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**Radioactive Substances Act 1993**

**Decision Document  
on the Review of Authorisations  
for British Nuclear Fuels plc  
to Dispose of Radioactive Wastes  
from the Springfields Nuclear Site**

**Main Document**

**September 2004**



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## Contents

### Page Number

Contents	iii
Executive Summary	iv
Summary of the Agency's Conclusions and Decisions	vi
1. Introduction	1
2. Guide to this Document	4
Part 1 - The BNFL Springfields Review, the Springfields Nuclear Site & Processes	6
Part 2 - Concepts and Principles	10
Part 3 - Legal & Policy Framework and International Commitments	20
Part 4 - The Agency's System of Regulatory Control	35
Part 5 - The Agency's Review and Re-authorisation Process	41
Part 6 - The Agency's Considerations After Consultation	46
- Section 6A Consultation Responses and Agency Comment	46
- Section 6B General Considerations	59
- Section 6C Limits and Conditions in the Authorisation and Radiological Impacts	62
Part 7 - The Agency's Decisions	86
Appendix 1 - Glossary	93
Appendix 2 - List of Consultees	98
Appendix 3 - Organisations and Individuals Responding to the Consultation	102
Appendix 4 - Responsibilities of Government Departments and Public Bodies	104
Appendix 5 - List of Changes Made to the Draft Authorisation	109
Appendix 6 - The New Authorisation for the BNFL Springfields Nuclear Site	112

## **EXECUTIVE SUMMARY**

### **Decision Document on the Review of Authorisations for British Nuclear Fuels plc to Dispose of Radioactive Waste from the Springfields Nuclear Site.**

The Environment Agency (the Agency) has the responsibility for regulating radioactive waste disposals from nuclear sites by means of authorisations issued under the Radioactive Substances Act 1993 (RSA93). The Agency reviews on a regular basis nuclear site authorisations to ensure that:

- radiation impacts to members of the public are as low as reasonably achievable (ALARA) and within national and international limits and constraints;
- UK policy requirements are implemented;
- environmental impacts are prevented or minimised; and
- existing limitations and conditions remain appropriate.

The Agency published a document setting out its proposed Scope and Methodology for a full re-examination of the Springfields authorisations in October 2001. It then published in November 2003 an Explanatory Document and associated draft Certificate of Authorisation in which the Agency proposed a number of changes to the regulation of radioactive waste disposals from Springfields.

The Environment Agency has considered the issues and has consulted on the review and draft Certificate of Authorisation with the public, Government, public bodies and interested stakeholders. This Decision Document now sets out the Agency's decisions and provides the background and basis for them.

The Agency considers that the new authorisation will:

- Reduce the radiological impact, especially on those people near the Springfields site. In particular, the decrease in authorised radioactive discharges to the River Ribble from Springfields will ensure reductions of 48 per cent initially, and 85 per cent from 2008, in the assessed radiological impact to the most exposed public groups from discharges at the new limits;
- Ensure that potential radiation doses from discharges continue to be below national limits and constraints;
- Reduce the annual liquid discharge limit for total beta by 42 per cent initially and by 91 per cent from 2008;
- Reduce the annual liquid discharge limit for total alpha by 86 per cent initially and by 97 per cent from 2008;
- Improve regulation by the introduction of discharge limits to individual plants;
- Provide a more transparent approach to the regulation of the site;
- Strengthen the Best Practicable Means (BPM) conditions by requiring waste minimisation at source, which will maintain downward pressure on waste disposals

## **Environment Agency**

below the limits imposed by the authorisation and will minimise the environmental and radiological impact;

- Encourage BNFL's progress in treating historic legacy wastes and residue materials;
- Promote BNFL's decommissioning programmes for redundant plants;

The Agency considers that the new authorisation will not:

- Place a grossly disproportionate additional burden on BNFL staff resources in meeting the requirements for information in the authorisation;
- Involve grossly disproportionate expenditure for additional sampling or monitoring and managerial control of discharges.

The Agency has decided not to authorise the option discussed in the Explanatory Document, allowing a greater uranium disposal activity concentration to be used for decommissioning wastes to be sent for disposal to Clifton Marsh.

Before implementing its final decisions, the Agency will send this Decision Document to the Secretary of State for Environment, Food and Rural Affairs and the Secretary of State for Health. This will enable them to determine whether they wish to exercise their statutory powers to issue directions to the Agency to modify the decisions. Subject to the implications of any interventions by the Secretaries of State, the Agency will issue a new Certificate of Authorisation to BNFL for the Springfields site.

The Agency believes that the new certificate of authorisation, provided in Appendix 6 in this Decision Document, will provide significant regulatory and potential environmental benefits, and will take the regulation of the Springfields nuclear site by the Environment Agency under the RSA93 forward to 2008 and beyond.

## **SUMMARY OF THE AGENCY'S CONCLUSIONS AND DECISIONS**

### **INTRODUCTION**

The Environment Agency (the Agency) has made its decisions for the review of the BNFL authorisations to dispose of radioactive wastes from the Springfields nuclear site. The Agency's decisions are set out in full in the Decision Document. This summary of the Decision Document is being sent to all stakeholders included in the public consultation.

The Decision Document, which is being made publicly available, provides the background to and basis for, the Agency's decisions for the Springfields nuclear site. It includes the Agency's responses to issues raised during consultation. Details of how the full Decision Document can be obtained from the Agency are included at the end of this summary.

The Agency has regulatory responsibility under the Radioactive Substances Act 1993 (RSA 93) for all disposals and discharges of radioactive waste from nuclear sites in England and Wales. As part of its role of protecting and improving the environment, the Agency is committed to progressive reductions in radioactive discharges and discharge limits where practicable.

The Agency began this review in October 2001 setting out its scope and methodology. This required the provision of certain information from BNFL. Following a full re-examination of this information and the existing authorisations, the Agency published its proposals for a new authorisation and regulation of the site in the form of an Explanatory Document and draft authorisation in November 2003. The Agency sought views on these proposals during a formal consultation, which included statutory consultees and the wider public. Due account has been taken of the responses to this consultation before any final decisions on re-authorisation were made. The Agency is now publishing this Decision Document setting out its decisions for re-authorisation of the Springfields nuclear site.

### **BNFL Springfields Review Submission and Issues Raised by the Agency**

The Agency specified in the Scope and Methodology document the information that BNFL Springfields was to provide for the review of the authorisations. The information included:

- past, current and predicted future waste disposals;
- Best Practicable Environmental Option (BPEO)/ Best Practicable Means (BPM) assessments for the principal radionuclides in major waste disposals streams;
- details of BNFL Springfields environmental management systems;
- data on the radiological and environmental impact of discharges; and
- details of research and development that BNFL Springfields is carrying out to reduce discharges of radioactive wastes.

## **Environment Agency**

The Agency requested that the information from BNFL Springfields covered the period 1990-2008 and beyond so that the review could take a longer-term perspective and take account of the company's planned operations. The information included projected lifetimes of plants, details of future operations and predicted production throughputs. The Agency considers that this information was essential for the review and would help to ensure that any changes that the Agency decided to make to the authorisations would remain appropriate for a number of years.

