

Health and Safety Commission Paper			HSC/06/32
Meeting Date:	9 May 2006	Open Gov. Status:	OPEN
Type of Paper:	Below-the -line	Paper File Ref:	
Exemptions:	None		

HEALTH AND SAFETY COMMISSION

HSC Coordinated Programme of Nuclear Safety Research for 2006/07

A Paper by Dr Peter Storey, Band 1, NSD4

Board Member: Dr Mike Weightman

Cleared by Justin McCracken on 19 April 2005

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/06/33 which sets out advice from NuSAC.

Timing

2. Routine. Commission approval is sought to enable HSE and the nuclear licensees to commission the 2006/07 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). 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 Safety Directorate (NSD) 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 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, external events. HSE implements the HSC Science Strategy for its Strategic Programmes by placing responsibility for financing and undertaking the research on the nuclear industry. Safety research on nuclear power plants continues to decline as the technology matures and plants close. We await the outcome of the Government's Energy Review in order to help decide whether further research is required in this area. Safety research on radioactive waste management and decommissioning receives greater prominence in order for the industry to respond to NDA's plans to accelerate decommissioning of redundant nuclear plant.

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 overseeing NSR in the UK in order to ensure it 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 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 which can be shared potentially within HSE's Major Hazards Research Programme. 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. However, the Levy Programme has fallen in value reflecting the maturity of the technology, our satisfaction with research being commissioned by the licensees and the transfer within this year of responsibility for maintaining graphite research expertise onto the licensees.

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 significant drop in funding of the power reactor programme reflects the mature nature of the AGRs and the PWR. Also as the Magnox plant approach the end of life, the benefit of new safety research related to power generation rapidly diminishes but equally there is an increased emphasis on research to do with waste and decommissioning. The 2006/07 programme which includes management charges is estimated at £5.3m (Annex 2) and is made up of an HSE Levy programme of £0.85m (Annex 3), a British Energy (BE) programme of £3.1m and a Magnox Electric programme of £1.35m (Annex 4). The programme represents a small reduction on the 2005/06 programme expected to outturn at £5.7m.

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. Because the safety research required by HSE is normally integrated within either operational or development research undertaken by the licensee. The cost of the safety research is not itemised but the requirement is characterised by a clear description of the safety issue which HSE wants addressed. In order to be consistent and proportionate, HSE has developed for the first time research

arrangements with UKAEA which draw from safety issues arising from regulatory interaction which have been put in the form of a Technology Plan. This plan is drawn from the Life Cycle Baseline (LCBL) document which is written for the NDA and which forms the basis for identifying safety issues, amongst other things, funded with the Site License Companies by the NDA. 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 recognises the significant steps made by UKAEA in its formulation of a Technology Plan and is working with the company to make it clearer how individual safety issues are being addressed on a year to year basis. HSE does not intend to commission any research in this area through its Levy Programme for the forthcoming year but will work with the NDA through its Research Board to identify ways in which the predicted larger number of future licensees will cooperate on safety research.

Consultation

9. The NSR programme was presented in full to the Nuclear Safety Advisory Committee (NuSAC) Sub-committee on Research on 7 April. At this meeting DTI were represented along with each of the licensees and the NDA. The Chair of the Sub-committee provides his advice on the adequacy of the NSR programme to the HSC in paper HSC/06/33 but in brief he advises HSC to approve the HSE Levy Programme and endorse the HSC Coordinated Programme of NSR for 2006/07.

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.

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. 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. 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 2006/07.

Contact:

Dr Peter Storey, tel. 01519514172, fax. 0151951 4100, peter.storey@hse.gsi.gov.uk

Table 1 HSC Co-ordinated Programme of Nuclear Reactor 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
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+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) Before April 2003 individual licensee's programmes were combined in the Industry Management Committee (IMC) programme.
(5) Before April 2003 the non-NRI Research Programme was called the Industry Direct 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.

TABLE 2 SUMMARY OF PLANNED NRI RELATED REACTOR RESEARCH SPEND £k: 2006/2007 versus 2005/2006

Technical Area	LEVY		LICENSEES		TOTALS	
	2005/2006	2006/2007	2005/2006	2006/2007	2005/2006	2006/2007
Chemical Processes	8	20	667	928	675	948
Graphite	118	57	1299	814	1417	871
Fuel & Core	236	192	64	184	623	677
Plant Modelling	144	133				
Nuclear Science	179	168				
Radiological Safety	0	0				
Waste & Decommissioning	0	0	720	833	720	833
Human Factors	0	0	120	200	191	275
Probabilistic Safety Assessment	71	75				
Control & Instrumentation	7	0	532	417	539	417
Nuclear Systems & Equipment	0	0	100	20	100	20
Plant Life Management - Civil Engineering	0	0	169	200	169	206
Hazards (external & internal)	44	6				
Plant Life Management - Steel	51	33	645	725	696	758
Programme Total	858	685	4316	4321	5174	5006
Management Charges	225	156	340	150	565	306
TOTALS	1083	834	4656	4472	5739	5312

TABLE 3 LEVY FUNDED PROJECTS 2006-07

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
External events (&Fire)				
Fuel	FC/GNSR/51	OECD Cabri	BE	INTL
	FC/GNSR/55	OECD Halden	BE	INTL
	FC/GNSR/56	OECD Studsvik Cladding Integrity Project	BE	INTL
Graphite	GRA/GNSR/4	Microstructural property relationships	BE/ME	ITC
		Routines for more efficient stress analysis of anisotropic AGR graphite	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	BE/ME	INTL

		Dosimetry		
Nuclear Systems & Equipment	-	-	-	-
Plant Life Management	PC/GNSR/151	FP6 GAIN Gap Analysis of Inspection	BE	INTL
	?	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) 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.

² Income from external users is used to offset the levy

TABLE 4 2006/2007 PLANNED REACTOR LICENSEES' PROGRAMMES OF RESEARCH (£k)

Technical area	BE NRI	ME NRI	BE non NRI	ME Non-NRI	Total NRI
Chemical Processes	818	110	70	0	928
Graphite	604	210	2648	0	814
Fuel & Core	167	17	590	108	184
Plant Modelling					
Nuclear Science					
Radiological Safety					
Waste & Decommissioning	110	723	89	636	833
Human Factors	170	30	0	0	200
Probabilistic Safety Assessment					
Control & Instrumentation	280	137	40	0	417
Nuclear Systems & Equipment (Fuel handling)	20	0	400	0	20
Plant Life Management - Civil Eng	175	25	26	77	200
Hazards (external & internal)					
Plant Life Management - Steel	635	90	1460	112	725
Generic	0	0	580	0	0
Programme Total	2979	1342	5903	933	4321
Programme Management	150				
TOTALS	3129				

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.