Annex A

Nuclear Safety Advisory Committee

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Triennial report 1999 to 2001

NuSAC membership during from 1999 to 2001

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Sir David Harrison	Chairman (retired December 1999)
Professor J Head	Caretaker Chairman (January to October 2000) Chairman (from October 2000)
Mr G Bellard	TUC nominee
Professor D Blockley	Independent (to December 1999)
Professor S Cox	Independent
Mr B Cripwell	TUC nominee (from October 2000)
Dr R Davies	CBI nominee
Professor K Duncan	Independent
Dr B Edmondson	CBI nominee (from November 1999)
Professor A Goddard	Independent
Mr J Hall	Independent
Dr R Hall	CBI nominee
Dr R McKenzie	Independent
Professor J Knott	Independent
Professor B Littlewood	Independent
Professor N Moray	Independent (from March 1999)
Mr S Napier	TUC nominee
Professor D Owens	Independent
Dr S Parry	TUC nominee
Dr J Whiston	CBI nominee
Mr L Williams	HSE Chief Inspector HMNII (standing invitation)
Mr N Starling	Secretary
Mr P Dickenson	Technical Secretary
Mr A Clarke	Observer, BNFL/Magnox
Professor R Clarke	Observer, NRPB
Miss F Fry	Observer, NRPB
Mr K Fox	Observer, SNL
Dr P Manning	Observer, BNFL
Mr J Western	Observer, BE
Dr R Peckover	Observer, UKAEA (to April 2000)
Dr J Crofts	Observer, UKAEA (from April 2000)
Dr J Crofts	Observer, AWE (from July to November 1999)
Dr E Drage	Observer, DTI (to July 2000)
Ms H Leiser	Observer, DTI (from November 2000)
Dr S Brown	Observer, DETR (to July 1999)
Mr R Wood	Observer, DETR (from November 1999)
Dr A Duncan	Observer, EA (to November 1999)
Mr J Gray	Observer, EA (from March 2000)
Captain K Watterson, RN	Observer, MoD (to March 1999)
Captain P Hurford, RN	Observer, MoD (from July 1999)

CONTENTS

Sampling

Restoration of the Wylfa Reactors to Service Following Discovery of Defects in Superheater Penetration Welds

Dungeness B Steam Header Recovery Project

Performance of the Sizewell B Primary Protection System

Closure of Hinkley Point A Power Station

Fuel Cycle and Decommissioning

Decommissioning of Ponds and Silos at Sellafield

Windscale Pile 1 Dismantling

Operational Arrangements at BNFL Springfields

Storage of Liquid High Level Waste at BNFL Sellafield

Decommissioning of the Windscale Advanced Gas Cooled Reactor (WAGR)

Decommissioning of Magnox Power Plants and Safestore Strategy

Advice to the Minister of State for Energy on the Treatment of Prototype Fast Reactor (PFR) Fuel at Dounreay

Response to DETR Consultation Document 'UK Strategy for Radioactive Discharges 2001 – 2020'

Response to the Environment Agency's Proposals for the Future Regulation of Disposals of Radioactive Waste from British Nuclear Fuels plc Sellafield

Increased Caesium Concentrations in Magnox Fuel Storage Ponds at Reactor Stations and in the Fuel Handling Plant at Sellafield

Emergency Arrangements

New Regulations

CHAIRMAN'S FOREWORD

Writing this foreword gives me an opportunity to thank all members of the Nuclear Safety Advisory Committee (NuSAC) for their work on the Committee over the three year period covered by this report. It has been a great pleasure working with them and I have particularly appreciated their support since I was appointed Chairman. I would especially like to thank the Convenors of our Review Groups, Gordon Bellard, Wynne Davies, Bob Hall, John Hall, Rod McKenzie and Steve Napier and the Chairman of our Sub-committee on Research, John Knott. They have been most generous with their time and expertise in the public interest and have contributed most of the content of this report. I would like to thank our Observers and their organisations for their contributions to our discussions and their willingness to respond positively to our many requests for information, also the Chief Inspector of Nuclear Installations, Laurence Williams, who likewise attends our meetings and responds equally positively to our requests for information. Finally, I would like to thank the members of our Secretariat, without whom the Committee could not function at all.

At the end of 1999, my predecessor, Sir David Harrison CBE, FREng, retired as Chairman after six years in office. I am sure that all members who served under him will wish to join with me in thanking him for his skilful and sensitive guidance during that time. We wish him well in his retirement.

Members of the public have a right to expect high standards of nuclear safety in the United Kingdom. It is the responsibility of the nuclear site licensees to maintain high standards and the role of the regulator, the Nuclear Installations Inspectorate (NII), to set those standards and ensure that they are maintained. NuSAC's role is to monitor the licensees' safety performance and the regulatory process and to advise the Health and Safety Commission (HSC) and, if appropriate, the relevant government ministers of any concerns we are unable to resolve by discussion with the licensees and/or the regulators.

At its meeting in November 2000, the Committee decided that it will in future publish a Triennial Report, to bring the reporting frequency into line with the three year term of appointment of the Committee, and an interim report midway through the term. This, therefore, is our first Triennial Report.

The report begins with an overview, which includes a list of sub-groups of the Committee, which we refer to as Review Groups, and the topical areas they cover. The overview also includes a list of some of the major issues addressed by the Committee during the period 1999 to 2001. Subsequent sections report in greater detail the work of the Review Groups and the Sub-committee on Research. Annexes include material which we believe helps to give a fuller picture of the work of the Committee. This material includes details of all open papers presented to NuSAC during the triennial period (Annex B), a description of way in which the Committee operates (Annex C) and examples of advice offered to government in response to consultation documents issued during the period covered by the report (Annexes D and E).

I have enjoyed the challenge of leading NuSAC during a period of continuing change for the nuclear industry and look forward to the remainder of my term of appointment. Much of the work to which this report refers will continue. For example, the Committee will continue to follow up the licensees' responses to the NII team inspection of the British Nuclear Fuels plc (BNFL) Sellafield site and the audits of British Energy and of the United Kingdom Atomic Energy Authority (UKAEA) site at Dounreay. We shall also be continuing to monitor the management of safety of the Ministry of Defence (MoD) licensed sites at Aldermaston and Devonport Dockyard.

I particularly welcomed the members' decision to set up joint study groups with the Radioactive Waste Management Advisory Committee (RWMAC) to look at current arrangements and requirements for the management of Intermediate Level radioactive Waste (ILW) and at some aspects of regulation for nuclear safety and environmental protection. The two Committees have overlapping interests in these areas and I believe that the work of both has benefited from this collaboration.

The period covered by this report has been one of great change in the nuclear industry and, consequently, has been a busy period for the Committee. I have no doubt that the next three years will be equally busy. I close by reiterating my thanks to members for their willingness to give generously of their expertise and time in the public interest.

Professor John Head, CBE
Chairman

THE WORK OF THE COMMITTEE AND ITS GROUPS

This report reflects the work of NuSAC, its Review Groups (RGs) and the Sub-Committee on Research during the period 1999 to 2001. During this period, NuSAC met nine times (including two residential meetings held in 1999 at Wylfa Nuclear Power Station and at Sellafield in 2001). A visit planned for 2000 to the Cogema site at La Hague, France was postponed because of travel difficulties and took place in February 2001.

As in previous years, NuSAC members supplemented the work of the main committee by additional effort within the five RGs (membership of which is given in Annex A) and the topics reviewed during the period are briefly described later in the report. The areas of work covered by the RGs are:

- Safety Management (RG1)
- Safety Performance (RG2)
- Fuel Cycle and Decommissioning (RG3)
- Emergency Planning (RG4)
- MoD Related Topics (RG5)

NuSAC's Sub-Committee on Research (SCR) also continued to operate and provided advice to HSC on its coordinated programme of nuclear safety research.

The main committee considered a number of major topics including the following:

- Control of contractors;
- Organisational change;
- Storage of liquid high level waste at BNFL Sellafield;
- Management at BNFL following the NII Team Inspection report and the falsification of records report
- Options for dealing with Prototype Fast Reactor fuel at Dounreay;
- Department of the Environment, Transport and the Regions Consultation Document on UK strategy for radioactive discharges 2001-2020

A list giving the titles of the papers presented to NuSAC and considered by the Committee during the period is at Annex B.

Following the decision in 1997 to introduce standing RGs to monitor and review developments in designated areas, they continue to prompt and steer the

preparation of papers for NuSAC to consider. Members also decided to investigate further the general 'ways of working' of NuSAC itself. As a result, members and the secretariat produced a draft document, which they used during 2001 and hope to review in 2002. A copy of the working draft is attached at Annex C.

SAFETY MANAGEMENT REVIEW GROUP (RG1)

NuSAC's concern about how the nuclear industry managed its safety against a background of continuing change, through mergers and reductions in staffing levels, and of increasing commercial pressures, continued to be the focus of activity for the group during the three year period covered by this report. The principal areas of work were the reviewing of the safety management arrangements of a number of nuclear site licensees, the use and control of contractors, organisational changes and the follow-up of the response of several licensees to management audits and team inspections by the regulators. The issues investigated by the group included:

- the need for safety management arrangements to be robust to change and maintain good safety performance.
- the need for licensees using contractors to retain enough knowledge and expertise within their own organisation to enable them to act as "intelligent customers";
- the need for licensees to retain control of activities on the licensed sites.

Safety Management Arrangements

In July 1999 NuSAC received a presentation from BNFL on safety management arrangements at their fuel production facilities at Springfields. The paper discussed site history, the materials handled and the practical steps taken to reduce hazards and risks and maintain the condition of the facilities.

In November 1999 Nycomed Amersham presented a paper on safety management arrangements at its isotope production facilities. The discussion focused on the structure of the company, the business and safety management arrangements at the company's four sites in the UK and how the sites comply with corporate and legislative requirements.

In November 2001 the Committee received an overview of the health, safety and environmental management at the Atomic Weapons Establishment, Aldermaston under the new contract arrangements. There was acceptance that the new contractor was building on the improvements initiated by the previous contractor.

Use and Control of Contractors

At the meeting in July 1999, the committee received presentations from the Health and Safety Executive's (HSE) Nuclear Safety Directorate (NSD) and from the Department of Trade and Industry (DTI) on the government's current policy on the use of contractors in Safety Critical Areas. NSD indicated that there could be benefits associated with the use of contractors at licensed sites, but that the licensees retain responsibility for nuclear safety on their sites. The licensees were

therefore required to maintain the day-to-day control of activities and must have sufficient knowledge and expertise to exercise this control and to advise others. The DTI paper highlighted government policies on contractorisation and DTI's responsibilities as industry sponsor.

At the November 1999 meeting the Committee received a presentation from BNFL on a proposal to set up an Atomic Energy Authority – Technology (AEA-T)/BNFL Joint Services Company. The paper outlined the reasons behind the initiative, namely to provide technical support to BNFL Magnox Generation, described the progress made and discussed the issues still to be resolved. Committee members raised a number of concerns. Subsequently, at the July 2000 meeting, BNFL gave an update. They had decided to set up a different structure, which met the original objectives but overcame the unresolved issues, including certain regulatory issues. The revised structure addressed the NuSAC concerns.

Discussions between RG1 and BNFL on use of contractors led to a paper at the November 2000 meeting of the Committee. The paper focused on the choice of work to be undertaken by contractors and the need for the company to remain in effective control. Prescriptive arrangements were put in place at the start of each contract and results were monitored.

Organisational Changes

There had been earlier concern in NuSAC over NSD's ability to regulate licensees' organisational and staff changes and therefore the introduction of a new licence condition (LC36 - 'Control of Organisation Change') for this purpose was welcomed by the Committee.

RG1 discussions and meetings with British Energy (BE) and BNFL Magnox led to the presentation of papers to the November 1999 meeting on organisational changes. BE provided an update of how it had changed since privatisation. The presentation acknowledged the growing significance of change as a key business and safety issue and set out the strengths of the UK systems, in particular the regulatory framework and the importance of maintaining licensee governance.

BNFL/Magnox presented a paper on the progress to date of the integration of BNFL and Magnox Electric. NuSAC's discussion focused on maintaining strong safety accountability through the power station managers and technical and engineering support. BNFL/Magnox explained how "shadow working" was being undertaken and was proving effective. This technique provided a way of sharing experience between BNFL and Magnox personnel and of encouraging better co-operation between staff from the two merged companies.

RG1 also considered a paper reviewing the potential safety implications for Springfields of BNFL buying the American company Westinghouse and concluded that they were not significant.

1998 HSE/Scottish Environmental Protection Agency (SEPA) Dounreay Audit Follow-up

At the March 1999 meeting, NuSAC received a presentation by the Chief Inspector of Nuclear Installations on the lessons learned from the Dounreay audit. The discussion highlighted a number of generic issues that were being considered by the industry and NII. These included management of change procedures, control of contractors, and the skills needed by a licensee to be able to act as an "intelligent customer".

In July 2000, the Committee received a presentation by UKAEA on progress in meeting audit recommendations. A substantial programme of work had been carried out and this had been publicly recognised by HSE/SEPA. NuSAC was impressed by the UKAEA's success at staff recruitment since the audit and UKAEA gave details of how the new staff were being integrated into the existing workforce.

1999 HSE Team Inspection of the Supervision and Control of Operations at BNFL's Sellafield Site

RG1 activity in the summer of 2000 focused on meetings with the Chief Executive of BNFL and a site visit to Sellafield to consider BNFL's response to the NII team inspection and discussion on BNFL's use of contractors. RG1 provided feedback on progress with the audit actions to the main Committee and followed this up with a meeting and a special visit to the Sellafield site (as part of the full NuSAC meeting there). The paper presented to the July 2001 meeting indicated positive outcomes of the work but RG 1 expressed some concern over the possibility of "initiative overload" given the amount of work being done. There was a need to ensure that the gains were embedded in the organisation and could be sustained before further changes were initiated. The Nuclear Installations Inspectorate (NII) presented a paper which agreed largely with the BNFL paper and noted that NII would continue to monitor implementation of the changes.

2000 NII Safety Management Audit of British Energy Generation Ltd and British Energy Generation (UK) Ltd

During 2001 Review Group 1 met with British Energy on two occasions to consider the companies' response to the NII audit and a paper was submitted to the November 2001 committee meeting. The audit had focused on corporate functions and their ability to support the safe operations of the nuclear power stations. It was clear that BE had accepted that the outcome of the audit had been beneficial and that improvements in their processes will have made them more robust (and improved safety). While there had been progress (BE published a position statement in June 2001), there had been problems with closing out actions and final close out was likely to be delayed to the end of 2002 or into 2003.

SAFETY PERFORMANCE REVIEW GROUP (RG2)

In the previous biennial report it was noted with satisfaction that increased emphasis on commercial matters and "downsizing" pressures following the privatisation of major elements of the UK civil nuclear power industry had not led in any perceptible way to an erosion of safety standards and practices. Overall NuSAC was satisfied that this position had been maintained during the period 1999 to 2001. However, concern was expressed in the previous biennial report that licensees could be at risk of reducing their technical support level below that essential to ensuring that they understood the safety cases for their plant, and reducing their capability to act as intelligent customers for selecting and supervising contractors. There was some evidence that in certain non-privatised parts of the industry this concern had proved well founded.

NuSAC was aware that existing substantial commercial pressures on the major electricity generators were likely to be increased by the change in the electricity trading arrangements to be implemented by the Government. NuSAC was alert to the need for the licensees to continue to maintain an adequate in-house technical capability despite the pressure to reduce costs, and supported the attention being given by the NII to this topic.

Comparison of Safety Performance of Licensees

The previous biennial report also indicated that whilst the Annual Health and Safety Reports from the major licensees were high quality documents, it was not at all straightforward to extract from them consistent data enabling any meaningful comparison of the safety performance between the licensees. In response, the major civil nuclear licensees (BNFL, BNFL/Magnox, UKAEA, British Energy, Nycomed-Amersham) jointly made available to NuSAC detailed and compatible information on both radiological and industrial safety for the years 1997/98, 1998/99, and for "historical" reference, data from 1990. Data concerning contractors was included where available. RG2 produced a paper during the year 2000 setting out both the data and its conclusions.

