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HEALTH AND SAFETY COMMISSION

HSC Coordinated Programme of Nuclear Safety Research for 2007/08

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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/07/41 that sets out advice from the Nuclear Safety Advisory Committee (NuSAC).

Timing

2. Routine. Commission approval is sought to enable HSE and the nuclear licensees to commission the 2007/08 NSR programme.

Recommendations

3. 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 Nuclear Decommissioning Authority (NDA). Principally this covers the UKAEA sites and BNG Sellafield. Primarily, HSC has a duty to ensure that adequate and balanced programmes of NSR continue to be undertaken in the UK. HSE, through its Nuclear Directorate (ND) implements this policy and the Nuclear Safety Advisory Committee (NuSAC), through its Sub-committee on Research advises HSC on nuclear safety research matters. 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 competence.

5. At both strategic and operational levels, the NSR programme has been coordinated wherever possible with other Major Hazards research commissioned under the Mainstream Programme. HSE places responsibility for financing and undertaking the research on the nuclear licensees. The balance of the programmes has been shifting from operating nuclear power plants to radioactive waste management and decommissioning, reflecting the reduction in operating power stations and the Nuclear Decommissioning Authority's (NDA) responsibility for redundant nuclear plant and nuclear waste. HSE has been exploring how the programme can be extended to cover MOD nuclear sites regulated by HSE.

Argument

6. Fundamental to the programme is a licensee's responsibility for identifying, commissioning and financing its own NSR needs. HSE's main role is in overseeing NSR in the UK in order to ensure it is adequate and balanced across the risks and hazards of the major 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 continue to form the basis for defining research needs and provide HSE with a measuring stick by which it can assess the adequacy and balance of the research commissioned by the nuclear licensees. HSE has agreed with the licensees unfettered access to all research outcomes arising from the programme and potentially these can be shared with others in the Major Hazards Research Programme. In addition HSE undertakes its own research, the HSE Levy Programme, to provide it with independent technical advice, to give access to international research programmes and to tackle research issues the licensees have declined to address.

7. The NSR programme for 2007/08 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 (see Annex 1) and consists of detailed programmes, including the HSE Levy Programme which are costed out and agreed with HSC. The funding level of the power reactor programme over this period has progressively reduced reflecting the planned closure of the Magnox plants and the mature nature of the AGRs and the PWR. New research commissioned on the Magnox reactors has largely ceased as the two remaining operating plants will be closed in 2008 and 2010, therefore NII and BNG Magnox have agreed that any safety issues requiring research will be undertaken through ND's regulatory interventions. HSE awaits the outcome of the Energy White paper on the likelihood of new power reactors being built but does not rule out at this stage the need for NSR within this year. However, because the type of designs are not known and the timing not defined it is not possible to define these research needs at this moment. Therefore the 2007/08 programme excluding management charges relates only to existing operating reactors and is composed of

an HSE Levy programme of £0.49m and a British Energy (BE) programme of £3.21m (Annex 2). Individual projects in the Levy Programme are detailed in Annex 3. The programme overall represents a reduction on the 2006/07 programme expected to outturn at £5.0m. This is due to the absence of a Magnox programme and the formation of a separate waste and decommissioning programme that is covered in the following paragraph. Also the licensees will commission research to meet their own needs (non-NRI) totalling £8.09m (Annex 4).

8. The second part in principle covers all nuclear sites where plant is being decommissioned and radioactive waste is treated, managed and stored. These sites are owned by the NDA which provides the funding to its 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 UKAEA and in principle the NDA will fund it through its agreement to fund the licensees' Technology Plans. The safety research required by HSE is normally integrated within either operational or development research undertaken by the licensee, therefore the cost of the safety research is not itemised but instead the research required is characterised by a clear description of the safety issue which HSE wants addressed. HSE has reviewed the NSR programmes that UKAEA and BNFL have agreed with the NDA and is satisfied that each adequately addresses the key safety issues identified for its sites. HSE does not need to commission any research through the Levy Programme. However, HSE is working closely with the NDA to identify a group which will assist in coordinating how research issues are progressed and shared between licensees.

Consultation

9. The NSR programme was presented in full to the Nuclear Safety Advisory Committee (NuSAC) Sub-committee on Research on 6 February. The licensees covered by the programme and the NDA were represented at the meeting. From discussions at the meeting NuSAC provided its advice to HSC on the adequacy of the 2007/08 NSR programme and this is provided in paper HSC/07/41. In brief NuSAC advises that HSC should approve the programme but has reservations that the Inspectorate resources employed in developing the programme may not be sufficient in the future to ensure an adequate and balanced programme and that this situation will be exacerbated by a new reactor build programme. Responding to this criticism ND is acutely aware of the shortage of Inspectorate resource but has to give priority to using its front line inspectors on its regulatory responsibilities. However, ND is looking at ways to address short falls in resourcing the development and oversight of the programme and, in particular, on human factors research is seeking increased synergies in working with others in HSE and HSL. The Chief Scientist Unit has been consulted on this paper.

Presentation

10. The key stakeholders have contributed 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 can be made available to the public where it is considered the

research has no security implications. These commitments have been agreed with the Communications Directorate.