After examining and considering the information provided, the Agency requested in September 2002, that BNFL Springfields supply further information, partly to expand on information already supplied and partly to cover new and emerging issues. BNFL Springfields supplied this second set of information in late 2002 and early 2003. The Agency has subsequently considered this second batch of information within this review.

All the information provided by BNFL Springfields has been placed in the public domain on relevant public registers. The Agency has also consulted with statutory consultees, the Health and Safety Executive's Nuclear Installation Inspectorate (NII) and the Food Standards Agency (FSA) on these submission documents.

The Agency has reviewed the information supplied by BNFL Springfields and has used it to make its decisions on the future regulation of radioactive discharges and disposals from the Springfields nuclear site. The Agency has consulted with the public and other stakeholders on its proposals, which were described in the Explanatory Document and specified in the associated draft Certificate of Authorisation. The Agency has taken account of the responses received during consultation and has made modifications to the authorisation where appropriate.

### **Public Consultation**

On 8 December 2003, the Agency began a public consultation to assist its decision making process on the BNFL Springfields review. The public consultation was carried out to enable members of the public and interested stakeholders to draw to the Agency's attention any matters they would wish it to consider when reaching its decisions for the review. Prior to public consultation, the Agency had not made any decisions on the outcome of the review.

The Agency consulted members of the public, national and local public bodies, interested groups, the Agency's relevant Advisory Committees and Groups, and the BNFL Springfields Local Liaison Committee. It consulted certain local authorities and other public bodies as statutory consultees under Section 16 of RSA 93. The Agency announced the consultation in the local press.

The consultation process has included consideration of:

- the BNFL Springfields submission documents;
- relevant information provided by HSE/NII and FSA;

## **Environment Agency**

- the Agency's own radiological screening assessment for the Springfields Nuclear site; and
- an Explanatory Document and draft authorisation prepared by the Agency to assist the consultation process.

The Agency has provided the full package of documents to its statutory consultees, while limiting wider consultation to the Explanatory Document, radiological assessments and draft authorisation. However the full documents were placed in the relevant public registers, in local libraries and on the Agency's web site.

The consultation period was held for 15 weeks, ending on 19 March 2004, but the Agency accepted comments for a reasonable period following this date.

The Agency received consultation responses from its statutory consultees and other stakeholders. All responses were carefully considered by the Agency in coming to its decisions on the BNFL Springfields review.

## **THE AGENCY'S CONCLUSIONS AND DECISIONS**

### **Risks from Radiation Exposure**

The Agency has concluded that the potential radiological impact on members of the public, and the environment, associated with the radioactive waste disposals from the Springfields nuclear site continues to be below the relevant dose constraints and national limits.

### **Justification**

In reaching a view on whether an authorisation should be issued to BNFL Springfields the Agency has not considered whether the practice concerned is justified, i.e. whether the benefits outweigh the detriments. The former Department of the Environment, Transport and the Regions (DETR) advised the Agency in February 2001 that, consistent with new regulations, decisions on justification for nuclear sites will be taken by Government. These Regulations, the 'Justification of Practices Involving Ionising Radiations Regulations 2004 No.1769' have been through the parliamentary process and came into force on 2 August 2004. Therefore the consideration of justification or any review of existing practices with regard to justification is a matter for the relevant Secretary of State as the 'Justifying Authority'.

### **The New Authorisation**

The Agency exercises regulatory control through the limits and conditions it includes in authorisations granted under RSA 93 for the disposal of radioactive waste. It can include any limits and conditions it thinks fit, subject to the legal test of reasonableness. The

## Environment Agency

Agency may vary an authorisation at any time, and aims to review each nuclear site authorisation on a regular basis.

The Agency sets limits on discharges such that, even if discharges were made at 100 per cent of the limits, the doses to members of the public would not exceed the relevant annual dose limit and constraints as set out in *The Radioactive Substances (Basic Safety Standards) (England and Wales) Direction 2000*. The Agency sets limits and conditions, which are consistent with European and UK law, international treaty obligations, Government policy objectives, and protection of public health, the food chain and the environment.

In reviewing BNFL Springfields authorisations, the first task for the Agency was to decide whether a new authorisation should be issued to the company. Further tasks included: deciding which disposal routes should be permitted; and deciding what the limits and conditions of the authorisation should be so as to provide proper protection to members of the public and the environment. This led to requests from the Agency for further information from BNFL Springfields.

### New Integrated Authorisations

Currently, there are seven separate authorisations issued to BNFL for the Springfields nuclear site, covering the discharge of liquid and gaseous radioactive wastes and the disposal of low level solid wastes, of which six were included in the review. The seventh authorisation, for the disposal of low level solid waste to Ulnes Walton landfill site, has undergone a separate revocation process, as it has not been used for many years. The draft authorisation on which the Agency consulted was prepared in a new, integrated form, so that all permitted means of radioactive waste disposal for the site would be regulated through a single authorisation. This is consistent with the Agency's holistic approach to the environment. The draft authorisation included new and improved conditions regarding arrangements for management and supervision, and the application of Best Practicable Means (BPM) to minimise waste production and discharges and for the assessment of discharges. The authorisation that the Agency now intends to issue to BNFL Springfields is based on that draft authorisation with appropriate modifications.

The template for the integrated authorisation consists of:

- a certificate page;
- schedule 1 containing conditions applicable to all disposals;
- schedule 2 specifying the types of waste that may be disposed of and by which routes;
- further schedules containing conditions applying to individual disposal routes; and
- the last schedule setting out a programme for improvements and the provision of additional information.

The Agency is satisfied that an integrated authorisation provides a sound basis for the regulation of radioactive waste disposals from the BNFL Springfields nuclear site.

## **Environment Agency**

### *General Limitations and Conditions (Schedule 1)*

The new authorisation requires the operator not only to comply with numerical limits on the levels of activity which may be discharged, but also to use Best Practicable Means (BPM) to minimise the amount of radioactivity discharged. This is consistent with the current authorisations. The new template introduces improved conditions which also require the operator:

- to use BPM to minimise the activity of radioactive waste produced which will require disposal under the authorisation; and
- to use BPM to minimise the activity of waste disposed of by discharge to the environment and to minimise the volume of radioactive waste disposed of by transfer to other premises.

The conditions provide the main basis for ensuring that the exposures of members of the public are as low as reasonably achievable (ALARA). They also encourage a holistic approach to radioactive waste management, intensify downward pressure on discharges, are consistent with the objectives of the OSPAR Convention and help to ensure that the best practicable environmental option (BPEO) is attained. Furthermore, the new conditions provide a more explicit statement of the policy requirement to ensure that radioactive wastes are not unnecessarily created.