The overall observation was that for nearly all parameters there was little significant difference between the data for 1997/98 and 1998/99, which highlighted the value of the 1990 data in showing trends. Very encouragingly, with one exception, all categories (radiological and industrial) showed substantial improvements since 1990 (by a factor of two or three for most categories and by orders of magnitude for the reduction in numbers of staff in higher dose bands). Not too surprisingly in view of the different tasks undertaken, in the radiological categories BNFL's figures appeared well above those of the other licensees, whose data were generally contained within a band of a factor of two. With regard to collective exposure, comparison indicates that in general the UK figures for collective exposure were commendably substantially less than exposures experienced overseas. In comparison with worldwide benchmarks for “Lost Workdays”, the data showed that despite significant improvements since 1990, the UK Nuclear Industry was still somewhat above the current level for the worldwide Nuclear Industry. The implication was that further reductions in the UK figures should be sought. The one area that this review suggested had not shown a real improvement since 1990 was

that of Major Injuries, this may be due to changes in data collection of inherently small numbers of incidents, but this explanation was speculation only.

The licensees agreed to provide NuSAC with an annual update of the information, additionally giving more complete data on contractors, and including where appropriate information on unplanned reactor trips. Thus RG 2 carried out a further review during the year 2001. This showed a commendable continuing trend of improvement in most parameters, albeit the figures for major injuries continued to defy the general trend.

Noting the value of the study, NuSAC nevertheless reflected on the difficulty of gauging Safety Performance solely from such parameters, and requested the licensees in future to provide, additionally, more macroscopic data including the reporting of incidents on the International Nuclear Event Scale (INES), and on Improvement Notices served by the NII.

Operational Experience Feedback

The civil nuclear power programme had for many years recognised the key role that Operational Experience Feedback (OEF) could play in promoting safe operation. Indeed, the requirement to implement OEF was incorporated within Licence Condition 7 of the nuclear site licences. BE, who operate the UK's Central Feedback Unit (CFU) on behalf of the major licensees, presented an overview of the processes by which relevant data (both of incidents, and near-misses) were promulgated to nuclear plant operators in the UK and overseas. The CFU also handled data produced from overseas operators, and ensured that it was forwarded appropriately to UK plant operators.

It was clear to members that the programme provided an effective tool to help prevent repeated events. NuSAC noted that improvements in safety culture had led to an increase in the number of events and near misses reported, indicating a welcome openness by the staff. Members believed that it was essential for success that management was responsive to the information obtained both on the power stations and company-wide. BE said that the intent of the CFU was to continue to work with the operators to seek improvements, and achieve world-class standards. (See also the following item).

The Institute of Nuclear Plant Operators (INPO) and the Worldwide Association of Nuclear Operators (WANO)

BE presented a paper giving the background to the formation of the organisations INPO and WANO, and their relevance to the objectives of the UK nuclear power industry to achieve world-class standards in safety and reliability performance. In essence INPO was set up following the Three Mile Island accident in 1979, to ensure that a process was available for sharing event information amongst nuclear operators in the USA. WANO was set up with a similar objective on a worldwide basis following Chernobyl.

The most striking aspect of INPO/WANO work to members was the carrying out of peer reviews of operation at specific plants. Within the UK internationally staffed peer reviews had been carried out at Hartlepool, Sizewell B, and Hinkley B. The

reviews lasted some two weeks, and involved an international team of 16 to 20 experts. Inevitably areas for improvement were identified and these were followed up in a progressive way, both by in-house staff, and by INPO/WANO visits, leading to a repeat peer evaluation four years on from the initial one.

The objective, as for OEF referred to above, was to assist the UK to progress to the best world standards for safe and efficient operation. NuSAC requested a further presentation in due course, to follow-up the progress of the UK operators in meeting the improvements suggested by the reviews.

British Energy Training and Accreditation Standards Board

This body was established by British Energy as a part of the route to achieving their objective of being one of the best nuclear plant operators in the world. The Board (which involves senior officers of British Energy, together with external representatives, one of whom is a University Professor and a Member of NuSAC) is concerned with evaluation of the *training processes*, and not the details of the training of individuals. Thus the Board arranges challenging evaluations of specific business units, such as a particular power station, or a specific HQ department, as to their arrangements and performance in this arena.

NuSAC welcomed the setting up of the Board, in that it showed recognition of a weakness, and was a part of a process to produce improvements. It noted that the process is hard-hitting, and that it works, both in finding problems and in dealing with them.

Review of Sizewell B Incident Concerning the Release of Primary Circuit Water into the Containment

NuSAC received a presentation from BE on an incident at Sizewell B which occurred on 6th March 1999 whilst the plant was shut down in preparation for its third refueling outage. During testing of the set-point of a water circuit Safety Release Valve, a fire alert (which proved to be a false alarm) led to the evacuation of the containment. An indirect consequence of this was that the valve under test did not properly reseat, causing the release into the containment of some primary circuit water. A Site Incident was then declared.

NuSAC noted that there were lessons learned from both the engineering aspects of the incident and the declaration of the Site Incident. In itself the latter constituted conservative decision taking, as the release of primary circuit water was terminated by the time of the declaration. However, the declaration caused concern to nearby residents due to their inability to quickly find out what was going on. Changes have been made subsequently to the emergency procedures, not least to ensure that information was rapidly available on a “residents' help-line”. As for engineering matters, the in-line test of water-relief safety valves was a departure from US practice, where bench testing was the norm. NuSAC was assured that in future the US practice would be followed.

Trawsfynydd Reactor Pressure Vessel Sampling

BNFL Magnox Generation reported on the results from the now completed major project of taking substantial steel samples from the pressure vessel of the decommissioning Trawsfynydd Power Station to measure its material properties. An interim view was given in the previous NuSAC biennial report, which provisionally concluded that the data obtained supported the predictive methodology for both neutron dose and fracture toughness. Magnox said that the results from the project confirmed that the quality and uniformity of the welds sampled were excellent, and the very large fracture toughness database obtained validated the methodology used to predict Reactor Pressure Vessel properties. In discussion it was noted if such information had been available at the time of the decision to close the station, it would have removed concerns about possible "cliff-edge" effects of irradiation on the vessel, which arose from the use of accelerated irradiation testing of the vessel steels.

Restoration of the Wylfa Reactors to Service Following Discovery of Defects in Superheater Penetration Welds

Noting that the Wylfa reactors had been shut down for an extended period, NuSAC requested an information paper from BNFL/Magnox Generation. This reported that during the course of an inspection being carried out for other reasons, defects had been found in some superheater header welds in the region where they penetrate the reinforced concrete reactor pressure vessel (RPV). Extensive examination showed that the defects had been formed during the welding process, rather than having grown in service.

The company took a parallel approach to restoring the plant to service, namely i) to demonstrate by analysis, supported by material sampling and testing, that the headers were fit for purpose without modification, and ii) additionally to fit restraints external to the RPV, such that if the welds did nevertheless fail, the headers would be secured in place with minimal gas leakage, thus preserving the safety case. This programme was successfully achieved, and the reactors returned to service following a shut-down of more than a year.

Dungeness B Steam Header Recovery Project

As in the Wylfa case reported above, a defect was found during an inspection put in hand for other reasons; rectification of the defect led to an extended outage of both reactors at the power station. Again, NuSAC had requested an information paper. The defect was in a superheater header in the region where the header penetrated the reinforced concrete RPV. Extensive investigation showed that the cause of the defect was the use, in the original fabrication process, of the wrong welding consumable material. This prompted a major review to establish whether other welds could have been similarly wrongly fabricated.

Inspection of construction records, interviews with workers employed during construction, and a major programme of inspection narrowed the problem down to very limited number of welds additional to the originally identified defective one. The project then moved to the major engineering task of the repair of the very substantial components. In addition, and in parallel, the safety case for the plant was thoroughly

reviewed, such that it was enabled to return to service when the extensive programme of work was complete.

NuSAC noted (for both Wylfa and Dungeness B) the significance of faults found by adventitious inspections, the conservative decision-taking to shut down the plants, and the successful achievement of major projects to restore the plants to service.

Performance of the Sizewell B Primary Protection System

Under its previous name of ACSNI (Advisory Committee on the Safety of Nuclear Installations) the committee had taken a considerable interest in the computer-based Primary Protection System (PPS) of Sizewell B. The committee had therefore requested a paper from British Energy on the performance of the system in practice; also, recognising the enormous amount of checking of the system that had been carried out as part of the original licensing process, they wished to know how significant changes to the software made since fuel loading had been controlled.

The committee was reassured that since its installation the PPS had performed in line with its functional requirements, had proved very reliable in operation and had not given rise to any spurious trips whilst the plant was at power. The software changes made subsequent to operation had been subject to checks as rigorous as those applied to the original software, as would any future changes. For security of capability in the future, British Energy staff have been trained in the various development, verification and assessment techniques, such that the company will be able to keep proper control of the software modification process even if the organisations involved in the past are not available in the future.

Overall, the committee were satisfied that the PPS had performed well, with better reliability than planned for, and that scrupulous attention continues to be given to the quality of the software through plant life.

Closure of Hinkley Point A Power Station

NuSAC requested a presentation from BNFL/Magnox Generation on the background to the decision taken in May 2000 to cease operation of Hinkley Point A Nuclear Power Station. The presentation explained that a retrospective review of the safety cases for all the Magnox Reactor Pressure Vessels (RPVs), highlighted a particular concern with regard to Hinkley Point A, the review having been closed-out satisfactorily for the other plants. The concern was that during manufacture, some of the steel plates used in the construction of the Hinkley A RPV were heat-treated at a higher temperature than that assumed in the safety case. This had the potential to reduce the start-of-life tensile properties for these plates. In association with a feature specific to the design of Hinkley B, namely a relatively cool region of the vessel at the mid-plane, the pressure reserve margins normally used in RPV analysis could not be demonstrated. A programme of work was proposed to increase margins and to reduce uncertainties by providing additional vessel insulation at the mid-plane to increase steel temperatures during operation and by carrying out increased inspection of some of the less accessible parts of the vessel. However a company decision was taken on commercial grounds that the cost of the work, including extended reactor outages, together with a lack of certainty of the

acceptability of a revised safety case to the NII, did not make a sound business case.

NuSAC noted that the uncertainties, which had led to the decision to close down the station, were plant-specific and therefore had no direct implications for the other operating Power Stations with steel pressure vessels. This has been confirmed by detailed reviews carried out of the Safety Cases of the Reactor Pressure Vessels for each individual station.

FUEL CYCLE AND DECOMMISSIONING REVIEW GROUP (RG3)

Decommissioning of Ponds and Silos at Sellafield

RG3 visited Sellafield for a presentation by BNFL on the decommissioning of the ponds and silos, which also provided an opportunity to see the work in progress and gain an appreciation of the further work planned.

Members noted that a key issue for such a complex site as Sellafield was for the site decommissioning strategy to cover three objectives:

- to include all the facilities on the site;
- to identify the treatment plants needed to deal with the wastes arising from decommissioning; and
- the subsequent decommissioning of the treatment plants themselves.

BNFL presented an overview of the site, the inter-relationships of the plants concerned and the strategy to be adopted to meet these objectives.

Some of the plants needed to deal with the waste products of decommissioning were already in operation. For example, the Magnox Encapsulation Plant (MEP) was on line to encapsulate Magnox swarf arising from current reprocessing operations. However, there were wastes in store and wastes yet to be produced during decommissioning which would require new facilities.

BNFL told RG3 that the first silo built at Sellafield was “dry”, i.e. aluminium cladding from the original Windscale Piles fuel together with a relatively small amount of Magnox swarf from the early Magnox reprocessing was stored in an air environment. The extent of radioactive decay of the contents of this silo had allowed the removal of an external additional shield wall and the main silo structure had been strengthened in advance of decommissioning operations. Work was in hand to provide argon inerting in preparation for the post operation clean out (POCO). BNFL’s current policy was to undertake the POCO on a plant as soon as possible after its operational life was over. However, Sellafield had a legacy of older plants, which were closed many years ago before the adoption of this policy.

The B38 silo was ‘wet’; i.e. the swarf arising from “decanning” Magnox fuel was stored under water. The last four compartments of this silo were filled relatively recently and managed to minimise corrosion of the wet swarf. As a consequence these compartments could be emptied by mechanical grabs and the swarf

transferred to MEP. At the time of the group's visit, February 1999, emptying of these compartments was well advanced. In the compartments used in the early years of the silo's operation the swarf had corroded extensively and formed a sludge which will need other means than the mechanical grabs to remove it.

RG3 was impressed by the comprehensive strategy for the site and the progress made. Members noted that the conversion of wastes into an immobile state was highly desirable in order to reduce the hazard, even though the assessed risk of the present situation was tolerable. NuSAC expressed its concern that reduction in discharge limits, for example, as a consequence of the OSPAR agreement, may cause a slow-down in the site's ability to convert wastes into immobile forms at the rates currently projected. There may therefore be an unfortunate impact on the ability to reduce the hazards on the site.

Windscale Pile 1 Dismantling

UKAEA provided members with a brief explanation of the history of the Windscale Piles to explain some of the problems they were having to address during their dismantling. Piles 1 and 2 were the first reactors on the Sellafield site. Pile 1 suffered a serious fire in 1957 that caused its shut down and, because of the safety issues concerned, Pile 2 was also shut down in 1957. The fire in Pile 1 was initiated by the uncontrolled release of Wigner energy from the graphite core of the reactor. Wigner energy was produced by the displacement of carbon atoms within the graphite lattice by neutron-bombardment. Because the operating temperature of the piles was below the annealing temperature of the graphite, a steady build up of Wigner energy occurred.

UKAEA stated that the extent to which the graphite core still holds Wigner energy was unknown and the dismantling process must cater for this uncertainty. In addition, the fire caused the melt down of some of the fuel in the core. The removal of this fuel will be difficult and carried the possibility of hydrided fuel being present, which carries a high risk of fire. Also, displacement of the melted fuel presented a potential criticality hazard.

The decommissioning strategy presented to RG3 by UKAEA included the inerting of the pile with argon gas and the annealing of all graphite removed from the pile, to remove any Wigner energy which might be present, before the graphite is allowed to come into contact with air. Similarly the uranium fuel removed from the pile would be proven to be non-pyrophoric before coming into contact with air.

Since NuSAC's meeting with the UKAEA further studies had shown that the strategy outlined could not be followed directly and the project was being rethought. NuSAC will keep in touch with any changes to the strategy and revisit the site at an appropriate time.

Operational Arrangements at BNFL Springfields

BNFL gave RG3 a presentation on the Springfields plant, near Preston, which started operation in the late 1940s and manufactured all the Magnox and advance gas cooled reactor (AGR) fuel used in the United Kingdom's nuclear power programme. Because of the length of time the site has been operating, there are older buildings alongside more modern plants. The site processes uranium ore

concentrate (UOC) through to uranium metal for magnox fuel, to UF_6 for dispatch to enrichment plants, such as URENCO at Capenhurst, and the conversion of enriched UF_6 to UO_2 for AGR or light water reactor (LWR) fuel.

RG3 visited the site to review the safety management generally including: the handling of radioactive waste; criticality precautions in the handling of enriched uranium; and decommissioning and dismantling of redundant facilities.

Members' impressions of the site's operations were generally good, although the method for storing 'tailings', which were destined for further processing, was agreed to be less than fully satisfactory and the uranium metal billet production areas were being improved to reduce UF_4 dust levels.

Storage of Liquid High Level Waste at BNFL Sellafield

The NII made its concerns known to NuSAC about the large quantity of highly active waste stored in liquid form at Sellafield. NuSAC members held joint discussions with BNFL and NII to examine the problem in depth. All three parties agreed that the principle which should be applied to all plants, whether nuclear or not, was that the hazards associated with the plant or process should be reduced as far as reasonably possible. NuSAC noted that since vitrified waste was immobile and did not require any engineered means of cooling to maintain its safety, it presented a lesser hazard than liquid waste contained in tanks to which cooling was needed.

Reprocessing spent nuclear fuel had been generating highly active liquids at Sellafield since the 1950s. However, a process to treat the liquid did not become available on the site until the Waste Vitrification Plant (WVP) came on stream in 1990. Hence, there was a backlog of material awaiting treatment and the WVP process was intended to reduce this, as well as treating new arisings. However, difficulties with the WVP process resulted in little reduction in the backlog. BNFL stated that they recognised the shortcomings of WVP and a new line was being constructed to increase the throughput.

The safety case for the storage of highly active waste in liquid form was acceptable but the NII's view was that the hazard was not being reduced at a sufficient rate. The NII intended to take regulatory action if progress was not made to an adequate timetable. The definition of a reasonable buffer storage quantity of liquid waste was also discussed and whether it should be defined by volume or in units of radioactivity.

At the end of NuSAC's involvement a general agreement had been reached on a forward programme to reduce the quantity of liquid waste, subject to discussions on matters of detail between NII and BNFL. However, NuSAC endorsed the NII's desire for the hazard to be reduced by BNFL reducing the quantity of highly active liquid being stored.

