group (BNG) Sellafield and the NDA has agreed to fund it. In order to be consistent and proportionate in its approach HSE is developing research arrangements with UKAEA that will be very similar to those operated with BNG Sellafield and these will be put in place during this year. However, HSE has had oversight of the NSR programme that UKAEA has agreed with the NDA and is satisfied that it adequately addresses the key safety issues for its sites. HSE does not

intend to commission any research through its Levy Programme but will work with the NDA through the NDA Research Board to develop a generic safety research programme that is funded by the NDA.

Consultation

9. The NSR programme was presented in full to the Nuclear Safety Advisory Committee (NuSAC) Sub-committee on Research on 14 April. At this meeting MOD and DTI were represented along with each of the licensees and the NDA. HSE's Chief Scientist also attended and has provided advice that relates to HSC Science Strategy. The Chair of the Sub-committee provides his advice on the adequacy of the NSR programme to the HSC in paper HSC/05/43.

Presentation

10. The key stakeholders have been involved in the preparations leading up to the production of this paper. The research strategies and safety drivers for the programme are published on HSE's website for the technical community to access and the research outcomes for the Levy Programme are put in the public domain also through the website. The Communications Directorate has cleared the presentational aspects of this paper.

Costs and Benefits

11. The programme keeps HSE informed of nuclear safety developments both in the UK and overseas which will contribute to its regulation of the UK industry. In addition, the UK public is assured that adequate levels of NSR continue to be undertaken on nuclear activities that do have the potential for substantial harm.

Financial/Resource Implications to HSE

12. The HSE Levy Programme has been cleared with PEFD. HSE recovers all its research and management costs from the nuclear licensees and there is overall neutral cost of this programme to HSE.

Other Implications

13. N/A.

Next Steps

14. If the programme is approved HSE and the licensees can commence commissioning the new research activities. HSE will provide estimated charges to the licensees for 2005/06.

Annex 1

HSC Co-ordinated Programme of Nuclear Safety Research 1990 - 2006

Spend (£M) (excluding Management Charges)

	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03 (2)	03/04 (3)	04/05 (7)	05/06
Levy	15.0	10.3	9.6	11.0	5.4	2.0	1.6	1.9	1.5	1.4	1.5	1.4	1.2	1.6	1.2	0.9
IMC/Licensees (4)	0.0	0.0	0.0	0.0	5.0	8.1	8.5	7.2	6.4	7.0	6.7	6.3	5.4	6.6	7.4	4.3
Levy+IMC/Licensees	**15.0**	**10.3**	**9.6**	**11.0**	**10.4**	**10.1**	**10.1**	**9.1**	**7.9**	**8.4**	**8.2**	**7.7**	**6.6**	**8.2**	**8.6**	**5.2**
Industry Direct/ Non-NRI Research (5,6)	7.1	11.8	6.5	8.0	4.3	9.4	10.4	9.9	7.7	7.4	10.6	9.2	8.4	9.5	7.8	7.0
Total	**22.1**	**22.1**	**16.1**	**19.0**	**14.7**	**19.5**	**20.5**	**19.0**	**15.6**	**15.8**	**18.8**	**16.9**	**15.0**	**17.7**	**16.4**	**12.2**

Notes:

(1) All figures are ex. VAT.

(2) The figures reported here the final outturn spend until 2002/03

(3) Planned spend from 2003/04.

(4) From April 2003 the IMC programme is replaced by individual licensee's programmes.

(5) From April 2003 the Industry Direct Programme is replaced by non-NRI Research Programme.

(6) Spend on non-NRI related research previously reported to HSC for the years up to 2000/01 included ~£6.5M/year of BNFL chemical plant research. This has now been excluded so that all data relate to spend on reactor safety research.

(7) This is the programme value as defined at the start of 2004/05.

Annex 2

LEVY FUNDED PROJECTS 2005/06

Technical area	Project reference	Title	Licensees	Research category [4]
Civil engineering	-	-	-	-
C&I	CI/KT/51	Reactor Protection Equipment	BE/ME	ITC
Coolant chemistry	CC/KT/25 renewal	PWR Primary chemistry	BE	ITC
	CC/KT/26 renewal	PWR Secondary chemistry	BE	ITC
External events (&Fire)	EE/GNSR/28?	IAEA CRP Near field earthquakes	BE	INTL
	?	Evaluation of fire models	BE/ME	INTL
	EE/GNSR/26	Fire information exchange	BE/ME	INTL
	?	Seismic site specific response spectrum	BE/ME	To be resolved [3]
Fuel	FC/GNSR/51	OECD Cabri	BE	INTL
	FC/GNSR/55	OECD Halden[1]	BE/ME	INTL
	FC/GNSR/56	OECD Studsvik Cladding Integrity Project	BE	INTL
Graphite	GRA/GNSR/1	AGR Brick Double Cracking	BE/ME	ITC
	GRA/GNSR/2	Crack arrest	BE/ME	ITC
	GRA/GNSR/4	Microstructural property relationships	BE/ME	ITC
Human Factors	-[1]	-	-	-
Nuclear Science	NS/GNSR/6 renewal	OECD NEA Databank membership[2]	BE/ME	INTL
	NS/GNSR/7 renewal	EWGRD European WG on Reactor Dosimetry	BE/ME	INTL
Nuclear Systems &Equipment	-	-	-	-
Plant Life Management	PC/GNSR/142	FP5 PISA Phosphorus Influence on Steel Ageing	BE/ME	INTL
	PC/GNSR/151	FP6 GAIN Gap Analysis of Inspection	BE	INTL
	?	FP6 PERFECT Irradiation embrittlement modelling	BE	INTL