A new condition in the template authorisation addresses management competence and supervision. This requires the operator to have a management system, an organisational structure and the resources in place sufficient to achieve compliance with the authorisation. Specific aspects addressed in the condition include:

- written arrangements for achieving compliance with the limits and conditions of the authorisation;
- written operating and maintenance instructions;
- consultation with suitable Radiation Protection Advisers;
- supervision of waste disposal; and
- internal audit and review of the management system.

The Agency can require the operator to provide all, or part, of the written arrangements prior to the first disposal of waste under the new authorisation. The Agency will consider what information it requires from BNFL Springfields and will carefully scrutinise BNFL's arrangements so as to be satisfied that adequate systems are in place. The importance of maintaining ongoing effective management, particularly at times of change, is recognised and Agency inspections early in the life of the new authorisation will focus on this area.

Schedule 1 of the new authorisation includes further conditions relating to measurement and assessment of discharges, record keeping and provision of information to the Agency. The Agency considers that the general conditions of the new authorisation will

## Environment Agency

provide a better basis for regulation than the corresponding conditions in the existing authorisations held by BNFL Springfields.

### *Schedules for Individual Disposal Routes*

The schedules for individual disposal routes each include limits and conditions applying exclusively to that route. The issues for the Agency are to decide whether a disposal route should be permitted and, if so, what limits and conditions specific to that route should be applied. Disposal limits set by the Agency take into account a number of factors, including radiological impact on humans and the environment, safety, operational need and cost implications, legal requirements, Government policy and international commitments.

The annual limits on discharges of radionuclides to the environment which are included in the new authorisation are **not** set at a level corresponding to the boundary between acceptable and unacceptable radiological impact (i.e. a measure of "safe" and "unsafe"). In particular they do **not** correspond to the annual dose limit (1 millisievert/year), set out in UK legislation, for exposure of members of the public to artificial radiation, excluding medical exposure. Even if discharges from the site were made at 100 per cent of the limits included in the new authorisation, the radiological impact on the most exposed members of the public would be well within the annual dose limit.

The Agency has carefully scrutinised BNFL Springfields' review submission, further information responses and all responses to the consultation. The Agency did this with the objective of setting limits on discharges to the environment at the minimum level which permits normal operation, including the disposal of legacy wastes and decommissioning from the Springfields nuclear site. The Agency's aim is to apply downward pressure on discharges. The expected levels of discharge, and the discharge limits which are appropriate for the Agency to set, are radionuclide, plant and task specific, reflecting the operations of the BNFL Springfields site. Relevant aspects include:

- the nature of discharges at the site;
- the identified operational improvements at the site;
- the need to process and dispose of legacy and decommissioning wastes;
- the suitability of effluent and environmental monitoring;
- the outcomes of BPEO studies; and
- the operational history and future business of the site.

The disposal routes authorised, and comments on the discharge limits included in the authorisation, are detailed in Part 6C of the Decision Document. The Agency has decided to reduce existing limits for liquid and gaseous effluent discharges. New limits have been set for the transfers of operational solid combustible waste to the Shanks incinerator. The format of limits for waste disposals to Clifton Marsh landfill site has been revised for clarity and to be consistent with other schedules. Revised limits have also been set for waste transfers to BNFL for the purposes of final disposal at Drigg.

## **Environment Agency**

The Agency is satisfied that the disposal routes for the Springfields nuclear site, and the discharge and disposal limits it has included in the new authorisation, are consistent with European and UK law, international treaty obligations, Government policy objectives, and protection of public health, the food chain and the environment.

### *Schedule for Improvement and Additional Information Requirements*

The final schedule of each authorisation requires the operator to carry out a programme of investigations and improvements. Examples are:

- reviews of whether the current disposal routes continue to represent BPEO;
- reviews of developments in best practice for minimising all waste disposals, together with a strategy for potentially achieving reductions in discharges;
- reviews of research into the effects of discharges on the environment; and
- a programme and audit of radioactive waste management arrangements.

All requirements have specified timetables. The Agency is satisfied that the introduction of such conditions together with the new, lower limits as described above will deliver potential environmental improvements.

### **Site-Specific Authorisation**

The points below identify for the Springfields nuclear site the Agency's decisions as to whether it should issue an authorisation to BNFL Springfields, the disposal routes included in the authorisation and, where appropriate, comments on the discharge limits. The radiological impact of the site, in the context of dose limits and constraints is also set out.

The Agency has decided that it should issue an authorisation to BNFL Springfields for the Springfields nuclear site.

The disposal routes included in the Agency's authorisation for the Springfields are:

- Discharge of gaseous waste to the atmosphere;
- Discharge of aqueous waste to the River Ribble;
- Disposal of low level solid radioactive waste to SITA 's Clifton Marsh landfill site;
- Disposal of combustible waste by transfer to Shanks Chemical Services Ltd at Hythe and to BNFL Capenhurst for the purposes of disposal by incineration; and
- Disposal of Drigg waste by transfer to BNFL at Sellafield or Drigg, for the purposes of final disposal at BNFL Drigg.

Each of these disposal routes have limits on the maximum amount of radioactivity that can be disposed of, many of which have been reduced from those specified in the previous authorisations. The Agency has also introduced some time varying limits so that

## **Environment Agency**

further reductions in limits will be applied from the start of 2008. The new authorisation will:

- Reduce the radiological impact, especially on those people near the Springfields site. In particular, the decrease in authorised radioactive discharges to the River Ribble from the Springfields nuclear site will ensure reductions of 48 per cent initially, and 85 per cent from 2008, in the assessed radiological impact to the most exposed public groups from discharges at 100 per cent of the new limits;
- Reduce the annual liquid discharge limit for total beta by 42 per cent initially and by 91 per cent from 2008;
- Reduce the annual liquid discharge limit for total alpha by 86 per cent initially and by 97 per cent from 2008;

The assessed doses to the most exposed members of the public from the Springfields nuclear site, assuming discharges at the limits set in the new authorisation, are much less than the relevant dose constraint and the annual public dose limit (see Table 6C.7 of the Decision Document).

### **The Agency's Determination Process**

As stated earlier, the Agency carried out a wide-ranging public consultation to assist its decision-making process during the BNFL Springfields review. The Agency will keep its arrangements for public consultations under review so that future consultations can benefit from accumulated experience. Prior to public consultation, the Agency had not made any decisions regarding the outcome of the review.

A number of responses were received by the Agency as a result of the consultation, commenting on matters associated with the consultation documents and the Agency's review process. The Agency is satisfied that the approach to the BNFL Springfields review consultation has been proportional to the assessed impacts from the site discharges.

The Agency is satisfied that the public consultation process has provided sufficient opportunity for members of the public and interested stakeholders to make full and informed representations. It has carefully assessed all the points raised during the consultation.

### **Matters for Government Raised by Respondents**

There were no responses requesting that a public inquiry be held, or that the Secretary of State should make the decisions on the review. If such requests had been received, the Agency would have provided them for consideration by the Secretary of State.

The Agency has not considered whether the practices on the Springfields site are justified, i.e. whether the benefits outweigh the detriments. Decisions on justification for nuclear sites are to be taken by Government.