Decommissioning of the Windscale Advanced Gas Cooled Reactor (WAGR)

UKAEA explained to RG3 that WAGR was the prototype advanced gas cooled reactor which first 'went critical' in 1962 and ceased operation in 1981. Its main functions were to:

- provide statistical information on the performance of fuel suitable for a civil reactor;

- determine the behaviour of the graphite moderator at the ratings required;

- investigate the compatibility of reactor materials in carbon dioxide at high pressure and temperature; and

- study the safety and control throughout the life of the fuel.

Although WAGR exported electricity to the National Grid when operating, it was too small to make it economical to use as an electricity generator when the test programme was completed.

At the time of its shut down the UKAEA, supported by the then Central Electricity Generating Board (CEGB) and the Department of Energy, decided to decommission WAGR as a generic demonstration project. Although there have been major changes in ownership of the electricity generating industry since 1981, this remained a major objective. Currently funding was provided by DTI under its 'SAFER' programme and BNFL Magnox Generation. This was to underwrite their Magnox 'SAFESTORE' proposals by demonstrating that, if need be, a 'mothballed' reactor could be dismantled safely using today's technology.

RG3 visited the site in 2000 and 2001 to discuss the safety management of the project and also to view the facilities. Members noted that the managerial structure had changed over the life of the project. Initially, a managing agency was appointed under the direction of the UKAEA Decommissioning and Radioactive Waste Management Directorate (DRAWMOPS). However, since 1998 there had been a principal contractor, Magnox Electric plc, now BNFL Magnox Generation, who was responsible for all the technical and commercial risks associated with the project, with UKAEA retaining control of all safety management to comply with the requirements of the site licence. Under these arrangements the UKAEA Safety Management and Control (SMAC) team owned all the safety documentation and were responsible for approving working instructions, issuing permits to work as well as confirming the adequacy of training of all contractors employed on the project.

Members noted that considerable progress had been made in decommissioning the reactor. For example, the heat exchangers were removed and transported to Drigg and the top dome of the reactor pressure vessel and the Hot Box (a complex metal structure that diverted the hot gas from the reactor core out into the heat exchangers) had been removed. During RG3's visit, members viewed the plant built to encapsulate and box components and a shielded store for the boxes. In addition, the method of assaying the radioactive content of items prior to encapsulation was described to them.

At the 2001 visit details were given of unforeseen problems which had arisen and how they had been overcome. These demonstrated that nuclear decommissioning is still at an early stage of development with the need for strong and experienced management control in order to handle problems safely when they arise and to find alternative methods when required.

RG3 considered the arrangements for safety management to be well integrated between UKAEA and the contractor and that a positive safety culture was developing. Members will revisit the project again in future to review progress.

Decommissioning of Magnox Power Plants and Safestore Strategy

RG3 visited Trawsfynydd and Berkeley sites to view decommissioning progress, discuss safety management and to explore the 'safestore' strategy. BNFL/Magnox provided members with an outline of the history of the sites.

Trawsfynydd generated power from 1965 to 1991. It was unique for reactors in the UK in being at an inland site; all other nuclear stations were built either on the coast or, in the case of Berkeley and Oldbury, on a large estuary. The decision was made to close the station in 1993. The main reason for its closure was uncertainty about its steel pressure vessel material properties since it had been subjected to higher neutron fluxes than at other stations as a neutron reflector had been omitted from the design (see earlier paragraph on Trawsfynydd Reactor Pressure Vessel Sampling). Berkeley generated power from 1962 to 1989 and was closed down because of failure to get agreement from NII for the continued operation of on-load re-fuelling using the existing overhead crane.

The basic decommissioning strategy adopted at both stations was to progressively reduce the radiological hazard followed by the passive storage of residual radioactive materials leading to a period of Care & Maintenance (C&M). The reactors at Berkeley were de-fuelled by 1992 and at Trawsfynydd by 1995, the rate of fuel removal being determined by the availability of flasks and Sellafield's capacity to receive the fuel. A consequence of de-fuelling was that 99.9% of the radioactivity was removed from the reactors.

Magnox told RG3 that the C&M period allowed significant decay of the radioactivity within the reactor cores most of which was Cobalt-60 with a half-life of 5.3 years that arose from the neutron irradiation of the steel pressure vessel during operation. After about 100 years no further significant dose reduction results from radioactive decay and the proposed strategy was to delay reactor dismantling for that period. This process was commonly referred to as a 'safestore' strategy based on:

- the reduction in dose due to radioactive decay enabling hands-on techniques to be used for ultimate dismantling;

- the fixed nature of the activity (activated structures rather than contaminated material) meant that encapsulation would not reduce the hazard;

- the robust structures surrounding the reactor cores would survive the long period of storage without leaking radioactive material into the environment;

- radioactive decay would reduce the volume of intermediate level waste (ILW) during the safestore period and hence reduce the volume of ILW for disposal and avoid the need for the construction of new stores to house ILW until an ILW repository was available.

Other contaminated materials will be encapsulated and stored in purpose-built or modified storage buildings, which will form part of the 'safestore'.

At Berkeley it was planned to reach the C&M phase in 2006 and the most significant achievements so far are:

- the removal of the gas-circuit pipework, stored in the reactor building basements;
- the lowering of the boilers to the horizontal and their storage on site (one boiler was decontaminated but this resulted in 40te of low level waste (LLW) being sent to Drigg);
- the reduction in height of the reactor buildings;
- the removal of the turbine hall and workshops and subsequent landscaping; and
- the cleaning of the fuel-handling ponds by removing sludges, removing all plant items and all contamination from the pond walls so that the area was expected to be returned to 'greenfield' status by the end of 2000.

Decommissioning activity at Trawsfynydd was not as advanced as at Berkeley although RG3 was told that it should reach the C&M phase by April 2006. The fuelling charge-machines had been decontaminated, dismantled and the materials largely 'free-released'. Construction of plant for the handling of miscellaneous active wastes and contaminated materials from the ponds was underway. Also, the removal of plant items from the turbine hall had been started.

Magnox recognised that although radioactive hazards were significant in nuclear decommissioning the conventional hazards were of equal significance. The record in this respect had not been good at Trawsfynydd but there was evidence of improvement in recent years.

At both sites work was mainly carried out by contractors under the licensee's control. The general approach was that the licensee pointed out the significant and 'peculiar' hazards to prospective contractors at the tender stage. The selected contractor wrote the safety cases and method statements, which the licensee vetted and approved formally. Most work was treated as 'Category 1', i.e. as if it had the potential to create an off-site emergency, even if in reality it could be considered to be of a lower designation. As a result the NII were involved in the approvals process at significant stages.

The outstanding issues which seemed to be significant to RG3 were: the definition of the 'end-point' for reactor site decommissioning; the acceptance of the 'safestore' strategy by the regulators; and the maintenance of records during a long C&M phase of 100 years or more.

It seemed to RG3 that the current method of project management ensured the licensee was exercising proper control.

Advice to the Minister of State for Energy on the Treatment of Prototype Fast Reactor (PFR) Fuel at Dounreay

In April 2000, the Rt. Hon Helen Liddell, the then Minister of State for Energy, asked for NuSAC's advice on the treatment of PFR fuel held at Dounreay which had not been reprocessed at the time of the failure of the dissolver in the PFR reprocessing plant. In order to be in a position to give the advice on the three possible strategies: Minimum Treatment (at Dounreay); reprocessing at Dounreay (Dounreay Strategy); and a Hybrid Strategy involving reprocessing at Sellafield, representatives of NuSAC received copies of consultation papers and the report of a Best Practicable Environment Option (BPEO) study members attended, together with members of RWMAC, a presentation by UKAEA.

NuSAC's advice to the Minister is reproduced at Annex D.

Response to DETR Consultation Document on the UK Strategy for Radioactive Discharges 2001-2020

NuSAC responded to this consultation document and presented its report via the Health and Safety Commission. The observations given by NuSAC are reproduced in Annex 1 of the paper that was presented to the HSC on 5 September 2000 (reproduced at Annex E to this report).

Response to the Environment Agency's (EA) Proposals for the Future Regulation of Disposals of Radioactive Waste from British Nuclear Fuels plc Sellafield

NuSAC responded to this consultation in November 2001. Its response will be published along with other responses to the EA's proposals. While NuSAC, in principle, welcomes reduction in discharges from the Sellafield site into the environment, it is chiefly concerned with the effect that such reductions could have on the safety of the workforce and members of the public living close to Sellafield.

Increased Caesium Concentrations in Magnox Fuel Storage Ponds at Reactor Stations and in the Fuel Handling Plant at Sellafield

Early in 2001 NuSAC received reports of an increase in the caesium concentrations in the pond water in which irradiated magnox fuel is stored. In the 1970's caesium levels had risen in the magnox storage pond (B30) with serious consequences in terms of radiation dosages to workers, reduced throughput in the magnox reprocessing plants and increased discharges of radioactivity to the Irish Sea. NuSAC considered that the matter deserved serious consideration.

Magnox fuel elements are uranium metal bars contained in cladding (cans) of a magnesium alloy known as magnox. As the fuel is irradiated in a reactor the fission of uranium 235 nuclei results in the creation of fission-products. Caesium 137 is one of the fission-products and is significant in the storage of irradiated fuel because of its high solubility in water. After magnox fuel has been removed from a reactor it is stored under water at a pond on the reactor site [at Wylfa a dry store is used] before being dispatched to Sellafield where it is stored in the Fuel Handling Plant (FHP). The FHP storage facility is a very large pond together with equipment for decanning the fuel elements before being sent for reprocessing. FHP was built to replace the older B30 and had many features to reduce the rate of corrosion of magnox cladding

during storage including: a cover over the pond; containerisation of the fuel; chemical treatment of the pond and container water; water temperature control and a dedicated ion-exchange effluent treatment plant. For its first decade of operation FHP had demonstrated that its design intent had been met. It was therefore disappointing to find that there was a trend towards the sort of problems which had been obtained in the 1970's. However it must be emphasized that the caesium levels were 1,000 times lower than the levels which had been experienced in B30.

Review Group 3 members had a meeting with BNFL staff representing both the Sellafield site and the magnox reactor stations. BNFL had set up a task force to investigate and take action. The chief causes identified for the increased levels of caesium were:

a. increased levels in the ponds at the stations — not fully explained but in part due to prolonged storage of the irradiated fuel at the stations;
b. reduced throughput in the reprocessing plants due to staff shortages and plant non-availability;
c. the increased time the fuel was spending in the FHP awaiting reprocessing, leading to increased corrosion of the magnox cladding leading to penetrations allowing caesium to be released into the container water;
d. a shortage of flatrols (railway wagons) for shipping fuel to Sellafield resulting in prolonged storage at the stations ponds where the conditions for the prevention of magnox corrosion are less favourable than in FHP;
e. a restriction on payload in flasks containing leaking fuel elements leading to yet longer storage periods at the station ponds.

The main actions taken by BNFL have been:

a. increased staffing levels to improve reprocessing rates and thus reduce storage periods in FHP;

b. purging of the fuel containers before they are opened prior to reprocessing;

c. redesign of the purging equipment, referred to in b. above, because initially it had been found to be ineffective;

d. speed-up of maintenance of flatrols to reduce the reactor station stocks;

e. provision of a submersible caesium removal unit in the ponds at the reactor stations.

There was evidence that the increased caesium levels were being brought under control but Review Group 3 will continue to monitor the situation.

EMERGENCY ARRANGEMENTS REVIEW GROUP (RG4)

New Regulations

The *"Radiation (Emergency Preparedness and Public Information) Regulations 2001"* (REPPIR) came into force in September 2001. The guide to the regulations

was published by the Health and Safety Executive (HSE) in January 2002. NuSAC's Emergency Arrangements Review Group (RG4) published its detailed comments on the regulations and guide in paper NuSAC (2001) P17. In its discussions on some aspects of the draft regulations, RG4 liaised with members of the Health and Safety Executive's Ionising Radiations Advisory Committee (IRAC). Some of the more significant issues of concern raised in the NuSAC paper are outlined below.

In retrospect, the initial decision by the HSE to model the regulations on those for other major hazards may have hindered clarity in the approach to radiation emergencies. The result was certainly a series of very complex drafts, which, together with the guidance to the regulations, required a considerable effort by RG4 to review over the period from mid-1997 to the end of 2001.

In summary, RG4 considers that the regulations and accompanying guidance will, on the whole, only consolidate the *status quo* for emergency planning at both fixed sites and in transportation of radioactive substances by rail.

RG4 welcomed the consolidation of the local authority role by introduction of a statutory responsibility for them to write off-site emergency plans for licensed nuclear sites and lead on exercising of these plans. RG4 considered, however, that the HSE could have taken a more comprehensive view of the potential for encouraging improvements and consistency in both transport and fixed site emergency planning. For example, RG4 was disappointed that the guidance to the REPPIR did not take more of a lead in promoting the longer-term and wider-area aspects of off-site planning of particular interest to local authorities - such as public information dissemination through the media, extended planning for more serious accidents and arrangements for the recovery period. The requirement for these aspects of emergency planning has since been greatly amplified in UK Government responses to the events and aftermath of the 11 September 2001 terrorist attacks in the USA.

RG4 considered that charging was a health and safety issue, particularly in that commercial considerations by operators might degrade the testing of plans. There were also differences between the ability of local authorities and the emergency services to recover costs that might inhibit participation in exercises. Additionally, testing of extended arrangements was excluded from the charging regime. RG4 will continue to take an interest in the development of this issue since it is to be further considered in joint DTI and DETR ministerial consultations on charging as applied to REPPIR and to the Control of Major Accident Hazards (COMAH) Regulations 1999.

There was not a clear agreement within RG4 over the inclusion of transport in the regulations. Some thought that this created significant problems with implementation for little apparent benefit given the existing international arrangements for transport detailed in the International Atomic Energy Agency (IAEA) safety series. Others considered that this offered an opportunity to consolidate the various emergency planning arrangements and for more information to be made available to people living beside transport routes. However, all agreed that the removal of transport, apart from rail, from the regulations by the HSE at a late stage created a potential anomaly since other transport methods were then intended to be dealt with in separate legislation formulated by the Department of the Environment, Transport and the Regions (DETR). RG4 preferred that transport was consolidated in a single set of legislation to aid clarity and consistency in dealing with aspects such as

emergency exposure levels. HSE indicated that rail transport might be removed from REPPIR in a future amendment.

RG4 was concerned that a potential health and safety risk existed because of a "loophole" in the draft regulations which might have allowed a new process to be started without an off-site plan being in place. NuSAC brought this to the attention of the Health and Safety Commission with a recommendation that the regulations be amended to remove this problem. The regulations were also amended to clarify the production of plans for multi-occupancy and complex premises such as universities and hospitals.

RG4 was also concerned that licensed sites contracted-out by the Ministry of Defence (MoD) such as the Atomic Weapons Establishment (AWE) at Aldermaston could potentially be exempted from the provisions of REPPIR. Some reassurance was received from the MoD that any exemption was extremely unlikely and that in that case the decision would be made by the Secretary of State for Defence in person.

Off-Site Emergency Arrangements and Exercises

RG4 published its detailed reviews of and recommendations arising from its observations at licensed nuclear site off-site plan exercise in papers NuSAC (2000) P10, for the 1997-1999 period, and NuSAC (2002) P6 for 2001.

The arrangements for co-ordinating and supplying information to the printed and broadcast media are still generally considered to be the main route for disseminating information to people in the wider area in an emergency. RG4 has been concerned to find considerable variation in the effectiveness of these arrangements in off-site plan exercises. There have, of course, been examples of good practice, innovative ideas and improvements in arrangements for providing information and these have been included in RG4's considerations.

RG4 made a number of detailed recommendations in the NuSAC (2002) P6 paper for improving information and media arrangements at Local Emergency Centres or Off-Site Centres (LECs/OSCs) and at Media Briefing Centres (MBCs). RG4's main recommendations are summarised below.

In general, RG4 recommended that to get real value from exercising these arrangements:

- Organisations should be represented at LECs/OSCs and MBCs by their regular press/media or public relations staff and/or staff who have had media training and who require the experience.

- Senior organisational representatives who may be required to attend press conferences or give individual interviews should have regularly updated media training for their roles.

- Professional press/media staff should be included in simulated media to give a more realistic test of the information co-ordination and dissemination arrangements.

To ensure effective flow, exchange and co-ordination of information within these centres RG4 recommended that they require:

- Clear and easily accessed central information display systems which must be kept up to date.