Costs and Benefits

11. The programme helps HSE benefit from nuclear safety developments both in the UK and overseas. 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. In principle the technical community is able to access and benefit from the research outcomes.

Financial/Resource Implications to HSE

12. HSE recovers all its research and management costs from the nuclear licensees and there is overall neutral cost of this programme to HSE. The financial aspects of this paper have been cleared with PFPD.

Other Implications

13. There are none.

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 2007/08.

HSC Co-ordinated Programme of Nuclear Reactor Safety Research 1990 - 2007

Spend (£M) (excluding Management Charges)(1)

	90/9 1	91/9 2	92/9 3	93/9 4	94/9 5	95/9 6	96/9 7	97/9 8	98/9 9	99/0 0	00/0 1	01/0 2	02/0 3	03/0 4	04/0 5	05/0 6	06/0 7 (4)
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	0.7
Licensees (2)	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	4.3
Levy+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	5.0
Industry Direct/ Non-NRI Research (3)	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	6.8
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	11.8

Notes:

(1) All figures are ex. VAT.

(2) Before April 2003 individual licensee's programmes were combined in the Industry Management Committee (IMC) programme.

(3) Before April 2003 the non-NRI Research Programme was called the Industry Direct Programme.

(4) Figures reported are planned spend for 2006/07.

SUMMARY OF PLANNED NRI RELATED REACTOR RESEARCH SPEND £k: 2006/2007 versus 2007/2008

Technical Area	LEVY		LICENSEES		TOTALS	
	2006/2007	2007/2008	2006/2007	2007/2008	2006/2007	2007/2008
Chemical Processes	20	108	928	770	948	878
Graphite	57	6	814	900	871	906
Fuel & Core	192	157	184	26	677	274
Plant Modelling	133	91				
Nuclear Science	168	0				
Radiological Safety	0	0				
Waste & Decommissioning	0	0	833	217	833	217
Human Factors	0	0	200	170	275	196
Probabilistic Safety Assessment	75	26				
Control & Instrumentation	0	0	417	329	417	329
Nuclear Systems & Equipment	0	0	20	0	20	0
Plant Life Management - Civil Engineering	0	0	200	100	206	100
Hazards (external & internal)	6	0				
Plant Life Management - Steel	33	40	725	700	758	740
Support for FP7 Bids	0	60	0	0	0	60
Programme Total	684	488	4321	3212	5005	3700
Management Charges	156	99	150	Charges not declared	306	99
TOTALS	834	587	4472	3212	5311	3799

LEVY FUNDED PROJECTS 2007-08

Technical area	Project reference	Title	Licensees	Research category
Civil engineering	-	-	-	-
C&I				
Coolant chemistry	CC/KT/25 renewal	PWR Primary chemistry	BE	ITC
	CC/KT/26 renewal	PWR Secondary chemistry	BE	ITC
	New Contract	Develop new ITC in PWR Primary Chemistry	BE	ITC
	New Contract	Develop new ITC in Reactor Secondary Chemistry	BE/ME	ITC
External events (&Fire)				
Fuel	FC/GNSR/51	OECD Cabri	BE	INTL
	FC/GNSR/56	OECD Studsvik Cladding Integrity Project	BE	INTL

Graphite	New Contract	Support for an Eng.D Student	BE/ME	ITC
Human Factors	- ¹	-	-	-
Nuclear Science				
Nuclear Systems & Equipment	-	-	-	-
Plant Life Management	New Contract	FP6 PERFECT Irradiation embrittlement modelling	BE	INTL
Plant Modelling	PM/GNSR/17	ARTIST SG Tube Rupture Accidents	BE	INTL
	PM/GNSR/18	USNRC Code Maintenance Programme (CAMP) ¹	BE	INTL
	PM/GNSR/19	CAMP code administration ¹	BE	INTL
	PM/GNSR/21	FP6 SARNET (Severe Accident Research Network)	BE	INTL
	PM/GNSR/22	OECD PKL (Primary Circuit)	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	USNRC CSARP (Severe Accident and PSA Project)	BE/ME	INTL
Radiological Safety	-	-	-	-
Radionuclide s	-	-	-	-
W&D	-	-	-	-
Various	New Contracts	Support for Euratom FP7 Funding Bids	BE/ME	INTL

¹ Income from external users is used to offset the levy

TABLE 4 2007/2008 PLANNED REACTOR LICENSEES' PROGRAMMES OF RESEARCH (£k)

Technical area	BE NRI	ME NRI	BE non NRI	ME Non-NRI	Total NRI
Chemical Processes	770	0	91	0	770
Graphite	900	0	3500	0	900
Fuel & Core	26	0	415	0	26
Plant Modelling					
Nuclear Science					
Radiological Safety					
Waste & Decommissioning	217	0	250	1495	217
Human Factors	170	0	0	73	170
Probabilistic Safety Assessment					
Control & Instrumentation	329		48	0	329
Nuclear Systems & Equipment (Fuel handling)	0	0	90	0	0
Plant Life Management - Civil Eng	100	0	102	0	100
Hazards (external & internal)					
Plant Life Management - Steel	700	0	1460	0	700
Generic	0	0	620	0	0
Programme Total	3212	0	6519	1568	3212
Programme Management	-				
TOTALS	3212				

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.