## **Environment Agency**

### **Government Policy and Guidance**

The Agency has used Command 2919, a White Paper published in 1995, as a basis for Government Policy, unless subsequent Government statements have modified the policy, and has acknowledged the UK's 1998 commitments under the OSPAR Convention.

The Agency has taken due account of the Government's documents "UK Strategy for Radioactive Discharges, 2001-2020" and the draft "Statutory Guidance to the Environment Agency on the Regulation of Radioactive Discharges into the Environment from Nuclear Licensed Sites".

### **CONCLUDING REMARKS**

The Agency is satisfied that the issuing of the new authorisation to BNFL Springfields will provide significant regulatory and potential environmental benefits and will help to promote the Agency's vision for the environment and a sustainable future. In pursuit of its vision, the Agency is committed to improving the effectiveness of regulation, and in operating openly and consulting widely.

The Agency believes that the new certificate of authorisation has been appropriately generated, and is suitable, robust and proportionate. It will provide significant regulatory and potential environmental benefits, and will take the regulation of the Springfields nuclear site by the Environment Agency under the RSA93 forward to 2008 and beyond.

The Agency's Decision Document is being made available free, in paper form, on request to the Agency. Requests can be made by telephone on 01768 215853 - (Nuclear Regulation Group, Penrith), or by fax on 01768 865606, or by email to [springfieldsreview@environment-agency.gov.uk](mailto:springfieldsreview@environment-agency.gov.uk), or by post to the Environment Agency at the following address:-

BNFL Springfields Review  
Environment Agency,  
Ghyll Mount,  
Gillan Way,  
Penrith 40 Business Park,  
Penrith,  
Cumbria,  
CA11 9BP.

The document is also being made available on relevant public registers and on the Agency's web site at [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk), and is being sent to relevant stakeholders.

## 1 INTRODUCTION

### Purpose & Background

1.1 The purpose of this document is to set out the decisions of the Environment Agency (the Agency) in respect of its review of BNFL Springfields discharge authorisations, under the Radioactive Substances Act 1993 (RSA 93), to dispose of radioactive wastes from the Springfields nuclear site, Salwick, Preston. The Agency has regulatory responsibility under RSA 93 for all disposals and discharges of radioactive waste from nuclear sites in England and Wales. As part of its role of protecting and improving the environment, the Agency is committed to progressive reductions in radioactive discharges and discharge limits where practicable.

1.2 The Agency's review has considered BNFL Springfields submission and has taken account of:

- existing Radioactive Substances Act authorisations held by BNFL Springfields;
- statutory requirements on the Agency and Government policy, guidance (including draft guidance) and commitments;
- past operations and disposals made from the Springfields nuclear site and BNFL Springfields future plans for operations and discharges up to 2008 and beyond;
- BNFL Springfields future plans to improve operations with respect to environmental discharges;
- requirements for the disposal of legacy and decommissioning waste materials from the site; and
- other factors relevant to the site including authorisations, consents and licences issued under other relevant legislation, where applicable.

1.3 The Agency has also taken due cognisance of the consultation process including remarks made at public drop-in surgeries as well as the formal responses (as detailed in Part 6C).

### BNFL Submission

1.4 BNFL made submissions to the Agency for the review in line with the Scope and Methodology document in October 2001. The requested information was collated by BNFL into a series of documents covering the following areas:

- Past Discharges;
- Future Discharges;
- Site Issues;
- BPEO & BPM;
- Radiological & Environmental Assessment;

- Monitoring;
- Compliance & Management Controls;
- Summary of Site Operations, Discharges and Discharge Limits Proposals.

1.5 BNFL Springfields discharges gaseous and aqueous waste and disposes of low level solid radioactive waste. These wastes arise from the various chemical plants that BNFL operate at Springfields for the purification of natural uranium from uranium ore concentrates and its manufacture into Magnox fuel and the fuel intermediate product Uranium Hexafluoride (UF<sub>6</sub> - or "Hex"). Wastes are also generated from the processing of legacy material and the decommissioning of redundant plant.

1.6 The Agency consulted with the Food Standards Agency and the Health and Safety Executive (HSE / NII) as required by RSA 93 on the submission, and sent relevant documents to public registers.

### **Public Consultation**

1.7 On 8th December 2003, the Agency began a public consultation to assist its decision making process for the BNFL Springfields review. The public consultation was carried out to enable members of the public and interested groups to draw to the Agency's attention any matters they would wish it to consider when reaching its decisions for the review. Prior to public consultation, the Agency had not made any decisions on the review, and welcomed comments from the public and other stakeholders on the review submission and Explanatory Documents such that they could be taken into account during the review process.

1.8 The Agency consulted members of the public, national and local public bodies, interested groups, the Agency's relevant Advisory Committees and Groups, and the BNFL Springfields Local Liaison Committee. It consulted certain local authorities and other public bodies as statutory consultees under Section 16 of RSA 93.

1.9 The primary consultation document was an Explanatory Document prepared by the Agency to assist the consultation process. This included:

- proposals for the future regulation of the Springfields nuclear site including new limits and conditions;
- the Agency's radiological assessment of potential impacts due to discharges from the Springfields nuclear site; and
- a draft certificate of authorisation for the Springfields nuclear site.

1.10 Six of the seven authorisations held by BNFL Springfields were included in the review. The joint authorisation for disposals to Clifton Marsh from BNFL Springfields and Capenhurst, has during the period of the review undergone a minor variation in respect of the conditions applying to disposals from the BNFL Capenhurst site. The seventh authorisation is subject to its own revocation process. The draft authorisation on which the Agency consulted was prepared in a new, integrated form, so that all permitted means of radioactive waste disposal for a given site would be regulated through a single authorisation. This is consistent with the Agency's holistic

## Environment Agency

approach to the environment. The draft authorisation included new and improved conditions regarding arrangements for management competence and supervision, and the application of BPM to minimise waste production and discharges and to assess discharges.

1.11 The Agency had already made copies of the submission (February 2002) available to statutory consultees and available on public registers. The Explanatory Document was made available at relevant local libraries and placed on public registers. Paper copies of the documents were provided by the Agency to members of the public and interested groups. Copies of the Agency's Explanatory Document were also made available on the Agency's web site. Requests for copies could be made by telephone, fax, e-mail or letter, and responses to the consultation were accepted by the same routes.

1.12 The consultation ran for 15 weeks until the 19th March 2004 but the Agency accepted comments for a reasonable period after this date. As required under RSA 93, the Agency consulted FSA on the limits and conditions of the authorisation it is proposing to issue. It also consulted HSE / NII.

1.13 This document sets out the background to, and basis for, the Agency's recommendations and decisions. It also includes the Agency's responses to issues raised during consultation.

### The New Authorisation

1.14 In considering its review of BNFL Springfields authorisations, the first task for the Agency was to decide whether an authorisation should be issued to the company. Further tasks included: deciding which disposal route should be permitted; and deciding what the limits and conditions of the authorisation should be so as to provide proper protection for members of the public and the environment. The Agency exercises regulatory control over disposals of radioactive waste through the limits and conditions of the authorisations it issues.