- Organisational representatives who are properly briefed and trained to be pro-active in obtaining information from other organisations within the centre in circumstances where there can be pressure to focus on specific areas of responsibility and individual problems.

- A media co-ordination and management group, with individual organisations' press/media representatives, to ensure efficient liaison and co-ordination in the production of media and public information. Representatives on this group should also be in communication with their organisational headquarters.

To enhance efficient and effective working of these centres RG4 recommended that:

- MBCs should be close to and easily accessible from the LEC/OSC so that senior staff can be in place on time for media briefings and minimise absence from their roles in the LEC/OSC.

- MBCs should be staffed full-time or for extended periods by press/media officers from the main organisations in the LEC/OSC so that informed briefing can be sustained in the sometimes quite long intervals between main press conferences featuring senior representatives.

- MBCs should have an MBC manager present at all times to oversee organisation and facilities and to provide information to media staff.

- The media should be provided with photo/film opportunities at significant sites which should be offered and organised pro-actively as an integral part of the MBC arrangements.

NuSAC welcomed the production of further guidance for civil nuclear emergency response arrangements by the Department of Trade and Industry's Nuclear Emergency Planning Liaison Group (NEPLG) in its *"Fact Sheets"* (issued mid-2000) and *"Consolidated Guidance"* (issued end-2001).

The Consolidated Guidance covers a wide range of off-site emergency response roles and arrangements including the provision of information to the public and running MBCs. Many of the specific points dealt with in these areas of the guidance are re-iterated in the NuSAC recommendations. The NuSAC recommendations on media and public information provision have been passed to the NEPLG for their consideration.

NuSAC welcomed in particular advice in the NEPLG Consolidated Guidance on co-ordinating the issue of food restriction orders by the Food Standards Agency (FSA) with other precautionary advice and on reducing the potential public concern raised by the comparatively larger area usually covered by these FSA restrictions. These issues have consistently generated conflicts within off-site centres and at media briefings in exercises observed by RG4 and require urgent resolution.

NuSAC also recommended that the FSA should take part in the Health Advice Group or its equivalent at off-site co-ordination centres to assist with co-ordination of food restriction advice with other safety countermeasures.

NuSAC is concerned that there is not an equivalent role to the Government Technical Adviser (GTA) in the off-site response arrangements at licensed military sites. One major GTA role is to provide independent and authoritative advice on safety countermeasures and environmental issues to the Police and other organisations involved in the off-site emergency response. The role envisaged by the MoD for the Military Co-ordinating Authority (MCA), usually an MoD person, is a more limited one covering only the other two GTA roles namely, informing the lead Government department (the MoD in the case of licensed military sites) and providing an authoritative response, if required, on behalf of the Government at media briefings.

NuSAC recommended that serious consideration should be given by the MoD to using a senior NII staff member in the GTA advisory and media roles in off-site emergency planning arrangements at military licensed nuclear sites.

Future Emergency Arrangements and Exercise Review Programme

In its future review programme, NuSAC will continue to look at arrangements for co-ordinating and issuing information to the media and the public, including the development of electronic methods of information transmission and dissemination, in off-site emergency plans and exercises.

The UK Government's response to the events and aftermath of the terrorist attacks of 11 September 2001 in the USA has highlighted various aspects of emergency response planning, including the capability of licensed nuclear site off-site emergency plans to cope with more serious incidents affecting a wider area than is usually considered – known as "extendibility" or extended planning. During its discussions on the development of REPPIR, NuSAC raised concerns with the HSE over the lack of consistency in implementation and exercising of "extendibility" arrangements in off-site emergency plans.

The NII last issued detailed guidance on extended planning in 1990. Further guidance on extended planning is contained in DTI's NEPLG *"Consolidated Guidance"*. These guidance documents are now being "re-visited" for off-site emergency planning at the behest of the NEPLG and recommended by them as generic guidance for any organisation which might be involved in extended planning because the basic principles are seen as suitable for application to all nuclear or radiological emergencies whether they result from an accident, terrorist attack or some other event. NuSAC will therefore wish to review the implementation and exercising of the extended planning guidance.

RG4 reviewed the 1999 “Best Endeavours” exercise of the National Response Plan (NRP) and Radiation Incident Monitoring Network (RIMNET) arrangements for the UK-national response to overseas and domestic nuclear accidents. RG4 considered then that the NRP required a fuller exercise in order to provide an effective test of the arrangements. In particular, RG4 considered that the aspects of media response and the issue of public information should be addressed more fully and under the circumstances of participation by all of the government departments, agencies and other organisations involved, including their media staff.

Plans are also being developed at a UK-national level for the response to the deliberate use of various types of devices which could cause radiological contamination incidents. NuSAC will wish to review the implementation and exercising of these plans in addition to the wider-area nuclear accident response arrangements in the NRP.

In the case of MoD sites where operators are licensed by the NII, NuSAC will continue to review the role of the MCA and the HSE’s NII in providing expert advice in emergencies to the civil authorities on the implementation of public safety countermeasures - a role carried out by the GTA at civil licensed sites.

MINISTRY OF DEFENCE TOPICS REVIEW GROUP (RG5)

The role of RG5 is to provide the full NuSAC committee with an overview of the four other RG topic areas (Safety Management, Safety Performance, Decommissioning and Emergency Arrangements) but for MoD sites.

Members of RG5 have undergone the lengthy process of obtaining appropriate levels of security clearance to allow the group access to the various operational sites of interest under NII licence arrangements. The group visited the AWE at Aldermaston in 1999 to obtain an overview of the history of operations on the site. The visit occurred prior to the group obtaining security clearance and therefore did not involve a visit to the operational facilities. It was also in the run up to relicencing the site to AWE plc and the tendering process for the site management contract.

The NuSAC Secretariat are now in the process of obtaining appropriate levels of security clearance for the full NuSAC committee to facilitate wider access of the committee to the developments in the defence related establishments and topics. This is again expected to be a lengthy process but one which is important to the role NuSAC is expected to perform.

AWE plc

Early in 2001, following the award of the management contract to AWE Management Ltd., a joint venture company comprising BNFL, Lockheed Martin and SERCO, the group visited the Aldermaston site. This was against the background of the NII report on the first three months after relicencing, and in the run up to a follow up report on the first 12 months and following a comprehensive brief by NII on the key issues affecting the site. The group focused on safety management systems,

processes and culture and the waste management and decommissioning operations on site.

It was clear to the group that AWE Management Limited (AWEML) had built on the work and experiences of Hunting Brae, the previous management team, and there was clear evidence of further improvement. Progress with implementing the NII recommendations was also running to schedule.

AWEML have a programme in place to develop improved behaviours and attitudes to safety with early signs of improvements in performance indicators.

The RG intend to revisit Aldermaston in 2002 to review existing criticality control arrangements and production facility operations. The group will continue to monitor the close out of NII recommendations following the recent published reports.

Devonport Management Limited

A repeat visit to Devonport took place early in 2001 looking at developments in the "dual regulation" regime reported in the 1997/98 biennial report and the upgrading of facilities and handling of repairs. The group was able to review the impact of dual regulation on the 9 Dock refurbishment programme. The review group recognise the difficulties that dual regulation poses but were content that standards were maintained and the interface did not impact on safety.

During 2001 the first joint Defence Nuclear Safety Committee (DNSC)/NuSAC visit to Devonport took place. DNSC and NuSAC intend to continue to work together more closely in the future.

NUCLEAR SAFETY RESEARCH

In 1989, the DTI transferred responsibility for the programme of nuclear safety research to HSC. The HSC Coordinated Programme of Nuclear Safety Research is managed by HSE on behalf of the HSC, under guidelines issued by the President of the Board of Trade. These guidelines set out the purpose of the programme, which is restricted to civil nuclear power reactors, and take into account that the safety of nuclear installations is the responsibility of the major nuclear site licensees, who are expected to be the main commissioners of relevant research. Briefly, the guidelines require that the programme is 'adequate and balanced'; that HSC should have due regard to the need to maintain an 'independent capability' for nuclear safety research; and that proper account is taken of the advantages of 'international collaboration'.

The programmes are developed each year using the HSE's annual Nuclear Research Index (NRI). The NRI is a compilation of generic nuclear safety issues identified by HSE's NII in regulating nuclear reactor sites and in its broader dealings with other organisations, both nationally and internationally. Discussions take place between NII and the major nuclear site licensees' Industry Management Committee (IMC) to prioritise these issues in the context of the overall programme strategy and to develop the programme for the forthcoming year.

The HSC Co-ordinated Programme consists of the following three elements:

- the IMC Programme where the majority of contracts are placed by, or on behalf of, the IMC, which has representatives from each of the major nuclear site licensees.

- the Levy Programme that consists of a smaller number of contracts placed directly by the HSE, the costs of which are recovered from the major nuclear licensees by the imposition of a levy.

- the Industry Direct Programme where individual licensees, at their own instigation, place contracts for research which may address NRI issues and the results of this work are made transparent to the HSE.

In January 2001, NSD instituted a review of the Co-ordinated Programme with the joint aims: first, of examining how well the present system was ensuring that the research in the programme was not only 'balanced and adequate' but was also contributing to nuclear safety; second, of exploring how the same approach might be extended to cover other licensees.

Sub-committee on Research

The role of the NuSAC Sub-committee on Research (SCR) is to provide independent advice to the HSC, through the main committee, on the adequacy of the HSC Co-ordinated Programme. In particular, SCR indicates to HSC its view as to whether the programme complies with the guidelines set by the DTI. In order to discharge its remit, the SCR meets formally with HSE and IMC representatives twice a year at appropriate times in the research procurement cycle. The agendas of the SCR meetings are placed on the Internet and papers discussed at the meetings are available to the public through the HSE. In addition, once a year the IMC invites SCR members to visit a nuclear power station or a research establishment to view the facilities and hear presentations on selected topics from the research programme, or to see examples of how the results of research have been applied. These presentations enable SCR members to understand the scope and extent of the research, particularly the "Industry Direct" element of the programme. In 1999, the SCR members visited Windscale to see the work being done by UKAEA in decommissioning the WAGR and the Windscale Piles. In addition, the SCR also received a presentation on the application of human factors research from the chair of the Human Factors Technical Working Group. In 2001, the SCR did not make a site visit, but met with British Energy Generation Ltd. at Barnwood (on 11 September) to listen to, and discuss, presentations made on the application of research at Dungeness power station. One particularly fascinating item was the "detective work" employed to trace back the cause for the incorporation of a small amount of "rogue" weld-metal in austenitic pipe-work.

During 1999-2000, the changes to the UK's nuclear research infrastructure continued. Maintaining essential research capability continued to be of major interest to the SCR. The methodology developed by the IMC for reviewing the maintenance of essential research capability was endorsed by the SCR. The latest review was presented to the SCR in June 2000 and the SCR was satisfied that the process met the stated objectives and that the overall position was reasonably stable. The teams identified in the original review were adequately maintained and positive action had been taken to maintain those teams external to the licensees whose contracts were due to expire. The SCR has continued to monitor the situation throughout 2001, with particular concern for the preservation of irradiation embrittlement facilities and for work on graphite. These areas have assumed sharper focus as a result of AEAT withdrawing from nuclear areas. Some, but not all, relevant parts of AEAT were taken over by SERCO. With these caveats, the situation for 2001 was considered still to be satisfactory.

The SCR expressed concern that it was receiving comparatively little information on the Industry Direct Programme, which comprises the largest part of the HSC Co-ordinated Programme. The SCR encouraged HSE to undertake an annual assessment of the Industry Direct Programme and the first review was reported to the SCR in June 2000. Although the review was based on a sample of the programme, it provided improved information to SCR members on the work being done within that part of the programme and enabled them to comment more authoritatively to the HSC on the HSC Coordinated Programme as a whole. If the basis for research changes along the lines put forward by the IMC in their contribution to the Review (see below), it will be necessary for licensees to make sure that the research that they do to ensure safety is made fully transparent, both to NSD and to the SCR, to enable them to fulfil their commitment to assure HSC that the guidelines are being met.

Throughout 2001, there has been an ongoing review of the operation of the HSC Co-ordinated Programme. Partly, this has been occasioned by NSD's requirement to cover the full range of Nuclear licensees, not just the civil generators. An NSD principle is that prime responsibility for safety should be assumed by the licensee. Partly, the review has been caused by the civil generator licensees looking carefully at their "core businesses", and at the safety implications of these. The "BEG" licensees and the "MGBG" licensees separately consider that there are many issues which are relevant only to the safety of their own operations, and for which there is therefore no motivation for shared research. Some areas are conceded to be common to both sets of licensees. A separate point is that the review aims to explore the relevance of the research commissioned and carried-out to improved safety on the operating plant. By the end of 2001, there was still no clear resolution of the way forward, although a number of principles had been put forward and discussed. The SCR has been attempting to probe the underlying reasons for changing what had always appeared to be a very good system. In particular, it was unhappy to see the disestablishment of Technical Working Groups (TWGs) which had provided fora for the technical exchange of views between both sets of licensees and associated NII Inspectors. It is also interested in the precise form of the new "Nuclear Research Index", which looks as if it may contain four sections: "BEG-only" topics, "MGBG-only" topics, joint "BEG/MGBG" topics, and topics raised by NSD. NSD and the IMC are continuing to hold discussions to find a mutually agreed way forward.

The research programme for 2001 was set-up entirely under the “old rules” and the SCR agreed that its content was both adequate and balanced, although it queried the reduced out-turn in the “human factors” area. This area has also been scrutinised with respect to the 2002 programme.

During 1999, the Organisation for Economic Co-operation and Development, Nuclear Energy Agency (OECD-NEA) carried out a survey of the provision of nuclear education within its member countries. The report concluded that there was a declining trend in the provision of nuclear education and training, which governments needed to address. As it was considered that the UK input into the survey was not as comprehensive as it might have been, a UK survey was commissioned. This survey confirmed that although the situation was not as bleak as that presented by the OECD, action was required. The SCR supported the HSE and IMC plans to highlight this issue and address the problem by involving all interested parties within the education sector and the UK nuclear industry (which goes much wider than the nuclear power generators). A forum to discuss this issue and consider ways in which the problem might be addressed was held on 16 February 2001 at Macclesfield, jointly sponsored by HSE and DTI, and attended by a number of members of the SCR. The outcome of this meeting was reported to the SCR and to NuSAC. Two initiatives following this meeting have been a survey of centres of excellence in the UK (carried out by NNC) and the setting-up by DTI of a Nuclear Skills Group, chaired by Prof. John Chesshire. The SCR is monitoring progress with interest.

Another topic that the SCR has been interested in was the dissemination of the research information acquired under the programme. As one of the objectives of the DTI guidelines for the programme, SCR members encouraged HSE and the IMC to disseminate information as widely as possible, whilst recognising that there were intellectual property rights implications for work done under the IMC and Industry Direct elements of the programme. The SCR endorsed the dissemination strategy developed by the HSE and the IMC, particularly the aim to use the HSE website to publish as much of the information as possible, and the SCR welcomed the progress made in publishing the NRI for 2000-2001 and for 2001-2002 in this way.

The SCR also kept abreast of the development of the Nuclear Chemical Plant Research Index (NCPRI) and received regular updates on its status. Several members took a particular interest in the NCPRI and in some of the specific safety issues. They visited BNFL to obtain a better insight into these issues, and attended meetings with HSE and BNFL representatives to discuss progress on them and the NCPRI in general. These meetings were useful and constructive in demonstrating the work being undertaken by BNFL in those areas, and the relevance of that work to safety issues. A subset of the SCR has continued to visit BNFL to be informed on the application of research to their operations. The SCR also took an interest in the research undertaken elsewhere in the nuclear industry and UKAEA made a presentation on their safety-related research and development to members in June 1999.

The SCR was able to report to the HSC that throughout 1999, 2000 and 2001, the HSC Coordinated Programme complied fully with the DTI guidelines. The SCR was further able to inform HSC that the arrangements put in place by the IMC, in consultation with the HSE, appeared to be adequate to ensure that an appropriate

nuclear safety research capability was being maintained. The SCR is aware that it has to maintain a close watch on the retention of research capability, particularly in view of the change of interests of AEAT.

JOINT STUDIES WITH THE RADIOACTIVE WASTE MANAGEMENT ADVISORY COMMITTEE

RWMAC/NuSAC Joint Study 'Current Arrangements and Requirements for the Conditioning, Packaging and Storage of Intermediate Level Radioactive Waste'

Members of RG3 were pleased to be able to participate in the above joint study led by NuSAC's radioactive waste counterpart, RWMAC. The study was still ongoing at the end of 2001 with a report of the work undertaken and findings scheduled for publishing mid 2002.