	?	R6 codes	ME	To be resolved [3]
Plant Modelling	PM/GNSR/16	OECD SETH (Senior Experts Thermal Hydraulic)	BE	INTL
	PM/GNSR/17	ARTIST SG Tube Rupture Accidents	BE	INTL
	PM/GNSR/18	USNRC Code Maintenance Programme (CAMP)[2]	BE	INTL
	PM/GNSR/19	CAMP code administration[2]	BE	INTL
	PM/GNSR/21	FP6 SARNET (Severe Accident Research Network)	BE	INTL
	PM/GNSR/22	OECD PKL (Primary Circuit)	BE	INTL
	PM/GNSR/23	FP6 EURANOS Radiological protection in accidents	BE	INTL
	PM/GNSR/25	OECD ROSA (JAERI thermal hydraulics project)	BE	INTL
PSA	PRA/GNSR/25 renewal	OECD ICDE Common Cause Failure Database	BE/ME	INTL
	PRA/GNSR/30 renewal	OECD ICDE Data provision	BE/ME	INTL
Radiological Safety	-	-	-	-
Radionuclides	-	-	-	-
W&D	-	-	-	-

1. The Halden project has also a Man Technology Organisation part (Human Factors), but the separate costs are not known. Magnox is charged an estimated amount for the MTO work only.

2. Income from external users is used to offset the levy.

3. The participation of British Energy (BE) and Magnox Electric (ME) in these projects has yet to be resolved and may result in HSE commissioning additional research projects and recovering the costs from the licensees.

4. ITC – Independent Technical Capability, INTL – International Collaboration

Annex 3

SUMMARY OF PLANNED NRI RELATED SPEND £k: 2005/2006 versus 2004/2005

Technical Area	LEVY		LICENSEES		TOTALS	
	2004/2005	2005/2006	2004/2005	2005/2006	2004/2005	2005/2006
Chemical Processes	17	8	987	667	1004	675
Graphite	268	118	1378	1299	1646	1417
Fuel & Core	287	236	27	64	314	623
Plant Modelling	135	144	7		142	
Nuclear Science	163	179	118		281	
Radiological Safety	18	0	32		50	
Waste & Decommissioning	0	0	2379	720	2379	720
Human Factors	20	0	276	120	296	191
Probabilistic Safety Assessment	78	71	8		86	
Control & Instrumentation	40	7	856	532	896	539
Nuclear Systems & Equipment	0	0	105	100	105	100
Plant Life Management - Civil Engineering	0	0	212	169	212	213
Hazards (external & internal)	31	44	15		46	
Plant Life Management - Steel	117	51	978	645	1095	696
Programme Total	**1174**	**858**	**7378**	**4316**	**8552**	**5174**
Management Charges	215	225	520	340	735	565
TOTALS	**1389**	**1083**	**7898**	**4656**	**9287**	**5739**

APPENDIX 1

Nuclear Research Index

The arrangements for implementing the reactor research programme require both HSE and the major nuclear generating licensees to commission research programmes to address safety issues identified by HSE in its Nuclear Research Index (NRI). The NRI, which is produced annually, is a compilation of generic nuclear safety issues generated by HSE as a result of its knowledge gained in regulating nuclear reactor sites and its broader dealings with other organisations, both nationally and internationally. The index provides a basis for: prioritising research; judging the balance and adequacy of the annual programmes; and ensuring that the support to the regulation of nuclear safety is optimised. It is necessary to ensure adequacy and balance within a technical area, between technical areas, and between different reactor types. The reactor safety research programme is drawn up following a dialogue based on the NRI with the reactor licensees.

This year's NRI is in the same format as last year and consists of three individual documents:

- A strategy document providing an overall strategy, which takes account of strategic regulatory and industry drivers as well as the individual technical area strategies, and an outline of the framework for the programme management.

- A live Issues Index which consists of all those issues which are not yet considered closed.

- A Closed Issues Index which provides details of all those issues raised in previous Indexes which are now considered closed together with details of why each issue is considered closed, with references where appropriate.