1.15 The authorisation that the Agency now intends to issue to BNFL for the Springfields nuclear site is included with this document. It is based on the draft authorisation that the Agency consulted on, after taking into account consultation responses. The disposal limits set out by the Agency in the new authorisation are consistent with European and UK law, international treaty obligations, Government policy objectives, and protection of public health, the food chain and the environment.

1.16 The annual limits on direct discharges of radionuclides to the environment which are included in the new authorisation have **not** been set at a level corresponding to the boundary between acceptable and unacceptable radiological impact. In particular they do **not** correspond to the annual dose limit (1 millisievert/year), set out in UK legislation, for exposure of members of the public to artificial radiation, excluding medical exposure. Even if discharges were made at 100 per cent of the limits included in the authorisation, the radiological impact of the site on the most exposed members of the public would be well within the annual dose limit.

## **2 GUIDE TO THIS DOCUMENT**

**2.1** The first chapter introduces the scope and methodology of the BNFL Springfields review and the Agency's decision-making process. This second chapter provides a guide to the document. Detailed information on the BNFL Springfields review, the Agency's decision making process, the Agency's response to issues raised during consultation and the Agency's decisions is set out in the individual parts described below. Issues raised during consultation are identified and addressed in the part of this document that the Agency considers is most appropriate to the particular issue. The Agency's new authorisation for the Springfields nuclear site is included as an appendix to this document.

### **Part 1 – The BNFL Springfields Review, the Springfields Nuclear Site and Processes**

**2.2** Part 1 provides a general description of the BNFL Springfields site and processes. It describes the nature of the radioactive waste arisings, the disposal arrangements and BNFL Springfields submissions to the review.

### **Part 2 - Concepts and Principles**

**2.3** Part 2 introduces the concept of risk and describes the principles of radiological protection as set out by the International Commission on Radiological Protection (ICRP). It discusses risks from radiation, claims that such risks have been significantly underestimated, and the results of health studies carried out in the vicinity of nuclear sites. It considers prospective and retrospective radiological dose assessments, and discusses critical group and collective dose methodologies.

### **Part 3 - Legal & Policy Framework & International Commitments**

**2.4** Part 3 describes the Agency's Environmental Vision and sets out the Agency's understanding of current Government policy. It identifies the legislation through which the ICRP principles of justification, optimisation and limitation are implemented in the UK. It interprets the requirements on the Agency in applying these principles. The dose limits and constraints applying in the UK are presented. Part 3 describes the UK's obligations under the OSPAR Convention and the 1998 Ministerial Agreement at Sintra, Portugal, on long term reductions in radioactive discharges to the marine environment (the OSPAR Strategy). It discusses the Agency's principal aim under the Environment Act 1995 (EA 95) of contributing to sustainable development and the guidance given to the Agency by Government in this regard. It summarises other relevant duties of the Agency arising from EA 95. With regard to conservation, Part 3 identifies the EC Habitats Directive and UK Habitats Regulations, relating to the impact of discharges on European sites designated under the regulations. Finally, it refers to obligations on the Agency under the Human Rights Act 1998. A guide to the responsibilities of other Government and public bodies mentioned in this document, including legal powers and duties as appropriate, is provided in Appendix 4.

## **Environment Agency**

### **Part 4 – The Agency’s System of Regulatory Control**

2.5 Part 4 describes the Agency’s regulatory powers and its overall system of regulatory control, including the issue and review of authorisations. The Agency’s approach to regulation and enforcement including inspection and the Agency’s response to incidents is described.

### **Part 5 - The Agency’s Review and Re-authorisation Process**

2.6 Part 5 describes the Agency’s review process for the BNFL Springfields review, including: receipt of the submissions; requests to BNFL Springfields for additional information; consultation with the Health and Safety Executive (HSE / NII), the Food Standards Agency (FSA), the Local Health Authority and other Government and Public Bodies; public consultation; and the Agency’s post consultation process.

### **Part 6 - The Agency’s Considerations After Consultation**

2.7 Part 6 (in three sections A, B and C) details the considerations the Agency has given to the BNFL Springfields review, including issues raised during consultation. In Section 6A details of responses received by the Agency on its proposals as set out in the Explanatory Document are presented, with comments from the Agency. Section 6B details the Agency’s consideration of certain general issues such as OSPAR, Conservation and other powers and duties of the Agency. Section 6C describes the Agency’s approach to and considerations with regard to the conditions of the new authorisation, the setting of limits and notification levels for radioactive waste disposals, and also the improvement conditions. Sub-sections are included, to identify and describe how the limits and conditions set out in the new certificate of authorisation have been derived. These sub-sections also detail the Agency’s prospective assessment of the radiological impact of discharges from the site.

### **Part 7 – The Agency’s Decisions**

2.8 Part 7 summarises the Agency’s main conclusions and decisions following on from its review of the BNFL Springfields authorisations.

### **Appendices**

2.9 Appendix 1 provides a glossary of abbreviations and terms used in this Document. Appendix 2 lists the consultees to whom the Agency sent consultation documents. Appendix 3 identifies the stakeholders who responded to the consultation.

2.10 Appendix 4 provides a summary of the responsibilities of Government and other public bodies relevant to the authorisation process. Appendix 5 provides a summary of the changes to the draft authorisation that has resulted in the new integrated authorisation for the Springfields nuclear site. The authorisation that the Agency is to issue to BNFL for the Springfields site is provided in Appendix 6.

**PART 1 - THE BNFL SPRINGFIELDS REVIEW, THE SPRINGFIELDS NUCLEAR SITE AND PROCESSES**

**BNFL Springfields Supplied Information**

**P1.1** The Agency requested information from BNFL Springfields to help the Agency perform its review. The first set of information requested consisted of documents as detailed in the Agency's Scope and Methodology. The information that BNFL Springfields supplied was prepared, and received by the Agency in March 2002. The requested information was collated by BNFL Springfields into a series of documents covering the following areas:

- Past Discharges;
- Future Discharges;
- Site Issues;
- BPEO & BPM;
- Radiological & Environmental Assessment;
- Monitoring;
- Compliance & Management Controls;
- Summary of Site Operations, Discharges and Discharge Limits Proposals.

**P1.2** The Agency has used the information supplied by BNFL Springfields, together with other information such as monthly discharge data provided under the existing authorisations, to review past discharge profiles and performance, to assess whether BPEO and BPM are being applied, and to develop limits and conditions for a new authorisation for the Springfields nuclear site.

**The Springfields Nuclear Site and Processes - Description**

**P1.3** The Springfields nuclear site is located at Salwick, Lancashire, to the west of Preston. Although the Springfields site supplies its products under the Westinghouse Fuel Manufacture and Reactor Service banner (part of the BNFL business group), the 'Operator' is British Nuclear Fuel plc for the purposes of the RSA 93 authorisations and also for the nuclear site licence issued by the HSE. The Springfields site is the only site in England that manufactures uranium fuel for British nuclear power reactors. It also supplies intermediate fuel products to customers abroad. The site has operated since 1946 under various operators and directly employs about 1500 people although staff numbers are gradually decreasing.