NuSAC/RWMAC Joint Study 'Review of the Regulation of Nuclear Safety and the Management of Radioactive Materials and Radioactive Waste Within the UK'

The two Committees set up a joint steering group to lead this study. At its first meeting, the steering group agreed that it would be helpful, as a first step, to develop a document setting out the current position with respect to the regulation for nuclear safety and for environmental protection. It was agreed that the document would set out the principles upon which the two regulatory processes are based and identify areas in which there are inconsistencies or incompatibilities between the regulatory processes. The document would then recommend areas in which further consideration of the bases of regulation could remove inconsistencies and incompatibilities.

The document was in draft form at the end of the period covered by this report and should be agreed by the two Committees and scheduled for publication in the Autumn of 2002.

CONCLUSIONS

NuSAC has concerns over the continuing changes within the industry including downsizing and the increase in the use of contractors from both the safety management and safety performance perspective. It will continue to monitor this situation.

NuSAC received papers on a variety of technical issues including: the release into the containment incident at Sizewell B (March 1999); the Trawsfynydd reactor pressure vessel sampling project; the closure of Hinkley Point A decision.

NuSAC has had a very busy period addressing a series of topics concerning decommissioning of the ponds and silos at BNFL, Sellafield, Windscale Piles, WAGR and Magnox power plants.

Following NuSAC's discussions with both NII and BNFL over the problem of storage of Highly Active Liquor (HAL) at BNFL, Sellafield, NuSAC endorsed NII's desire for the hazard to be reduced by BNFL reducing the quantities being stored.
NuSAC was pleased to have been able to advise the Minister on the treatment of the Prototype Fast Reactor fuel at Dounreay and to respond to DETR's Consultative Document on the UK Strategy for Radioactive Discharges 2001-2020.

NuSAC monitored the progress of the REPPIR regulations through its publication phase.

NuSAC (as a body and its RGs) undertook a variety of visits to sites and licensees throughout the period.

NUSAC's Subcommittee on Research reported that the HSC Co-ordinated Programme complied fully with the DTI guidelines.

NuSAC has worked closely with RWMAC on two Joint Studies with each Committee taking the lead for one. These studies have been very helpful in gaining appreciation of how each Committee works and a greater understanding of the areas each covers.

FUTURE TOPICS

NuSAC will continue to look at aspects of nuclear plant operation, which have safety implications for either workers in the industry or the general public. The body of the report indicates some issues the Committee will be addressing, including:

- reviewing progress by UKAEA in improving the approach to safety at Dounreay and elsewhere where applicable;
- undertaking continuing comparison between the safety performances of the major licensees;
- monitoring decommissioning, waste storage and eventual waste disposal;
- monitoring WAGR and Windscale Piles dismantling;
- continuing to review off-site emergency arrangements;
- monitoring the management contractors at AWE, Aldermaston and 'dual' regulation at the Devonport Dockyard;
- monitoring the working of the HSE - MoD interface at licensed dockyards and licensed AWE sites;
- monitoring the provision of nuclear education and training; and

- completing and referring to Ministers and publishing the NuSAC/RWMAC Joint Study report 'Structures and Principles of the Regulation of Civil Nuclear Licensed Sites'.

In all this work NuSAC will continue to aim to provide independent, competent and professional advice for the HSC and Government Ministers.

NuSAC recognises the continuing need to maintain and promote nuclear safety culture, maintain regulatory effectiveness, and, with pressure on greater openness, interact more effectively with the public, the media and Parliament. As part of this, as mentioned in the Chairman's Foreword, NuSAC together with its radioactive waste counterpart, RWMAC, will jointly look at some aspects of Nuclear Industry regulation. A preliminary report on this work is scheduled for the end of 2002.

The Chairman would also like to foster closer working relationships with RWMAC and DNSC on other suitable and appropriate topics.

NuSAC will also consider issues as they arise from technical, socio-economic and political sources, and organisational, management and human aspects.

GLOSSARY

ACSNI
Advisory Committee for the Safety of Nuclear Installations

AEA-T
Atomic Energy Authority – Technical

AGR
Advanced Gas Cooled Reactor

ALARA
As low as reasonably achievable. Radiological doses of risks from a source of exposure are as low as reasonably achievable when they are consistent with the relevant dose or target standard and have been reduced to a level that represents a balance between radiological and other factors, including social and economic factors. The level of protection may then be said to be optimised.

ALARP
As low as reasonably practicable. To satisfy the ALARP principle, measures necessary to reduce risk must be taken until or unless the cost of these measures, whether in money, time or trouble, is disproportionate to the reduction risk.

AWE
Atomic Weapons Establishment

AWEML
Atomic Weapons Establishment Management Ltd

BEG
British Energy Generation

BNFL
British Nuclear Fuels plc

BPEO
Best Practicable Environment Option. A concept developed by the Royal Commission on Environmental Pollution, it implies that decisions on waste Management have been based on an assessment of alternative options evaluated on the basis of factors such as the occupational and environmental risks, the environmental impacts, the costs and the social implications.

BSO
Basic Safety Objective. BSOs complement the BSLs as a means of applying the tolerability of risk principle to the regulation of nuclear safety. Each BSL has a corresponding, and lower, BSO. The BSOs define the point beyond which the regulatory assessors need not seek further safety improvements from the licensee in the quest for ALARP.

CD
Consultative Document

CEGB
Central Electricity Generating Board

CFU
Central Feedback Unit

C&M
Care and Maintenance

COMAH
Control of Major Accident Hazards

DETR
Department of Environment, Transport and the Regions

DNSC
Defence Nuclear Safety Committee

DRAWMOPS
Decommissioning and Radioactive Waste Management Directorate

DTI
Department of Trade and Industry. The UK Government department responsible for nuclear industry sponsorship and safety.

EA
The Environment Agency. The regulatory body for England and Wales with responsibility for regulating the accumulation and disposal of radioactive waste, including discharge authorisations, under the Radioactive Substances Act 1993.

FHP
Fuel Handling Plant

FSA
Food Standards Agency. An independent food safety watchdog set up by the UK Government in 2000 to protect the public's health and consumer interests in relation to food.

GTA
Government Technical Adviser

HAL
Highly Active Liquor

Health and Safety Commission (HSC)
The Health and Safety Commission (HSC or the Commission) and the Health and Safety Executive (HSE or the Executive) are bodies created by the Health and Safety at Work etc. Act 1974. The Commission is responsible to the Secretary of State for the Environment (and to other Secretaries of State) for the administration of the Act. The Commission makes substantial use of independent Advisory

Committees who advise the Commission directly. The Commission's independent advisor on the subject of nuclear safety is NuSAC.

Health and Safety Executive (HSE)
The Health and Safety Executive. It is a distinct statutory body with a day-to-day responsibility for making arrangements for the enforcement of safety legislation. The Executive is the statutory licensing authority for civil nuclear installations, functions that it delegates to senior officials within the Nuclear Installations Inspectorate (NII) that is part of HSE's Nuclear Safety Directorate (NSD).

HSWA74
The Health and Safety at Work etc Act 1974. A UK Government Act to secure the health, safety and welfare of persons at work and to protect persons other than persons at work against risks to health or safety arising out of or in conjunction with the activities of persons at work.

IAEA
International Atomic Energy Agency. A United Nations organisation, based in Vienna, which provides a worldwide intergovernmental forum for scientific and technical cooperation in the nuclear field.

ILW
Intermediate Level radioactive Waste

IMC
Industry Management Committee for Nuclear Safety Research Programmes

INES
International Nuclear Event Scale

INPO
Institute of Nuclear Plant Operators

IRAC
HSE's Ionising Radiations Advisory Committee

LEC
Local Emergency Centres

LLW
Low Level radioactive Waste

LWR
Light Water Reactor

MBC
Media Briefing Centres

MCA
Military Co-ordination Authority

MEP
Magnox Encapsulation Plant

MGBG
Magnox Generation Business Group

MoD
Ministry of Defence

NCPRI
Nuclear Chemical Plant Research Index

NEPLG
Nuclear Emergency Planning Liaison Group

NII
HM Nuclear Installations Inspectorate - a part of the Nuclear Safety Directorate of HSE, senior officers of which have delegated licensing and enforcement powers relating to nuclear plant under the NI Act 1965 (as amended).

NRI
Nuclear Research Index

NRP
National Response Plan

NSD
Nuclear Safety Directorate of HSE, of which NII is the major part.

NuSAC
Nuclear Safety Advisory Committee. NuSAC advises the Health and Safety Commission (HSC) and, when appropriate, Secretaries of State, on major issues affecting the safety of nuclear installations including design, siting, operation, maintenance and decommissioning which are referred to it or which it considers require attention. It also advises the HSC on the adequacy and balance of the nuclear safety research programme that the Commission coordinates.

OECD-NEA
Organisation for Economic Co-operation and Development's Nuclear Energy Agency. A specialised agency which aims to assist member countries in promoting the safe, environmentally friendly, and economical use of nuclear energy for peaceful purposes.

OEF
Operational Experience Feedback

OSC
Off-Site Centres

OSPAR
Oslo and Paris Convention. There are 16 contracting nations, including the UK, to the 1992 Convention which has the aim of protecting the marine environment of the North East Atlantic. Its coverage includes radioactive discharges to the marine environment.

PFR
Prototype Fast Reactor

POCO
Post Operation Clean Out

PPS
Primary Protection System

REPPIR
Radiation (Emergency Preparedness and Public Information) Regulations

RG
Review Group of NuSAC

RIMNET
Radiation Incident Monitoring Network

RPV
Reactor Pressure Vessel

RWMAC
Radioactive Waste Management Advisory Committee. It is an independent body that advises UK Government, and the devolved administrations, on major issues concerning the development and implementation of policy for the management of civil radioactive wastes.

SCR
NuSAC's Sub-Committee on Research

SEPA
Scottish Environmental Protection Agency. It is the regulatory body for Scotland with responsibility under the Radioactive Substances Act 1993 for regulating the accumulation and disposal of radioactive wastes.

SMAC
Safety Management and Control

THORP
Thermal Oxide Reprocessing Plant

TWG
Technical Working Group

UKAEA
United Kingdom Atomic Energy Authority

UOC
Uranium Ore Concentrates

WAGR
Windscale Advanced Gas Cooled Reactor

WANO
Worldwide Association of Nuclear Operators

WVP
Waste Vitrification Plant

ANNEX A

NuSAC REVIEW GROUPS

Membership of Review Groups

Safety Management Review Group 1	Professor Cox Dr Davies* Dr Whiston	Mr. Napier Professor Littlewood Mr. Cripwell
Safety Performance Review Group 2	Dr R Hall* Professor Duncan Professor Owens	Professor Goddard Professor Knott
Fuel Cycle Management and Decommissioning Review Group 3	Mr Bellard Dr Parry Professor N Moray	Mr J Hall* Professor Goddard (for criticality issues)
Emergency Planning Review Group 4	Dr Davies Professor Head	Dr McKenzie*
MoD related topics Review Group 5	Mr J Hall Professor Head Professor Knott	Mr Napier* Dr Edmondson

* Convenor for the Review Group

Membership of NuSAC's Sub-Committee on Nuclear Safety Research

Professor Duncan
Professor Goddard
Mr J Hall
Dr R Hall
Professor Head (Chairman - to June 2000)
Professor Knott (Chairman - from July 2000)
Professor Littlewood
Dr Parry
Professor Richardson (co-opted member)

ANNEX B

PAPERS TO THE NUCLEAR SAFETY ADVISORY COMMITTEE: 1999	
PAPER TITLE	**PAPER NUMBER**
Fuel Cycle Management: Decommissioning of Silos and Ponds at Sellafield (BNFL)	NuSAC (99) P1
Competition in the Electricity Industry and its Impact Upon Nuclear Power Plant Operations (British Energy)	NuSAC (99) P2
Safety Performance: Operational Experience Feedback and the Processes Employed by UK Electricity Generators (Nuclear) (British Energy)	NuSAC (99) P4
Fuel Cycle Management: Decommissioning of the Windscale Piles (UKAEA)	NuSAC (99) P5
Resources and Priority (NII)	NuSAC (99) P6
Lessons Learned from the Dounreay Audit (NII)	NuSAC (99) P7
Computer Systems' Millennium Problem: Its Handling by UK's Nuclear Industry and its Regulator (NII)	NuSAC (99) P8
Computer Systems' Millennium Problem: Its Handling by UK's Nuclear Industry and its Regulator (NII)	NuSAC (99) P8(rev)
Sellafield: Safety at B215 High Level Waste Plant (HLWP) (NII)	NuSAC (99) P9
Safety at B215 HLW Plant (HLWP) at Sellafield (NII)	NuSAC (99) P9(rev)
Safety Management: Arrangements at Fuel Production Facilities (BNFL)	NuSAC (99)P10
Government's Current Policy on the Use of Contractors in Safety Critical Areas (NII)	NuSAC (99) P11
Safety Performance: Review of Two Years Experience of Licensing at AWE Sites (Hunting BRAE)	NuSAC (99) P13
Safety Performance: Review of Two Years Experience of Licensing at AWE Sites (NII)	NuSAC (99) P13a
Integration of British Nuclear Fuels PLC and Magnox Electric Plc (part 1) (previously titled – 'BNFL/ME: Issues arising from Merger') (Magnox Electric/BNFL)	NuSAC (99) P14

The AEA-T-BNFL Joint Services Company - A Brief Review and Status Report (part 2) (BNFL)	NuSAC (99) P14/1
Safety Management: Arrangement at Isotope Production facilities (Nycomed Amersham)	NuSAC (99) P15
REPPIR - Progress Report on Draft Regulations and Consultation (HSE)	NuSAC (99) P16
Organisational Changes within British Energy (BEG(UK)L)	NuSAC (99) P17

Notes:

i) 'Closed' papers and papers subsequently withdrawn have been excluded from this list

ii) All papers written on or after 1 May 1998 for NuSAC must be vetted, at the time of writing, against the provisions of Section 28 of the Health and Safety at Work etc Act 1974 (HSWA74), exceptions in the Environmental Information Regulations 1992 or exemptions in the Code of Practice on Access Governmental Information

iii) Copies of the papers can be obtained from the NuSAC Secretariat

PAPERS TO THE NUCLEAR SAFETY ADVISORY COMMITTEE: 2000	
PAPER TITLE	**PAPER NUMBER**
Licensing: Sizewell B - NII Activities (NII)	NuSAC (2000) P1
Safety Management: Decommissioning/Dismantling of WAGR (UKAEA)	NuSAC (2000) P2
Review of Sizewell B Loss of Coolant Incidents of March 1999 and Lessons Learned (NII)	NuSAC (2000) P4
Nuclear Safety in the Former Soviet Union and Central and Eastern European Countries (HSE)	NuSAC (2000) P5
Comparison of Safety Performance of Licensees (NuSAC's RG2)	NuSAC (2000) P6
Safety Management: Decommissioning Activities at a Nuclear Power Station Site - 'Safestore' Strategy for Power Stations (BNFL Magnox)	NuSAC (2000) P7
NII regulatory guidance documents 'Decommissioning on Nuclear Licensed Sites' and 'Management of Nuclear Matter, Including Radioactive Materials and Waste, on Nuclear Licensed Sites' (NII)	NuSAC (2000) P8
Training for Nuclear Safety Competencies into 21st Century (NII)	NuSAC (2000) P9
Emergency Exercise Reviews (NuSAC's RG4)	NuSAC (2000) P10
NII Audit of Dounreay - Follow-up (UKAEA)	NuSAC (2000) P11
Re-licensing of BNFL/ME Sites (Provision of Technical Support) (BNFL)	NuSAC (2000) P12
The Relevance for World Association of Nuclear Operators (WANO) and Institute of Nuclear Power Operators (INPO) to Nuclear Safety in the UK (BEGL)	NuSAC (2000) P13
Use of Contractors by BNFL (BNFL)	NuSAC (2000) P15
Trawsfynydd Reactor Pressure Vessel Sampling Programme (BNFL Magnox)	NuSAC (2000) P16
Closure of Hinkley Point A NPP (BNFL Magnox)	NuSAC (2000) P17
NII's Resources (NII)	NuSAC (2000) P19

Notes:

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iii) Copies of the papers can be obtained from the NuSAC Secretariat

