

Health and Safety Commission Paper		HSC/03/72	
Meeting Date:	10 June 2003	Open Gov. Status:	Open
Type of Paper:	Below-the-line	Paper File Ref:	NUC/45/4/1/35
Exemptions:	None		

HEALTH AND SAFETY COMMISSION

HSC CO-ORDINATED PROGRAMME OF NUCLEAR SAFETY RESEARCH

for 2001/2002: Efficiency Report

Note from the Director, Nuclear Safety Directorate (NSD)

Issue

1 Annual report on the efficiency and effectiveness of the 2001/2002 HSC Coordinated Programme of Nuclear Safety Research.

Timing

2 Routine. This reports relates to existing and new projects managed by the IMC and HSE in the financial year 2001/2002. The availability of final outturn information on the programme from both HSE and the licensees determines the timetable for preparation of the report.

Recommendations and Decisions

3 The HSC is asked to note and, if appropriate, comment on the report, which summarises the HSE's and licensees' evaluation of the efficiency, effectiveness and financial management of the 2001/2002 HSE Coordinated Programme.

Identification and Commissioning of Programme.

4 HSE is responsible for ensuring that the HSC Coordinated Programme of Nuclear Safety Research is balanced and adequate. The Programme comprises three elements:

- work contracted collectively by the licensees through a body called the Industry Management Committee (IMC) - the IMC Programme;
- and work contracted by HSE with costs recovered from the licensees by levy - the Levy Programme.
- work contracted by the individual licensees for their own purposes but declared relevant to the Co-ordinated Programme - the Industry Direct Programme.

5 HSE directs the IMC and Levy elements of the programme by identifying safety concerns which may benefit from research. These concerns are prioritised as individual safety issues in a document called the Nuclear Research Index (NRI). The third element is directed by the licensees but is made transparent to HSE.

6 HSE presented the arrangements for identifying and commissioning the 2001/2002 HSC Coordinated Programme of Nuclear Safety Research to the May meeting of the HSC (HSC/01/36). The paper advised that the programme met the objectives, and requirements for balance and adequacy, called for by guidelines set out by the President of the Board of Trade. The HSC agreed the total programme for 2001/2002.

Consultation

7 HSE's overall strategy for nuclear safety research is reviewed annually, along with the strategy for each technical area within the NRI, and these are published annually as part of the NRI. This is to ensure that the programme addresses issues of real need that will be of long-term benefit to the safety of nuclear reactor plant. The Nuclear Safety Advisory Committee, through its sub-committee on research (NuSAC SCR), has advised on the strategy as part of its consideration of the NRI, and of other aspects of the programme. Other government departments, MOD and DTI are consulted through their representation on HSE's Nuclear Safety Research Steering Group (NSRSG).

Evaluation

8 HSE and the IMC have conducted evaluations of their respective parts of the 2001/2002 programme which were reported to NuSAC SCR in March 2003 and to HSE's NSRSG in May 2003. Table 1 presents the overall findings from both evaluations. The discussion under Effectiveness of the 2001/2002 Programme gives further consideration to these findings.

9 HSE reported in paper HSC/02/12 that the 1999/2000 Industry Direct Programme was not completed until the end of 2001 due to limited resources, staffing changes and concentration on other areas of work. Due to continued resource shortages NSD is unable to progress reviews of the licensees' Industry Direct Programme. Therefore, this paper is concerned primarily with those elements commissioned by HSE and IMC only.

Efficiency and Financial Management

10 Table 2 compares planned expenditure on the Levy and IMC programmes proposed to the HSC in 2001 with the final outturn expenditure. The table also includes figures for the Industry Direct Programme. The spend was lower than planned by approximately 10%. This is within an acceptable margin and reflects changes to the programme arising from developments throughout the year, eg. changing priorities and minor contract delays leading to reduced spend in the financial year.

11 Table 1 shows that both the licensees' and HSE's Project Officers reported that the contractors provided value for money

Effectiveness of 2001/2002 Programme.

12 Table 1 shows that the evaluations of the IMC and Levy Programmes found a high level of satisfaction by Project Officers regarding the contribution of research to nuclear safety and improving licensees' safety cases. Both the IMC and HSE reported that, in general, the contractors provided quality outputs that addressed the project specifications. HSE reports that all Levy activities had contributed to its technical strategies.

13 HSE reported that a high proportion of the Levy activities satisfactorily progressed the NRI issue. Both the IMC and HSE reported that a large number of NRI issues were closed during the 2001/2002 financial year. Many research activities span more than one year and therefore the closure rate can vary up and down. However, the high number of closures reported for 2001/2002 was influenced by the thorough review of NRI issues that accompanied HSE's review of the HSC Coordinated Programme and was completed in 2002.

14 Annex 1 provides details of examples of how the 2001/2002 Coordinated Programme helped to secure higher standards of nuclear safety.

Dissemination

15 HSE recognises that the licensees own the rights to most of the intellectual property derived from the IMC programme. Under agreements, both between HSE and licensees, and between the licensees themselves, these results are made transparent to the extent that they are accessible and can be put to limited use by all parties.

16 HSE is committed to disseminating research results that have implications for nuclear safety, and has previously developed a strategy for the dissemination of information which has been endorsed by the NuSAC SCR. Increasing use is being made of the HSE website to keep the technical community informed of the research carried out under the Levy Programme. Additionally, nuclear safety research either undertaken or planned, is shared with the rest of HSE through HSE's Research Co-ordinator's network.

17 HSE has recently published a new policy on the exploitation of the IPR of HSE research. It is too early to predict the impact of the effects of this on the dissemination of Levy funded research. Future arrangements for disseminating and exploiting the IPR of Levy funded research will take account of HSE's policy.