**P1.4** BNFL operates various chemical plants at Springfields for the purification of natural uranium from uranium ore concentrates and its manufacture into Magnox fuel and the fuel intermediate product Uranium Hexafluoride (UF<sub>6</sub> - or "Hex"). Enriched UF<sub>6</sub> is converted into uranium oxide powder for direct sale or the subsequent manufacture at Springfields of fuel for the Advanced Gas-cooled Reactor (AGR) and Pressurised Water Reactor (PWR) nuclear power stations. It is these processes undertaken on the Springfields site which give rise to radioactive waste. The processes can be summarised as:

- Conversion of uranium ore concentrate to uranium tetrafluoride;

## **Environment Agency**

- Manufacturing of uranium hexafluoride;
- Manufacturing of Magnox fuel;
- Manufacturing of AGR, PWR, and any other oxide fuels;
- Processing of waste materials and residues;
- Decommissioning of redundant plant, operational clean-up, legacy issues and land remediation;
- Research and development.

**P1.5** The Agency regulates the discharge of radioactive waste to water and air, and the disposal of radioactive waste by transfer to other sites from the Springfields nuclear site (and other nuclear licensed sites in England and Wales) under the Radioactive Substances Act 1993 (RSA93). It also regulates the wider BNFL Springfields site under Part I of the Environmental Protection Act 1990 (those processes specified in the Prescribed Processes and Substances Regulations 1991) and the Water Resources Act 1991. The Agency is the leading public organisation for protecting and enhancing the environment in England and Wales. It regulates industry and inspects industrial sites to protect the environment and people from pollution and associated environmental risks to health. The Agency works to encourage effective environmental management by industry and all other sectors.

**P1.6** The Health and Safety Executive, through its Nuclear Installations Inspectorate (HSE / NII), regulates nuclear safety, including the safe management, conditioning and storage of radioactive waste on nuclear licensed sites.

**P1.7** Both organisations aim to deliver effective and efficient regulation of the nuclear industry to maintain and improve the protection of workers, the public and the environment by ensuring that radioactive wastes are appropriately managed in both the short and long term, in accordance with legislation, government policy and international obligations.

**P1.8** In October 2001, the Agency published its Scope and Methodology document which described its plans for the re-examination (review) of the authorisations granted to BNFL Springfields under the Radioactive Substances Acts of 1960 and 1993. The aim of the document was to inform the public and other stakeholders of what was to be included in the review of the nuclear site authorisations and how the Agency was to carry out the review.

**P1.9** An Explanatory Document was published in November 2003 that set out and explained the issues which the Agency has assessed for the future regulation of disposals of radioactive waste from the Springfields nuclear site, to air, water and by transfer to other sites. It provided details of the proposals that have been developed from the Agency's assessment. The Agency has sought to take account of radiological and environmental impact, health and safety, operational aspects (including technical feasibility), cost effectiveness and social factors in carrying out the assessment. The Agency has also reviewed all the current radioactive waste disposal limits.

**P1.10** The Agency used the Explanatory Document as the basis for a public consultation that invited all stakeholders and other interested parties to comment on

the proposals, such that they could be taken into account before any decision was made.

**P1.11** The consultation ran for 15 weeks from 8th December 2003 to 19th March 2004, although the Agency accepted responses for a reasonable period after this date. This document sets out the Agency's decisions following a thorough review of BNFL Springfields current authorisations and operations at the Springfields nuclear site. Consultation responses have also been taken into account and where relevant the Agency has provided comments in Section 6C. The Agency will issue the new authorisation at the same time this Decision Document is published, but the new authorisation will not become effective until a specified period (usually about 28 days) after the publication.

### **Radioactive Waste and Disposal Arrangements at the Springfields Nuclear Site**

**P1.12** In the UK, radioactive waste is classified according to its heat-generating capacity and activity concentration and inventory, under four broad categories defined in the White Paper, *Review of Radioactive Waste Management Policy: Final Conclusions* (July 1995), Cm 2919. These categories are high level waste (HLW), intermediate level waste (ILW), low level waste (LLW) and very low level waste (VLLW). High level waste arises only from the reprocessing of spent fuel and generates sufficient heat such that this must be taken into account in designing storage facilities. Intermediate level waste has radioactivity levels which exceed the upper bounds for low level waste but does not generate sufficient heat such that this must be taken into account in storage facility design. Solid low level waste has radioactivity levels within the limit acceptable for disposal at BNFL's facility at Drigg in Cumbria. Very low level waste has such a low level of radioactivity that this waste is suitable for disposal with ordinary refuse. There is no HLW or ILW currently arising at the Springfields nuclear site, although ILW may be generated from future decommissioning activities.

**P1.13** BNFL Springfields provided information to the review in line with the Agency's Scope and Methodology document, and in its responses to questions from the Agency, about radioactive waste arising at the Springfields nuclear site. Only low level radioactive wastes are created in gaseous, liquid and solid forms.

#### **Gaseous Waste**

**P1.14** Numerous production buildings give rise to aerial discharges via stacks and other discharge points. Currently the site has an annual aerial discharge limit but to aid regulation and to help force down discharges, the stacks with the potential for the greatest contribution to the overall site discharge have also been individually limited in the new authorisation.

#### **Aqueous Waste**

**P1.15** For liquid discharges, which are the main operational discharges from the site, only one main production area contributes significantly to the discharge therefore only a site discharge limit has been set. Historically the liquid discharge was monitored at

## **Environment Agency**

the discharge point from the site rather than at each individual drainage point. This means that the opportunity for retrofitting individual sampling points is restricted on health and safety grounds as well as for practical reasons.

### **Solid Waste**

**P1.16** Solid low level operational wastes that may arise include clothing, tissue paper, and other combustible materials in small volumes that might become lightly contaminated during the course of operations. Combustible solid waste is to be transferred to, and incinerated at BNFL Capenhurst until the incinerator closes in 2005/06. Solid low level wastes above radioactivity concentration criteria for certain wastes are disposed of by transfer to BNFL, for the purpose of final disposal at Drigg, West Cumbria. Below these concentration criteria, the lowest range of low level solid wastes are disposed of directly by BNFL to the Clifton Marsh landfill site.

### **Other Wastes**

**P1.17** A new waste form of organic liquid wastes including waste solvents and Liquid Scintillation Counter waste scintillant, from laboratory analytical work is to be transferred to Shanks Chemical Services incinerator at Hythe, Southampton.

## PART 2 - CONCEPTS AND PRINCIPLES

### Concept of Risk and System of Radiation Protection

#### Introduction

**P2.1** This Part of the document describes the concept of risk and the system of radiation protection. This system is based on the evaluation of the risks to which members of the public are exposed and which society normally accepts in its day to day activities.