PAPERS TO THE NUCLEAR SAFETY ADVISORY COMMITTEE: 2001	
PAPER TITLE	**PAPER NUMBER**
Chief Inspector's Report (NII)	NuSAC (2001) P1
Restoration of the Wylfa Reactors to Service Following the Discovery of Defects in Superheater Penetration Welds (BNFL Magnox)	NuSAC (2001) P2
Cracked Steam Headers at Dungeness B (BE)	NuSAC (2001) P3
Radiation (Emergency Preparedness and Public Information) Regulations (REPPIR): Draft Regulations Implementing the Emergency Preparedness Aspects of the Euratom Basic Safety Standards Directive (HSE)	NuSAC (2001) P4
Comparison of Safety Performance of Licensees: Annual Update (NuSAC's RG2)	NuSAC (2001) P6
Chief Inspector's Report (NII)	NuSAC (2001) P7
NII's Team Inspection of BNFL Sellafield: Update (NII)	NuSAC (2001) P8
Progress Report Following NII's Team Inspection (BNFL)	NuSAC (2001) P9
Progress Update on Windscale Piles Decommissioning Project (UKAEA)	NuSAC (2001) P10
Safety Management: Decommissioning/Dismantling of WAGR - Management Issues Including the Control of Contractors (UKAEA)	NuSAC (2001) P11
Sizewell B - Primary Protection System (BE)	NuSAC (2001) P12
Training Standards and Accreditation Board (BE)	NuSAC (2001) P13
Chief Inspector's Report (NII)	NuSAC (2001) P14
An overview of the Health, Safety and Environmental Management at AWE Under the New Contract Arrangements (April 2000 to September 2001) (AWE)	NuSAC (2001) P15
Department of Trade and Industry's Statement on the Nuclear Safety Implications of the New Electricity Trading Arrangements (NETA) (DTI)	NuSAC (2001) P16

Commentary on the Radiation Emergency Preparedness and Public Information Regulations 2001 – REPPIR (NuSAC's RG4)	NuSAC (2001) P17
BE Response to NII Audit (BE)	NuSAC (2001) P18
Basis for the Decision to Cease Generation at Hinkley Point A and Arguments that Support Continued Operation of the Remaining Magnox Steel Reactor Pressure Vessel Stations (BNFL Magnox)	NuSAC (2001) P19

Note:

i) 'Closed' papers and papers subsequently withdrawn have been excluded from this list

ii) All papers written on or after 1 May 1998 for NuSAC must be vetted, at the time of writing, against the provisions of Section 28 of HSWA, exceptions in the Environmental Information Regulations 1992 or exemptions in the Code of Practice on Access Governmental Information

iii) Copies of the papers can be obtained from the NuSAC Secretariat

ANNEX C

THE HEALTH AND SAFETY COMMISSION

THE TERMS OF REFERENCE AND METHODS OF WORKING FOR THE NUCLEAR SAFETY ADVISORY COMMITTEE

WORKING DRAFT (10 APRIL 2001)

Contents

1. Introduction

1. The Nuclear Safety Advisory Committee (NuSAC) is a body established to provide the Health and Safety Commission (HSC) and when appropriate Secretaries of State with an additional and major source of expertise and advice on nuclear safety matters and issues (see paragraph 8). The purpose of this document is to provide NuSAC members, prospective members and other interested parties with information on how NuSAC functions. HSC has also issued 'A Code of Practice for Members of the Commission's Advisory Committees' (reference 1) which should be read in conjunction with this document. If there is a difference between this document and reference 1, the wording of reference 1 takes precedence.

2. The first Nuclear Safety Advisory Committee (NSAC) was established in 1960 as an independent high powered committee to act in an advisory capacity to the then Minister of Power. Its first Chairman was Sir Alexander Fleck. The 'Nuclear Engineering' magazine of August 1960 stated that "The committee of 23 members makes an impressive list of notabilities and includes representatives with widely different backgrounds. The weight of expert opinion should be vast and one trusts not unmanageable." Sir John Cockcroft, Mr H N Pemberton and Maj-Gen SW Joslin, the first Chief Inspector of Nuclear Installations, were included in the membership.

3. NSAC continued its work as originally constituted from 1960 until 1977, when it was taken under the aegis of the Health and Safety Commission (HSC) and its name was changed to the Advisory Committee on the Safety of Nuclear Installations (ACSNI). This name continued until 1997 when the members made some changes to the methods of working (see paragraph 26) and the name became the Nuclear Safety Advisory Committee (NuSAC), as at present. Thus since 1977 NuSAC and its predecessor have provided HSC and relevant government ministers with a source of expert advice on nuclear safety on nuclear licensed sites, independent of the nuclear site licensees and of the Health and Safety Executive (HSE). The nuclear safety issues on which the Committee provides advice range from broad policy development to specific matters of nuclear safety concern.

4. The membership of NuSAC, to a degree, reflects that of HSC in that it has members nominated by both the Confederation of British Industry (CBI) and the Trade Union Congress (TUC), but NuSAC has a majority of independent members and an independent Chair. Members generally bring to the Committee expertise relevant to nuclear safety.

5. The independence of NuSAC can help in the public perception to underwrite the decisions of HSC and of government ministers on issues upon which NuSAC's advice has been accepted. This is especially valued by both the HSC and government ministers when those issues have high public profile and/or political sensitivity.

2. Constitution

6. As stated above, HSC first appointed an advisory committee on nuclear safety (the NSAC) pursuant to powers found in section 13(1)(d) of the Health and Safety at Work etc. Act 1974 (the 1974 Act) in 1977. Like all HSC advisory committees, the need for NuSAC is reviewed every three years. The last reconstitution exercise took place in 1999 and it will be repeated again after the three year term in 2002. Responsibility for initiating and coordinating arrangements for reconstitution rests with the Secretariat. Halfway through the third (and final) year of the Committee's term of appointment, the Secretariat will prepare a raison d'être paper for submission to HSC setting out:

(i) an assessment of the continued need for NuSAC and, if necessary, a justification for its continued existence;

(ii) a proposed programme of work (paragraphs 45 and 46); and

(iii) the size and proposed balance of representation on the Committee.

7. The paper gives HSC the opportunity to consider all aspects of the Committee's raison d'être and composition, and to satisfy itself that there is a useful job for the Committee to do. If the raison d'être paper is accepted by HSC, the Secretariat provides HSC with the reconstitution paper. This paper is also used as the mechanism by which HSC normally appoints the NuSAC members. The term of appointment, if appointed at the start of the cycle, is normally three years and ceases at the end of the three year cycle of the Committee. The process of appointment for a further term is detailed in paragraphs 11 and 12.

3. Terms of Reference

8. NuSAC's Terms of Reference were last updated in 1994 and are:

(i) to advise HSC and, when appropriate, Secretaries of State, on matters affecting nuclear safety of nuclear installations including design, siting, operation, maintenance and decommissioning which are referred to it or which it considers require attention;

(ii) to advise the HSC on the adequacy and balance of its nuclear safety research programme.

9. NuSAC is an advisory body appointed by the HSC pursuant to powers found in section 13(1)(d) of the Health and Safety at Work etc. Act 1974. For the purposes of section 28 of the 1974 Act (restrictions on the disclosure of information), any reference to HSC in section 27(1) or section 28(3) is taken to include a reference to an adviser appointed under section 13(1)(d) of the 1974 Act (see sections 27(3)(c) and 28(4)(c) respectively). As a consequence, section 27(1) reads as "For the purpose of obtaining any information which [NuSAC] needs for the discharge of its functions [NuSAC] may, with the consent of the Secretary of State, serve on any person a notice requiring that person to furnish [NuSAC] such information about

such matters as may be specified in the notice, and to do so in such form and manner and within such time as may be specified."

4. Constitution of NuSAC

4.1 Membership

10. NuSAC has a complement of 20 members; of these, four members are nominated by the TUC, four are nominated by the CBI and the remaining 12 members are independent of any nominating bodies or organisations. In addition, there is an independent Chair for the Committee.

11. As their term of appointment approaches its end, the Secretariat will ask independent members to indicate whether they wish to be considered for re-appointment. Those members who want to be considered for re-appointment will be proposed to HSC as described in paragraph 6, providing their expertise is appropriate for the Committee's future work programme. There is no limit to the number of terms of office an independent member may serve on the committee, provided HSC accepts their re-appointment. Independent members may resign at any time.

12. Also, as part of the reconstitution process, the Secretariat will ask the TUC and CBI for nominations for their representatives on NuSAC. Again there is no limit to the number of terms of office the TUC and CBI members may serve on the committee provided HSC is prepared to re-appoint them. Nominated members may resign at any time.

4.2 Secretariat

13. NuSAC is supported by a Secretariat drawn from the Safety Policy Directorate of the HSE. The support services provided by the Secretariat are listed in paragraph 53.

4.3 Selection of Members

14. When a vacancy occurs for a CBI or TUC nominee, the relevant organisation is requested by the NuSAC Secretariat to make a nomination. The request will be for a nominee with extensive experience relevant to the nuclear industry. Once nominated, the nominee is invited to attend meetings of the Committee whilst awaiting formal appointment by HSC.

15. TUC and CBI nominees may discuss non-confidential NuSAC matters with their respective nominating organisations, but in their work on the Committee their role, like that of the independent members, is to represent the public interest. In terms of the normal operation of the Committee, there is no distinction made between the independent and the nominated members.

16. When a vacancy occurs for an independent member the Chair and members will assist HSC in the selection of a new member. The Chair and members, with the assistance of the Secretariat, will draw up an appropriate description of the new member's role on NuSAC. The necessary consultation will normally take place at a

members-only meeting (paragraph 35). The description may specify a requirement for experience relevant to nuclear safety and may specify a particular area of expertise to fill any gap in the range of expertise currently represented on the Committee. The vacancy will normally be advertised by various methods including the relevant professional press and by other appropriate methods.

17. Applications will be considered by a panel of members, supported by the Secretariat. The membership of the panel will also be decided at the members-only meeting at which the description is drawn up. The panel may interview applicants before making a decision. The panel will select the most suitable applicant irrespective of gender and ethnic origin and will not exclude any applicant on account of any disability. Given its public interest role, the Committee will seek to have a member who is drawn from an appropriate public interest group, for example, a member of a local authority with a nuclear licensed site within its boundaries or a member of the local liaison committee at a nuclear licensed site.

18. The candidate selected by the panel will be nominated by the Secretariat for appointment by HSC.

19. The secretariat will provide newly appointed members with an "Introduction Pack" that includes: this document; general information provided to new members of all of the HSC's Advisory Committees; specific information relevant to NuSAC, which includes the relationships between NuSAC and government ministers, the HSC, the HSE, the Nuclear Installations Inspectorate (NII), the Environment Agencies and other relevant government advisory committees, in particular the Radioactive Waste Management Advisory Committee (RWMAC).

4.4 Appointment of Chair

20. The Chair is appointed by HSC after consultation with appropriate government ministers. The appointment is normally made from outside the Committee but may be made from within the Committee if HSC considers this appropriate. In drawing up a short list of candidates for consideration by HSC, the Secretariat invites nominations from learned societies (such as the Royal Society and the Royal Academy of Engineering), also from professional bodies such as the engineering institutions and from other government departments.

21. The Chair's main role, having taken the lead in determining the Committee's programme of work, is to chair the formal meetings of the Committee, in which they are supported by the Secretariat. The Chair attends meetings of HSC, as required, to present the Committee's programmes of work, biennial reports and for any other purposes that may arise. The Chair occasionally represents the Committee at conferences and other external events and may liaise with other bodies and individuals about matters within the remit of the Committee. The Secretariat provides support to the Chair for these purposes.

4.5 Conditions of Service

22. Neither the members nor the Chair are paid a fee but are entitled to claim reimbursement of travelling costs, subsistence (at senior civil service rates) and incidental expenses. Members are also entitled to a loss of earnings allowance

where appropriate. The entitlement applies to attendance at meetings of the full Committee and of the various subgroups, briefing meetings, site visits, presentations to HSC etc. HSC has the power to pay remuneration to members of the advisory committee is found in section 13(1)(d) and (e) of the 1974 Act should it wish to do so.

23. Members, including the Chair, are required to declare direct and indirect pecuniary interests that may be perceived by a reasonable member of the public to influence judgment when acting as a member of the Committee. The Secretariat maintains a register of members' interests. Members are required to notify the Secretariat as soon as is practicable of any changes to their declaration. The register is made available to members of the public on request and is published in the Committee's triennial report (paragraph 51).

24. For some of the Committee's work, members will require appropriate security clearance before participating in certain Ministry of Defence related activities.

25. Further information on the conditions of service is in the Code of Practice for Members of the Commission's Advisory Committees (reference 1).

5. Working Structure of NuSAC

5.1 Review Groups

26. In order to achieve item (i) of its Terms of Reference (paragraph 8) more effectively, the Committee has established five Review Groups (RGs), each of which focuses on a specific aspect of nuclear safety or, in the case of one of the RGs, a particular group of nuclear site licensees. Each of the RGs consists of between four and six members, chosen by the full Committee to reflect members' particular interests and experience whilst reflecting the composition of the Committee, i.e. each RG includes CBI and TUC nominees and independent members. RGs may co-opt persons from outside the Committee, if necessary, to fill any gaps in the range of expertise essential to the working of the RG. Each of the RGs is lead by a convenor, nominated by the Chair in consultation with the Secretariat. The Secretariat will circulate details of each group's membership, but in any case members may contribute to any group's work if they so wish (unless security clearance is required as indicated in paragraph 24). The group will remain in existence for as long as NuSAC considers it of value; but all groups will be reviewed annually as part of the process of preparing a forward programme of work.

27. The RGs are currently:

RG1 - Safety Management
RG2 - Safety Performance
RG3 - Fuel Cycle Management and Decommissioning
RG4 - Emergency Planning
RG5 - MoD-related Topics

5.2 Subcommittee on Nuclear Safety Research

28. To achieve item (ii) of its Terms of Reference (paragraph 8) efficiently, the Committee has established a standing Subcommittee on Research (SCR). Membership of the SCR is drawn from the membership of the main Committee and includes one or more of both the TUC and the CBI groups of nominees. The SCR may co-opt persons from outside the main Committee, if necessary, to fill any gaps in the range of expertise essential to the working of the Subcommittee. The SCR is supported by a Secretariat drawn from the Nuclear Safety Directorate (NSD) of the HSE but from outside the NII (the NII is the larger part of the NSD). The Chair of the SCR is nominated by the Chair of the main Committee, in consultation with members and with the SCR Secretariat.

29. The role of the SCR is to advise the HSC, through the main Committee, on the adequacy and balance of the HSC "Coordinated programme of nuclear safety research" and whether the programme meets the guidelines set out by the Department of Trade and Industry (DTI) (see Appendix 1). (Note that the DTI is the Department accountable to Parliament for the safety of nuclear installations. Responsibility for the adequacy and balance of the nuclear safety research programme has been delegated to the HSC by the DTI.)

5.3 Study Groups

30. From time to time NuSAC identifies an issue, relevant to the safety of nuclear installations, that demands a study in greater depth than is practicable within the Committee's normal working procedures. On such occasions, the Committee sets up a Study Group (SG), with appropriate terms of reference, to address the issue. The SG is normally made up of NuSAC members with, if necessary, persons co-opted from outside the Committee. The SG is normally chaired by a NuSAC member. SG reports represent major contributions to knowledge and are published by HSE Books as either priced or unpriced publications depending on HSC/E policy current at the time. The most recent example, published in 1998, is "The use of computers in safety-critical applications", being the final report of the NuSAC SG on the safety of operational computer systems. SGs are disbanded when they have completed their set task and reported.

6. Methods of Working

6.1 Main Committee

31. NuSAC has a three year rolling programme of work, set in the manner described in paragraphs 47 to 49, and approved by HSC. The Committee meets three times per year, the meetings being coordinated by the Secretariat. The meetings are normally spread over two days and start with a "members-only" meeting, supported by the Secretariat and with any other persons present whom members may wish to invite. The "members-only" meetings provide members with the opportunity to discuss matters of policy in private.

32. After the "members-only" meeting, members and the Secretariat are joined for a "full" meeting by the Chief Inspector of Nuclear Installations, who has a standing invitation to attend, and by observers from relevant government departments and

agencies and from the major nuclear site licensees, all of whom take part, as appropriate, in discussions. During the "full" meeting, members may discuss papers they have requested and may receive presentations on topics relevant to NuSAC's Terms of Reference. Presenters of papers may, as they wish, attend at the appointed times to present and discuss their papers, or they may remain throughout the "full" meeting as (normally silent) observers.

33. Two meetings each year are normally held at the headquarters of the HSC in London. The third meeting is normally held at one of the nuclear licensed sites and is combined with a site visit. The site visit is for members supported by the Secretariat with any other persons present whom members may wish to invite.