Financial/Resource Implications for HSE

18 The cost of the research commissioned by HSE and the programme management charges are recovered by a levy made on the nuclear licensees.

There are no additional financial implications for HSE.

Environmental Implications

19 There are none.

Other Implications

20 There are none.

Conclusions.

21 The IMC and HSE evaluations of the 2001/2002 HSC Coordinated Programme of Nuclear Safety Research concluded that:

- actual expenditure was within 10% of that originally proposed to HSC in 2001 and the research provided good value for money;
- contractors provided quality reports that addressed the project specifications;
- a high proportion of the contracts progressed closure of NRI issues and contributed the HSE technical strategies;
- the programme helped secure higher standards of nuclear safety.

20 HSE has taken steps to encourage the dissemination of the output from 2001/2002 programme of research both within the industry and HSE which recognise the licensees' rights to IPR.

Action

21 The HSC are requested to note the paper and comment if appropriate.

TABLE 1**Indications from Evaluation of Programme**

	2000/2001		2001/2002	
	IMC	Levy	IMC	Levy
Number of Projects	93	51	116	38
Satisfactory report (%)	n/a ¹	100	n/a ¹	97
Met Specification (%)	86	100	92	95
Quality of work / value for money (%)	93	97	97	95
Inclusion in safety case (%)	n/a ¹	81	n/a ¹	82
Contribution to technical strategy (%)	n/a ¹	95	n/a ¹	100
Progressing NRI Issue (%)	n/a ¹	100	n/a ¹	95
Number of NRI Issues Closed	51	3	129	9

1 The format of the IMC evaluation changed in 1999/2000 and as a result some of the information previously collected is not available.

TABLE 2**HSC Co-ordinated Programme Expenditure 2001/2002**

	Plan	Outturn	Comment
	£M (ex VAT)	£M (ex VAT)	
Levy	1.49	1.40	
IMC	7.12	6.29	
Total (Levy + IMC)	8.61	7.69	11% less than planned
Industry Direct ¹	9.24	9.17	1% less than planned.
Overall HSC Programme	17.85	16.86	
Management charges:			
HSE	0.38	0.3	
IMC	0.25	0.32	
Total Management Charges	0.63	0.62	

1 The Industry Direct figures are estimates of the value of work undertaken by licensees which was relevant to the Programme.

ANNEX 1 TO HSC/03/72

2001/2002 HSC COORDINATED PROGRAMME OF NUCLEAR SAFETY RESEARCH

Securing Higher Safety Standards

The work of the programme contributes to securing higher standards of nuclear safety. Examples taken from a number of technical areas are presented below:

Chemical Processes: The Levy programme is used to maintain staff and facilities that have been identified as essential research capabilities or key teams in the areas of iodine and radiation chemistry. The work continues to improve knowledge of gas phase methyl iodide radiolysis and decomposition behaviour in design basis faults. The results further the understanding of radioactive iodine release rates and mechanisms that are relevant to reactor safety cases.

Fuel: NSD's independent technical capability was supported through work to correlate computer code predictions with experimental data to confirm the adequacy of the code.

The UK participation in the international CABRI water loop project being co-ordinated by the OECD-IPSN is funded through the Levy Programme. The work involves an international investigation into high burn-up PWR fuel under reactivity initiated accident conditions.

Carbon deposition on fuel cans during their irradiation causes heat transfer impairment and its prevention would improve reactor safety cases. Production trials have now successfully demonstrated a procedure to produce a surface oxide layer on new fuel cans that will prevent such deposition and pre-treated cans are now an option for inclusion in a future pilot loading of fuel.

Nuclear Systems and Engineering: Virtual reality modelling techniques were successfully applied to the design of highly active areas, contributing to the areas of operator ergonomics, decontamination provisions and eventual decommissioning.

A real-time video enhancer has been identified to improve the ability to deal with high contrast and poor image TV systems used for remote inspection work. Image processing software has been developed to enhance the operator's ability to control cameras, detect defects and archive images.

A patent application is in process for an electronic welding spatter control unit that will improve welding techniques. Preliminary design and testing of the proposed system has been successfully completed.

Plant Life Management- Steel Components: Direct support continued to the development of the R5/R6 procedures, which are routinely used for safety case assessments for all stations. Areas covered included leak before break, probabilistic fracture mechanics, ductile tearing and the validation and removal of assessment conservatism.

The validation of radiographic construction inspection techniques and current in-service ones for Magnox pressure vessels has been extended to thinner section AGR applications to demonstrate the capability of detecting potential defects of concern. Projects on in-service inspection have supported enhanced detection capability and capability validation.

The results of projects aimed at residual stress measurement/interpretation and the modelling of reheat cracking have improved the management of the consequences of reheat cracking on AGRs.

Plant Life Management- Civil Engineering: A project on the development of leak searching and sealing methods for the cooling systems of concrete pressure vessels has provided a comprehensive review of relevant techniques and an enhancement of the effectiveness of the current leak sealing material.

The IMC continued funding of the advanced mechanical testing rig at Sheffield University provided UK licensees with further valuable data that is informing their analysis of the response of nuclear prestressed concrete pressure vessels to fault conditions. Access to the rig and data contributed to Sheffield University success in securing funding for the Euratom 5th. Framework Project MAECENAS which is developing an advanced numerical analysis tool for modelling the time and temperature dependent behaviour of nuclear pressure vessels and containments.

Waste and Decommissioning: The Corrosion Measurements on Packaged Wastes programme has identified package movement itself as being a possible variable that affects the corrosion rate of waste containers. The enhancement of the rate appears to be short lived and limited to a few weeks but it may have consequences for any proposed container monitoring regime that requires frequent container movement. It is thought to be the result of a rupture and subsequent repair of a passivating film of corrosion products and is the subject of further confirmatory work.