#### Concept of Risk

**P2.2** All human activities including those which society accepts every day involve some element of risk, i.e. involve some chance of suffering injury, illness or death.

Examples of risk, in terms of the average annual risk of death, are:

solo rock climbing (5 hours a week)	= 1 in 100
smoking 10 cigarettes a day	= 1 in 200
heart disease	= 1 in 300
all cancers	= 1 in 400
natural causes for someone aged 40	= 1 in 700
coal mining	= 1 in 7,000
accidents in the home	= 1 in 10,000
road accidents	= 1 in 10,000
alcohol consumption (light drinker)	= 1 in 50,000
accidents at work (self-employed)	= 1 in 77,000
accidents at work (all workers)	= 1 in 125,000

**P2.3** Some risks, although they may be high, are associated with activities people choose to pursue, such as smoking and certain sports, whilst others are an inherent feature of employment and everyday life. Risks associated with being at work are explicitly recognised and are treated differently from risks to which the general public is exposed. This is because the behaviour of people at work can be managed so as to ensure they are adequately protected but the general public must be free to adopt any reasonable pattern of behaviour.

**P2.4** Any industrial activity inevitably involves risks to workers, to the public and to the environment. The Agency has a responsibility for ensuring that risks to members of the public and to the environment arising from authorised disposals of radioactivity are minimised and are acceptably low.

**P2.5** There have been many studies to establish levels of risk which society considers to be trivial, acceptable, tolerable or unacceptable. In particular, a report by a study group of the Royal Society, published in 1983, concluded that a risk as low as one in a million per year for members of the public was commonly regarded as trivial, and that there was a widely held view that few people would commit their own resources to

reduce an annual risk of death which is already as low as one in a hundred thousand. HSE / NII, in establishing what would be an unacceptable level of risk, has stated that a risk of one in ten thousand per year to any member of the public is the maximum that should be tolerated from any large industrial plant in any industry. For new nuclear power stations HSE / NII has proposed adopting a lower risk of one in a hundred thousand per year as a benchmark. This figure has also been taken into account by NRPB in its advice on radiation protection standards for any single nuclear plant.

**P2.6** The information presented in paragraphs P2.2 to P2.5 is general background information on risk. The Agency recognises that the interaction between human activity and the environment is complicated and difficult to quantify, and that it is not easy to judge where the balance should lie between environmental protection and economic and technological progress. In July 2000, DETR published "Guidelines for Environmental Risk Assessment and Management" (DETR, Environment Agency, and Institute for Environment and Health). This document sets out a framework for environmental risk assessments and includes discussion on the social aspects of risk. The Guidelines recognise that "the final decision on how best to manage environmental risks should be informed both by science and stakeholder concerns". The Agency, as a joint author of the Guidelines document, endorses this statement. It considers that its approach has been consistent with the framework set out in the Guidelines document, which includes:

- **Risk assessment.** The Agency notes that radiation dose assessments adopt an approach that is consistent with the framework for environmental risk assessment. Dose assessments require: a clear definition of the problem; screening and prioritisation of any potential pathways that may give rise to exposure to radiation; consideration of the consequences of any exposure to radiation; and evaluation of the consequences against regulatory dose limits. Monitoring, data collection and analysis, and continuing development of dose assessment models support this process.

- **Stakeholder involvement.** The Agency notes that the process for the review of BNFL Springfields authorisations included specific arrangements for consultation (see Part 5 of this document). The focus for the consultation was an Explanatory document, BNFL Springfields review submissions and the proposed draft certificate of authorisation, which were made widely available. The Agency accepted consultation responses over a period of 15 weeks. The responses have been used by the Agency to inform its decisions as set out in this document.

- **Risk management.** The Agency notes that the concepts of "best practicable means" and "as low as reasonably achievable" provide a formal means for considering risk management options. Their use provides input to risk management decisions that involve balancing the reduction of risk with the practicability and cost of reducing that risk.

**P2.7** The Guidelines document suggests that *uncertainties* should be addressed and that these generally fall into the following categories: model, sample, data, knowledge and environmental uncertainties. The Agency notes that the evaluation of uncertainties runs throughout the risk assessment and risk management process. Examples include the following:

## Environment Agency

- Dose limits and constraints are based on international standards that allow for uncertainties in the relationship between radiation dose and the risk to people;
- It is standard practice to include a reasonable degree of conservatism in dose assessments. Assumptions that form the basis of a dose assessment tend to adopt a cautious approach to uncertainty to provide additional assurance that actual exposures are unlikely to be significantly underestimated;
- Samples from the local environment (including air, water and soil) and locally produced foodstuffs are taken and analysed by the operator, by the Environment Agency and by the Food Standards Agency. The operator and the Food Standards Agency also collect information on local patterns of food consumption. This data provides a check on the modelling assumptions made in dose assessments and allows the development of improved models as knowledge increases; and
- Monitoring of discharges is undertaken by the operator and by the Agency. The Agency carries out independent analysis of check samples of liquid and gaseous effluents discharged, solid wastes disposed of, and environmental samples. Monitoring data is used to inform dose assessments.

**P2.8** It is not possible to achieve a state of "no risk" since all human activities are associated with some level of risk. All industrial processes have attendant risks which, however, can be minimised through appropriate regulatory controls. The Agency and HSE / NII regulate the nuclear industry in order to ensure, in particular, that exposures to ionising radiation, and hence radiation risks, meet nationally and internationally accepted limits and constraints.

**P2.9** Monitoring data from the Agency and FSA's joint publication "Radioactivity in Food and the Environment" ("RIFE") show that there is no substantial accumulation of radionuclides in the environment. The RIFE Reports include retrospective dose assessments and these indicate the risks from radionuclides in the environment are very small. The Agency notes that, even if there were a revision of the dose/risk relationship, it would have to be substantial to increase the risk from radionuclides in the environment to levels at which there would be reason for concern.

**P2.10** On fundamental matters of radiological protection, the Agency's primary source of advice is from the National Radiological Protection Board (NRPB). NRPB was created under the Radiological Protection Act 1970 and has a statutory role in advising the Government on radiation protection issues and in particular on radiation risks. NRPB keeps abreast of, and contributes to, international developments in radiological protection, including the work of such bodies as the International Commission on Radiological Protection (ICRP) and the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). International committees such as UNSCEAR and ICRP base the risk factors used to establish dose limits and constraints on comprehensive examination of available data on health effects of ionising radiation. The dose and risk factors established by such studies tend to be cautious and reflect potential differences in sensitivity to radiation exposure (i.e. vulnerability) within a population.

## Environment Agency

**P2.11** The Agency has an independent dose assessment capability that is consistent, though not identical, with those approaches adopted by the Food Standards Agency (FSA) and NRPB. The Agency also initiates research in radiological protection, as in other areas, where it has an interest and when it perceives that work needs to be done. One such aspect, which the Agency is currently pursuing as part of an international collaborative effort, is the radiological protection of wildlife.