6.2 Conduct of Meetings

34. A third of the membership shall be present when a decision of the Committee is required. Further, the membership must include not less than one TUC member, one CBI member, three independent members and the Chair or acting Chair.

35. At the members-only meetings, members receive reports from the RGs, discuss and agree strategy for the full meetings, consider matters relevant to filling vacant posts and discuss any other appropriate issues. Members have a collective responsibility for the conduct of NuSAC's business. Members should engage fully in the collective consideration of issues, taking account of the full range of relevant factors, including any guidance issued by HSC.

36. At the full meetings, members receive and discuss presentations of papers requested by the Committee. Papers are requested of the licensees, the NII, other HSE divisions and branches and occasionally of other government departments and agencies. The agenda always includes a report from the Chief Inspector of Nuclear Installations. The papers, which have usually been developed in association with one of the RGs (paragraph 26), are distributed usually two weeks prior to the meeting and are taken as read: presentations need only highlight the main points at issue. These discussions, the resulting actions placed on the presenters and their responses to the actions are one of the mechanisms by which NuSAC exerts influence on nuclear safety. It is only on rare occasions that this mechanism is ineffective and the Committee is obliged to advise that HSC or the appropriate government minister should intervene.

37. The members-only meetings and the full meetings are conducted in a formal manner, with previously-distributed agenda and papers, and are minuted. A very short summary paper is prepared for HSC and any appropriate government minister. Meetings of the whole committee will agree how and when a piece of work has been completed.

6.3 Site Visits

38. The purpose of the site visit is provide members with first hand knowledge of nuclear safety issues at the site. The visit therefore includes meetings with and/or presentations from the NII's site inspector, site management, safety representatives and if possible representatives of local authorities or nominated members of the

public interest groups who are members of the Local Consultation Liaison Committee.

39. Prior to the visit, in order to ensure that time at the site is spent effectively, the Chair or RG Convenors may ask a representative group of members to travel to the site to discuss and agree the programme for the visit with representatives of the licensee. The discussions are informed by the NII site inspector's recent reports on the site and any briefing material the NII may wish to provide. The preliminary visits will be coordinated by the Secretariat.

40. The programme for the visit includes a closed session at which members, supported by the Secretariat, discuss and summarise their impressions, prior to a final review meeting with the licensees. At the final review meeting, any follow-up actions are identified.

41. The details and conclusions of the site visits will be recorded by the Secretariat or members attending at the site visit, as appropriate, and reported in the triennial report (paragraph 51).

6.4 Review Groups

42. The RGs work in a less formal and more flexible manner. Their role is to monitor developments in their designated areas, to identify issues that should be brought to the attention of NuSAC and progress relevant topics from the plan of work. They meet with representatives of the organisations in which the issues arise, invite papers, liaise on the content and format of the paper and generally ensure that the content and format are appropriate to the Committee's needs. The RGs order the priorities of papers within their designated areas and advise the Secretariat of the dates of meetings to which the papers should most appropriately be assigned. Meetings of the RGs are held at the discretion of the convenor. Meetings of RGs are not minuted, but convenors report, either by means of a short written note or orally, to the full Committee at the members-only meetings. These reports will include any issues the RGs wish to refer to the full Committee for collective consideration. Hence, it is a RG's function to:

- Review developments in the RG's area of interest and alert NuSAC to topics which it should investigate further or that need to be considered by the whole Committee.
- Steer the preparation of papers within its area of interest, meeting the lead authors where appropriate, ensuring the paper is correctly focused and sufficiently detailed for NuSAC's purposes. The group should review the paper critically and ensure that the salient issues are highlighted.
- Contribute to the discussion at NuSAC meetings.
- Ensure any follow-up action is taken, e.g. the preparation of a supplementary paper, follow-up report, offer of further information.
- Contribute an item on its area for publication, where appropriate, either as a stand alone document or as part of NuSAC's reports.
- Identify specific topics which need to be included in NuSAC's future programme of work.

- Advise the whole Committee on the appropriate line to take on topics in the RG's area.
- Seek agreement from the whole Committee that a piece of its work has been completed.
- Where appropriate work with other RGs where the topic under consideration warrants such an approach.

Output from the RGs will be reflected in the triennial reports, see paragraph 51.

6.5 Subcommittee on Research

43. The SCR meets twice per year with the Industry Management Committee (IMC), which represents the major nuclear site licensees, and representatives of the NSD's Nuclear Safety Research Unit. These meetings are held at the headquarters of the HSC in London, normally in July and December to coincide with key dates in the research procurement cycle. The meetings are conducted in a formal manner, reflecting the manner in which the meetings of the full Committee are conducted.

44. The SCR meets additionally once per year at one of the relevant research establishments, at the invitation of the IMC, to obtain first hand knowledge of the research conducted on the site. The programme for these visits consists of a tour of the establishment plus presentations on work of particular relevance.

45. The Chair of the SCR attends the annual meeting, usually held in February of each year, of the Nuclear Safety Research Steering Committee, which is chaired by the Deputy Director General of the HSE, to offer the SCR's advice on the adequacy of the research programme. The Chair of the SCR also attends a meeting of the HSC, usually once per year, to present an annual report on the work of the SCR in meeting the requirements of item (ii) of the Terms of Reference.

6.6 Study Groups

46. The manner in which SGs work is left to the discretion of the SG Chair. SGs make interim reports to the full Committee at appropriate times during the conduct of their work and produce a final report which, after endorsement by HSC, is published by HSE Books.

7. Programme of Work

7.1 Development of Programme of Work

47. NuSAC's programme of work is developed, in the autumn of each year, by consultation between the Chair, RG convenors and the Secretariat. They may meet, if necessary, to discuss priorities. The programme includes issues on which requests for advice have been received from government ministers or the HSC, issues identified by the RGs or by the full Committee (at site visits, for example) and issues on which advice has been sought by NSD or other Divisions of HSE. The NII is asked to identify any anticipated issues or milestones. Requests from government ministers and HSC are given highest priority. Recent examples of work by the Committee in response to requests for advice include:

(i) advice to the DTI on options for dealing with the Dounreay Fast Reactor fuel;

(ii) advice to HSC on a response to a Consultative Document (CD) on proposals for compliance with the OSPAR (Oslo Paris) agreement on reductions of radioactive discharges to the marine environment; and

(iii) advice to HSE on the drafting of the Radiation (Emergency Preparedness and Public Information) Regulations (REPPIR).

These demonstrate another mechanism by which NuSAC influences nuclear safety.

48. A three year rolling programme is developed, with the first year in detail but subject to revision to accommodate any high priority issues that may subsequently arise. The second and third years are inevitably less detailed because of uncertainties. The programme is distributed to members in draft for comment and, when agreed by members, is presented by the Chair to HSC and, if appropriate, to government ministers, for approval.

49. The rolling programme of work, as agreed for NuSAC, will normally be progressed by the respective RGs who will provide feedback to the main committee for acceptance of its findings and views on the work undertaken. The formal feedback to relevant parties, on issues arising from the work, will be given through NuSAC. This will be achieved in a manner that NuSAC considers appropriate taking into account any sensitivities that may be relevant to the issues arising (for example, confidentiality).

7.2 Format and Presentation of Papers

50. A set of guidelines for authors is being developed. This will cover general requirements of papers to NuSAC and the manner of their presentation. The purpose is to assist authors and to avoid repetitive work by the RGs who may then, in their negotiations with authors, concentrate on technical content.

7.3 Production and Presentation of Triennial Report

51. Towards the end of the three year term, NuSAC will prepare a Triennial report on its work over the previous three year period and its anticipated programme over the next three year term. The content of the report will be mainly provided by the RG convenors and the SCR Chair, with the Secretariat providing an editorial function to ensure uniformity of style etc. It will also include information on the register of members interests (paragraph 23) and site visits (paragraph 41). Members will comment and agree the report before it is presented to HSC, published by HSE Books, and launched at a press conference by the Chair of NuSAC, supported by other members and the Secretariat. The press conference is publicised in an appropriate manner by the Secretariat.

52. An interim report of the Committee's work will be prepared by the Secretariat approximately half way through the term. Once this interim report has been agreed by the Committee and HSC, it will be published on HSC's Internet site.

8. Work of the Secretariat

53. The Secretariat supports the full Committee by:

(i) taking notes at meetings and drafting minutes;

(ii) progressing actions from the meetings;

(iii) drafting papers for formal interaction with government ministers and the HSC;

(iv) making as much of NuSAC's work available to the public as it can (paragraph 55);

(v) initiating and coordinating arrangements for reconstitution of NuSAC as required by HSC (paragraphs 6 and 7); and

(vi) interfacing with HSC Secretariat as required.

In addition, the Secretariat supports the full Committee and the RGs by:

(vii) making travel arrangements

(viii) booking hotels

(ix) processing expenses claims

(x) arranging meeting rooms at the HSC headquarters in Rose Court

(xi) preparing and distributing documents**.**

54. For the above arrangements to be effective, it is important for the Secretariat to be given as much notice of meetings as possible. Even on occasions when Secretariat assistance is not required, prior warning of meetings is helpful for financial planning purposes.

9. HSC Policy - Openness

55. In line with HSC policy, NuSAC makes as much of its work available to the public as it can. The agenda and minutes of each meeting are placed on the Internet. Papers are made available on request and authors are asked to minimise the proportion of their papers that are excluded from publication under the exemption criteria. The Secretariat advises members and authors on openness issues as they arise. Further information on the conditions of service is in the Code of Practice for Members of the Commission's Advisory Committees (reference 1).

10. Conclusion

56. This paper has set out the terms of reference and methods of working that are adopted by NuSAC to ensure the Committee acts at all times in an effective and efficient manner when undertaking its work on behalf of ministers and HSC. The Committee will also work within any directions or guidance HSC issues for its Advisory Committees in general or specifically for NuSAC.

11. Periodicity of Revision of this Document

57. The document will be subject to review and, where necessary, revision at least once during NuSAC's constituted three year period, or more frequently if the Committee believes this to be appropriate.

12. References

1 The Code of Practice for Members of the Commission's Advisory Committees published by HSC.

APPENDIX 1

GUIDELINES [on the Nuclear Research Programme] FROM THE PRESIDENT OF THE BOARD OF TRADE

These guidelines amend and update those issued with effect from 1 April 1990 regarding nuclear safety research responsibilities which are, or will be, managed on HSC's behalf by the Health and Safety Executive (HSE). They take effect from 1 April 1994 except where otherwise indicated.

The guidelines take into account the fact that the safety of nuclear installations is the responsibility of the licensees of such installations, and that research covering their safety is largely undertaken or commissioned by commercial licensees, if necessary at the request of the HSE's Nuclear Installations Inspectorate (NII). They also take account of the public interest in maintaining the availability of the research capability needed for regulatory purposes.

1. Primary Objectives

i) To ensure that adequate and balanced programmes of nuclear safety research continue to be carried out, based on a view of the issues likely to emerge both in the short and long term.

ii) To ensure that, as far as reasonably practicable, the potential contribution which such research can make to securing higher standards of nuclear safety is maximised.

iii) To ensure that the results of any such research having implications for nuclear safety are disseminated as appropriate.

2. Supporting Objectives

i) To take account of the desirability of maintaining a sufficient range of independent capability to ensure the attainment of the primary objectives.

ii) To ensure that proper account is taken of the advantages of international collaboration in furthering the primary objectives.

3. Research and related work covered by HSC Coordinated Programme

These arrangements cover research and related work which has as a primary purpose the improvement of nuclear safety, offers a potential return in terms of greater safety standards at reasonable cost, and which is relevant to any activity or process associated with operation or decommissioning of nuclear power systems on a UK licensed site.

The HSC Coordinated Programme may also include work which:

i) would not be undertaken by commercial licensees on their own account;

ii) though of potential interest to commercial licensees is more appropriate for HSC to retain the proprietary rights;

iii) though required by licensees, may for legal or contractual purposes require HSC to retain the proprietary rights (e.g. where government participation is required for collaboration with other countries).

4. Research not covered by HSC Coordinated Programme

i) Research which is undertaken individually or in collaboration by, or on behalf of, commercial licensees primarily for purposes other than safety; or to meet licensing conditions or their own safety design rules;

ii) Research which is commissioned by the NII to enable it to take specific licensing decisions, or by the licensees as a particular condition of their licences.

5. Determination of HSC Coordinated Programmes and Budgets

The HSC should determine the programmes in the light of consultations by HSE with:

i) the nuclear industry bodies concerned;

ii) the Advisory Committee on the Safety of Nuclear Installations (ACSNI);

iii) such other sources as they consider appropriate;
and upon recommendation by the HSE.

6. Basis for Cost Recovery

i) The costs of research, and its management by HSE, should be recovered from licensees of, or licence applicants for, nuclear installations to the safety of which the research appears to the HSC/HSE to relate.

ii) They should be recovered in proportions which

- reasonably reflect the costs of research (and its management by HSE);

and which take account inter alia:

- in the case of existing licensees, of the scale on which each of them undertakes the activities to which the research relates.

- in the case of licence applicants, of the scale on which each of them plans to undertake the activities to which the research relates.

The scaling factors will be specified in a Memorandum of Arrangements between HSE and the licensees.

7. Proprietary Information

In exercising their coordinating role, the HSC/HSE should use their best endeavours to protect any proprietary information which comes to their attention, so far as this is consistent with the requirements of nuclear safety.

8. The Department of Trade and Industry's residual Programme of Safety Research

The Department of Trade and Industry may retain responsibility for funding certain safety research which is more relevant to its own responsibilities than to those of the HSC/HSE. The results of this work will nevertheless be made available to HSC/HSE, and their views may be sought on its content and direction.

Department of Trade and Industry
April 1994

ANNEX D

NuSAC's Advice to the Minister of State for Energy on the Treatment of PFR Fuel at Dounreay (May 2000)

1. The Rt. Hon Helen Liddell, Minister of State for Energy and Competitiveness in Europe in the Department of Trade & Industry (DTI), in a letter dated 30 March 2000, asked the Chairman of the Health & Safety Commission for the advice of the Nuclear Safety Advisory Committee (NuSAC) as part of a consultation DTI had undertaken concerning options for managing certain of the fuels currently in store at the UKAEA's nuclear licensed site at Dounreay. This report is NuSAC's response to the request.

2. In considering this topic the NuSAC has an interest in all aspects of nuclear safety on the Dounreay nuclear licensed site particularly with respect to the workforce and members of the public who might be affected by work carried out on the site. (NuSAC's Terms of Reference are given in the appendix to this document.)

3. Representatives of NuSAC, especially members of its sub-group with responsibility for the fuel cycle and decommissioning, attended a presentation with members of the Radioactive Waste Management Advisory Committee (RWMAC) given by UKAEA in London on 13th April 2000 on the Dounreay PFR fuel management options. NuSAC regarded it as important that any decision taken about the PFR fuels should not foreclose options for the management of other materials at the site. NuSAC was therefore pleased to learn that, in addition to the PFR fuels issue, the UKAEA had considered all the materials on the site when carrying out a Best Possible Environment Option (BPEO) study. In fact, the NuSAC members attending the meeting received copies of the full study report in addition to the documents that had been prepared for members of the public as part of the public consultation exercise. The UKAEA presenters were questioned on aspects of the methodology and on specific practical issues that will have to be addressed in pursuing the proposed strategies. The methodology used in the BPEO study, and the sensitivity analyses used to ensure that any bias was recognised, had been subjected to peer review and was considered by NuSAC to be robust.

4. In NuSAC's view, having considered all the documents, the consultation documents represent a full statement of the technical strengths and weaknesses of each of the options. However, NuSAC was unclear as to how costs had been calculated. For example, the treatment of final disposal costs did not appear to be consistent between the three options. NuSAC was unsure whether medium and long term costs between the options had been ranked in any way and whether a sensitivity analysis had been undertaken of the outcome if the cost assumptions were changed.

5. NuSAC was also satisfied that the BPEO study, being a fully comprehensive study for the materials on the Dounreay site, had dealt with the issue of the effect of a decision on PFR fuels not foreclosing options for other materials at Dounreay.

6. The outcome of the BPEO study shows little to choose between the three strategies, especially when discounting is applied to **the Minimum Treatment Strategy**. The impact on public health, flora, fauna and occupational health and safety was similar for each of the strategies. NuSAC notes in particular that any new plant will be constructed with the aim of meeting the Nuclear Installations Inspectorate's (NII) Basic Safety Objectives (BSO) as described in the NII's Safety Assessment Principles (reference 1). Also, existing plant will be refurbished according to the principles of As Low as Reasonably Practicable (ALARP) and all the plant will be subject to the NII's regulatory acceptance.

7. NuSAC, in making a judgement between the strategies, is firmly of the view that the use of proven technology will reduce the risk with respect to safety. NuSAC is also concerned about the time-scale for applying the strategies. The development of new technologies could lead to unexpected delays that would retard the treatment of the fuels and therefore delay reduction in the hazards. Furthermore, delay in treatment in preparation for disposal may foreclose the possibility of changing course if this were deemed desirable at a later date. This is because, if the development of the new technologies proved unsuccessful, other strategies may not be readily available as the facilities they require may no longer be in service. An example could be that the Thermal Oxide Reprocessing Plant (THORP) at Sellafield had closed down and was no longer an option for treating the PFR fuels.

8. NuSAC recognises that two of the options require the fuel to be reprocessed which some will see as unacceptable. However there is no barrier, in NuSAC's opinion, to reprocessing on safety grounds.

9. NuSAC is also aware of the very considerable regulatory effort which NII and UKAEA would be obliged to devote to the introduction of new technologies at Dounreay. The professional expertise and experience required is already in short supply and reducing this burden would enhance safety at Dounreay and in the UK generally. The **Minimum Treatment Strategy** involves the most significant involvement in new technology because of the high levels of plutonium present in the fuel when compared, for example, with pressurised water reactor fuel. This, NuSAC feels, presents a significant challenge.

10. NuSAC also believes that transport of materials, which have not been immobilised in readiness for disposal, should be avoided if at all possible. The **Hybrid Strategy** requires more transport of such materials than the other strategies. It would also require significant assessment and possible development before PFR fuel could be treated at THORP.

11. NuSAC acknowledges the desire to reduce discharges to the environment to near zero by 2020. All the options available will require some discharges of radioactive material to the environment, however, the quantities will be small. The **Dounreay Strategy** is, in NuSAC's opinion, most likely to be completed earliest. NuSAC believes this issue will be dealt with in greater detail by RWMAC in its response.

12. It is desirable where appropriate for non-foreclosure of waste management options. However, the site at Dounreay is being decommissioned and it is important

that the present generation leaves as small a clean-up legacy as possible for future generations. For this reason, and the importance of reducing the hazards on the site within a reasonable timeframe, NuSAC believes the PFR fuels on the site should be treated sooner rather than later.

13. Treatment of the PFR fuel using the **Dounreay strategy** would require existing technology and relatively straightforward modifications to the relevant facilities at the site. When comparing this advantage with the considerations given above on the other two options proposed, NuSAC's advice is that the **Dounreay Strategy** is the best way forward.

APPENDIX

The terms of reference of NuSAC are:

To advise the Health and Safety Commission and, when appropriate, Secretaries of State, on major issues affecting the safety of nuclear installations including design, siting, operation, maintenance and decommissioning which are referred to it or which it considers require attention;

To advise the Health & Safety Commission on the adequacy and balance of its nuclear safety research programme.

Reference 1: Safety Assessment Principles for Nuclear Plants, HMSO, ISBN 0-11-882043-5

ANNEX E

HEALTH AND SAFETY COMMISSION

UK STRATEGY FOR RADIOACTIVE DISCHARGES 2001 - 2020

HSC RESPONSE TO DETR CONSULTATION DOCUMENT

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Cleared by Clive Norris on 9 August 2000

Issue

1. The Department of Environment Transport and the Regions (DETR) recently published its consultative document (CD) on the UK Strategy for Radioactive Discharges 2001 - 2020, inviting comments by 22 September 2000.

Timing

2. DETR's closing date for comments is 22 September.

Recommendation

3. The Commission sends to DETR the letter which appears at Annex 2, this being the combined responses of NuSAC and HSE.

Background

4. The draft strategy relates to the Oslo and Paris Commission's (OSPAR) agreed strategy for radioactive substances in relation to the 1992 Convention for the Protection of the Marine Environment of the North East Atlantic. The UK is a Contracting Party to the 1992 Convention. The environment agencies regulate disposal and discharges from licensed nuclear sites in England and Wales (Environment Agency) and Scotland (Scottish Environment Protection Agency).

Radioactive material, including waste, kept or stored on nuclear licensed sites is subject to the conditions of the nuclear site licence and is regulated by HSE. Thus, the interests of the environment agencies and HSE are complementary.

5. A copy of the CD was attached as an annex to paper MISC/60/00.

Argument

6. DETR is obliged to implement the agreements reached at the 1998 Ministerial meeting of the OSPAR Commission with regard to radioactive substances. This paper seeks only to ensure that the comments of HSC, as informed by NuSAC and NSD, are conveyed to DETR within its deadline.

7. The environment agencies regulate radioactive discharges under the Radioactive Substances Act 1993, while HSE regulates health and safety aspects under the Health and Safety at Work etc. Act 1974, the Ionising Radiations Regulations 1999 and the licensing provisions of the Nuclear Installations Act.

8. HSE has a particular interest in discharge limits as radioactive material on nuclear licensed sites must be managed until their disposal or radioactive decay (which may be many thousands of years). During their storage on the site they present a potential hazard to workers and the public. In regulating long-term storage of radioactive materials HSE seeks to ensure that they are converted to a form which is passively safe (i.e. which requires little or no intervention to maintain safety, such as vitrification). HSE will not, however, allow treatment which gives rise to radioactive waste in such a form that there is no foreseeable disposal route.

9. There is an inevitable relationship between the various forms of discharge. Reductions in aerial, liquid or gaseous discharges lead to increased accumulation of solid wastes which must be managed on licensed sites until a disposal route becomes available. Such accumulations present a potential hazard to the workforce and the environment in the event of their escape.

10. The CD does acknowledge these potential effects, but there is no evidence that they have been analysed and taken into account in the derivation of the strategy.

11. The CD concentrates on discharges to the marine environment with a presumption that such discharges should be reduced to “close to zero “ (sic). This implies that practically all waste would be diverted to a solid waste management regime. Without an integrated overall strategy for radioactive waste management, which includes liquid discharges, aerial discharges, storage, and solid waste disposal, this could become unbalanced.

12. The scope of DETR’s CD covers only those discharges which are regulated by the respective environment agencies under the Radioactive Substances Act 1993, and concentrates on the nuclear industry as the dominant contributor to UK discharges.

13. Neither does the CD consider radioactive (or indeed other pollutant) discharges arising from complementary power production sources (e.g. oil, coal, gas etc.). The CD does not attempt to set an overall pollutant discharge strategy for the UK, but instead considers the nuclear industry in isolation.

14. An important principle in assessing the impact of discharges on humans and the environment is that radioactive isotopes differ greatly in their effects. This causes presentational difficulties in that discharges which measure large number of Bequerels (see glossary) may have comparatively little effect, but may give rise to public/political concern which is disproportionate to their potential harm. The CD does not attempt to explain how the intended reductions in particular nuclides have been prioritised in terms of their effects on the environment. This is a serious presentational weakness.

15. The strategy outlined in the CD involves substantial reduction in discharges over the next 20 years by means of:

- the gradual phasing out of Magnox stations (which has already been announced);
- use of MagRox fuel in Oldbury and Wylfa, obviating the need for Magnox fuel;
- cessation of the reprocessing of Magnox fuel at Sellafield due to the above;
- development of new technology to remove some nuclides (e.g. Technetium 99) from discharge streams, but causing it to have to be stored on site.

16. Against this, discharges of some nuclides will increase as Advanced Gas Cooled reactors age and also as nuclear reactors and other plants are shut down and decommissioning begins. There also may be situations in which the discharge of one nuclide can be reduced by accepting a small increase in the discharge of another nuclide. The CD proposes that statutory guidance to the EAs should require:

"progressive reduction in radioactive discharges and discharge limits for the site as a whole; any proposed increases should only be considered in exceptional circumstances."

17. When a facility is shut down, discharges usually will be reduced initially. However, as the facility enters decommissioning, discharges of some radionuclides may rise as contamination and activation products, which have accumulated over the life of the facility, are removed and treated to make them suitable for storage and ultimate disposal. Decommissioning of nuclear facilities is an inevitable part of their life-cycle. The CD should acknowledge explicitly that discharges of some nuclides will need to increase during the decommissioning phase.

18. The proposed strategy is driven by the political need to meet the UK's OSPAR commitments: the proposed reductions go beyond what would be expected by normal risk-based analysis, but there is no reference in the CD to a regulatory impact assessment.

Consultation

19. Comments from NuSAC are attached at Annex 1: together with comments from HSE they form the basis of the proposed response to DETR (Annex 2). Because of summer commitments some NuSAC members have not yet been able to comment on the paper: there may therefore need to be additional oral NuSAC comments relayed to the Commission meeting.

Presentation

20. The CD has attracted relatively little media attention so far. However, it is of considerable interest to NGOs and signatories to the OSPAR agreement.

21. All responses to the CD will be placed in the public domain unless the authors request otherwise.

Costs and Benefits

22. Not applicable (comments on Consultation Document).

Financial/Resource Implications for HSE

23. Not applicable (comments on Consultation Document).

Environmental implications

24. Not applicable (comments on Consultation Document).

Other Implications

25. The consultation by DETR has been UK-wide. The Scottish Executive, the National Assembly for Wales and the Department of the Environment Northern Ireland are all involved, with commentators in Scotland and Northern Ireland being encouraged to respond to national contact points.

Action

26. You are invited to approve or amend the draft letter at Annex 2.

ANNEX 1

Observations from the Nuclear Safety Advisory Committee

1. Members of the Nuclear Safety Advisory Committee (NuSAC) have studied the DETR's consultation document on the UK strategy for radioactive discharges. The following comments have been prepared to inform the Commission's response to the consultation exercise. They refer to matters relevant to NuSAC's remit on nuclear safety on nuclear licensed sites.

Executive Summary

2. The executive summary states that the strategy is guided by the precautionary principle. However ALARA and ALARP might be regarded as equivalent to the precautionary principle but applied in a reasoned way. The executive summary also uses in paragraph 4 the phrase 'nuclear and non-nuclear sources of radioactive discharges'. This phrase is ambiguous; does it mean nuclear industry and non-nuclear industry sources of radioactive discharges?

Background

3. In para. 1.2 it is stated, "The ultimate aim is to achieve concentrations in the environment near background levels for naturally occurring radioactive substances …". The document helpfully gives radiation unit definitions, and states that the annual dose from natural background is 2.6mSv. However, there is little mention of the range of natural background radiation in the UK, which should have some relevance when setting what seem to be arbitrary targets for reductions. Also there is no mention of the range of natural background radiation in the sea. Recognition of the latter is surely important to the aim of the policy.

4. The second bullet point in paragraph 1.3 is open to different interpretations. What is meant by the term 'historic levels' used in this paragraph and elsewhere in the document? Are these levels of the 1970s, when discharges were at their peak, or the levels of the 1930s, say? Also what is meant by the term 'close to zero'? More specific wording is desirable if a consistent response is to be achieved. Perhaps guidance on the meaning of the term could be in the statutory guidance to the Environment Agency, referred to in paragraph 8.1.1.

Principles and Aims

5. The fifth bullet point of paragraph 2.1 is unclear. Is the aim to reduce exposure so that no member of the public in the UK will be exposed to a dose of more than 0.02 mSv a year from discharges made from the UK from 2020 onwards? DETR has no control over discharges from other countries.

Scope of the UK Strategy

6. Paragraph 3.4 concludes with the statement that "as a general principle reductions in liquid discharges proposed in this strategy will be achieved in ways that have no adverse implications for doses to workers or the general public …..". From the NuSAC point of view this is to be welcomed. The point is made again in para.

6.4.1 “it will be important to ensure that discharge reductions are not achieved at the expense of increased accident risk, due, for instance, to storage of greater quantities of waste on site, for longer time, in unsatisfactory conditions.” However the document does not in general follow this logic. Paras 6.3.1 and 6.5.1 say that any technical methods for reducing discharges must be practical and not entail disproportionate costs (how are disproportionate costs defined?). Again these principles seem to be lost when one looks at specific reduction proposals. An example can be found in 7.3.9 discussed below. The issue of reductions in liquid discharges being achieved in ways that have no adverse implications for doses to workers or the general public is an important topic and should be dealt with in the statutory guidance referred to in paragraph 8.1.1.

Discharges

7. Paragraph 5.1.6 states: “Operators will be expected to minimise releases of tritium to the environment, but in most cases it is not technically possible to remove tritium from liquid discharges.” This means that operators must achieve the technically impossible or stop their activities.

Health and Safety Considerations

8. Paragraph 6.4.1 is an important paragraph and is welcomed by NuSAC. As noted above, in the comment on paragraph 3.4, a reduction of liquid discharges may result in an increase of either aerial discharges or solid waste arisings, with possible increases in doses to workers and/or local critical groups. Guidance on how to balance the interests of workers and local critical groups against the reduction of liquid discharges should be included in the statutory guidance to the Environment Agency referred to in paragraph 8.1.1.

Cost Effectiveness

9. Paragraph 6.5.1 is another important paragraph and again is welcomed by NuSAC. Expenditure of limited financial resources should always be made to achieve the greatest benefit in the widest sense, balancing the interests of workers, local critical groups and the environment. This is another area on which guidance should be included in the statutory guidance to the Environment Agency.

Spent Fuel Reprocessing

10. In paragraphs 7.3.9 and 7.3.10 specific limits are placed on Technetium 99 (Tc^{99}) discharges without any logical argument for them. Tc^{99} is referred to in paragraph 7.3.1 as one of the radionuclides of primary importance but there is no information about its significance in terms of dosage to the critical group. The concern is that discharge reductions might be achieved by increasing holdings of waste in an unsatisfactory condition. It would be help generally if judgements on limits to discharges were qualified by indicating how harmful to the environment a specific radionuclide is.

Reviewing the UK Strategy

11. Paragraph 8.2.5 is another important paragraph welcomed by NuSAC. It acknowledges that decommissioning and remediation activities will give rise to discharges over and above those from ongoing activities, but states that they will be closely regulated.

NuSAC Conclusions

12. The logic stated in the document is good from the point of view of safety on and near to nuclear sites. However it does not consistently follow this logic or state why any exceptions to that logic might have been made.

13. The statutory guidance to the environment agencies should include:

(i) Guidance on the meaning of 'close to zero';

(ii) Guidance on achieving reductions in liquid discharges without having adverse implications for doses to workers or the general public, and how judgements on this balance of interests should be made;

(iii) Guidance on how cost effectiveness should take into account when balancing the interests of workers, local critical groups and the environment;

(iv) Guidance on the meaning of disproportionate cost.

ANNEX 2

UK STRATEGY FOR RADIOACTIVE DISCHARGES 2001 - 2020

Draft Letter to DETR

The Health and Safety Commission supports the intention to reduce radioactive discharges that may cause health hazards to members of the public but notes that reductions in discharges will necessitate increases in the inventories of radioactive waste on sites licensed under the Nuclear Installations Act 1965 (as amended). Such increases will add to the hazard presented to the workforce and to the public. The Commission would like to see some indication as to how the proposed strategy, which focuses on liquid discharges, will eventually link with a national strategy for solid and aerial radioactive waste disposal such that the 'overall' best strategy can be identified for each waste stream. We are pleased that the CD notes the need to balance the effects of reductions in discharges against health and safety effects, but there is no indication that any analysis of this balance has been performed in developing the strategy presented in the CD. It would also have been helpful to have included information on how these interests are to be balanced against the cost of implementation.

We would have expected a comparison between the health, safety and environmental effects of all means of power production, particularly since activities other than nuclear can involve the discharge of significant quantities of radioactive material.

The CD is silent on the relative risks from the discharge of different nuclides, so it is not clear that the most important ones have been targeted for reduction; we would encourage you to publish this information in the interests of transparency.

In order to deliver the proposed strategy the industry will have to develop new abatement technology on nuclear licensed sites. In regulating these sites HSE will seek to ensure that any new processes are acceptably safe and that they do not give rise to products or waste streams for which there is no foreseeable disposal route.

Finally, we are concerned that the CD proposes that statutory guidance to the environment agencies should require:

"progressive reduction in radioactive discharges and discharge limits for the site as a whole; any proposed increases should only be considered in exceptional circumstances."

As sites move into the decommissioning phase of their lifetimes, discharge of some nuclides inevitably will be reduced, but equally, it is important that there is some flexibility to accommodate temporary increases. Such flexibility will be important for health and safety, and to allow decommissioning to proceed at an appropriate pace. Decommissioning is an integral and inevitable part of an installation's life-cycle.