**P2.12** The Agency recognises that members of the public may mistrust experts and officials and that concerns have arisen regarding radiation risks. The Agency is also aware that some members of the public may feel that information is being concealed and that the full truth is not being revealed. These concerns may stem, in part, from the use of technical jargon, which can act as a barrier to effective communication. The Agency is also aware of a belief that the public's views on risks are often disregarded. It accepts that, in the past, the public might not have been taken fully into the confidence of experts and officials.

**P2.13** The Agency considers that improved dialogue between the public and its staff should help overcome such problems and build wider trust in its decision-making. In its dialogue with the public on environmental risks, the Agency aims to be open and transparent. It has tried to achieve this in its public consultation for the Springfields nuclear site. The distribution of consultation documents was intended to give members of the public an opportunity to respond to the BNFL Springfields review proposals and the Agency's draft authorisation. The Agency has sought to gain views from the public to inform its decision-making process. The Agency is seeking to learn from the BNFL Springfields consultation and will try to identify lessons that might lead to improvement in future public consultation arrangements.

### Risks from Radiation Exposure

**P2.14** Exposure to ionising radiation can cause cancers and hereditary defects. The higher the radiation dose the greater the likelihood or risk that a cancer or a hereditary defect will result. But, apart from very high levels of radiation dose, there is no certainty that an individual exposed to radiation will suffer a health effect. The dose/risk relationships have been determined by studies undertaken on various groups that have been exposed to radiation, predominantly survivors of the atomic bombs in Japan and certain medical patients.

**P2.15** There is little direct evidence that very low doses of radiation cause harm. However, the approach taken in radiation protection errs on the side of caution by assuming that there is no dose so low that it cannot potentially cause harm and there is no absolutely safe threshold of radiation dose below which the risk may approach zero. In the present state of knowledge it is appropriate to assume an increasing risk with increasing dose, with a linear relationship at low doses and no threshold. This approach is accepted by international bodies such as ICRP and UNSCEAR, and by national advisory bodies such as NRPB in the UK. The Agency recognises that there is a range of other views, including those who claim that the assumptions made are over-cautious at very low levels of dose and those who claim the opposite.

**P2.16** It is possible to use studies of acceptable levels of risk and of dose/risk relationships to set dose limits and targets for members of the public. For example, it is estimated that a radiation dose of 1 millisievert (mSv), i.e. a thousandth of a sievert, results in a one in twenty thousand risk of contracting a fatal cancer; and that the dose from one microsievert (microSv), i.e. a millionth of a sievert, results in a one in twenty million risk.

**P2.17** For comparison, the dose to an average member of the UK population is 2.2 mSv/year arising from natural background radiation and 0.4 mSv/year from medical exposure. There is a large variation in the natural background radiation that members of the public receive depending primarily on where they live. Any doses that people receive from practices involving the use of radioactive substances are in addition to the dose from natural background radiation.

**P2.18** International committees such as ICRP and UNSCEAR regularly review the risks arising from exposure to radiation. UNSCEAR is an international body composed of expert scientific delegations from a range of nuclear and non-nuclear countries and is constituted entirely separately from ICRP.

**P2.19** Current UK dose limits and dose constraints are based on the recommendations of ICRP and have been accepted by the Government following advice from NRPB. The legal basis for the dose limits and constraints is set out in Part 3 of this document. The Government has stated that it has confidence in the radiological protection advice being provided by NRPB. However, the Government recognises that concerns have been expressed that official advice on the effects of low level radiation might possibly be underestimating the risks. It has asked the Committee on the Medical Aspects of Radiation in the Environment (COMARE), a committee of independent and eminent medical and scientific experts which advises Government on the health effects of exposure to radiation, to conduct a thorough review of the evidence regarding the effects of low level radiation. The Agency understands that COMARE will be reviewing evidence from a wide range of sources on the effects of low level radiation. In the past, it has carried out authoritative studies of cancer incidence around a number of nuclear installations in the UK, including Sellafield, Dounreay and the nuclear weapon sites at Aldermaston and Burghfield.

**P2.20** On 31 July 2001, the Government announced that a new broad based working group would be established whose remit would be: "To consider the present risk models for radiation and health that apply to exposure to radiation from internal radionuclides in the light of recent studies and any further research that might be needed." The working group called CERRIE (Committee Examining Radiation Risks from Internal Emitters) will produce and publish a report that will be considered by COMARE who will then advise the Government.

**P2.21** The Agency notes that, in establishing 1 mSv/year as the value for the dose limit, ICRP took a number of factors into account, including natural background radiation and the health consequences of continued exposure to additional radiation over a lifetime. (*ICRP, 1990 Recommendations of the International Commission on Radiological Protection, ICRP 60, Annals ICRP Vol. 21, No 1-3, 1991 - Annex C*) Consideration of health consequences included, for example, incidence of non-fatal cancers and possible hereditary effects.

## Environment Agency

**P2.22** The current radiological risk estimate recommended by NRPB, 6% per sievert for the UK population, is consistent with the value of 5% per sievert recommended by ICRP in its Publication 60. The NRPB and ICRP values are supported by evidence from the recent UNSCEAR review, which presented a fatal cancer estimate of about 6% per sievert for whole body exposure at low dose rates for a population of all ages. (*United Nations Scientific Committee on the Effects of Atomic Radiation, UNSCEAR 2000 Report to the General Assembly, Vols. 1 and 2, United Nations, New York, 2000.*) The UNSCEAR review supports the scientific consensus on the linear no-threshold dose response for cancer induction at low doses and low dose rates of radiation.

### Environment Agency Conclusions on Risks from Radiation Exposure

**P2.23** The Agency has carefully considered the points raised by respondents on risks from radiation exposure. The Agency has based decisions in this document on the current advice on radiological protection from NRPB.

**P2.24** Although the Agency does not anticipate any substantial changes in future to the advice it is currently receiving from NRPB on risks from exposure to low level radiation, it will remain alert to developments in this area and, if appropriate, will review relevant authorisations under RSA 93 accordingly.

### Radiological Protection Principles

**P2.25** Current UK and EU legislation is based on the *1990 Recommendations of the International Commission on Radiological Protection (ICRP 60)*. Part 3 of this document provides further information.

**P2.26** For practices involving the use of radioactive substances, the system of protection recommended by ICRP is based on the following principles:

(a) no practice involving exposures to radiation should be adopted unless it produces sufficient benefit to the exposed individuals or to society to offset the radiation detriment it causes (the **justification** of a practice);

(b) in relation to any particular source within a practice, the magnitude of individual doses, the number of people exposed, and the likelihood of incurring exposures where these are not certain to be received should all be kept as low as reasonably achievable, economic and social factors being taken into account. This procedure should be constrained by restrictions on the doses to individuals (*dose constraints*), or the risks to individuals in the case of potential exposures (*risk constraints*), so as to limit the inequity likely to result from the inherent economic and social judgements (the **optimisation** of protection);

(c) the exposure of individuals resulting from the combination of all the relevant practices should be subject to dose **limitation**, or to some control of risk in the case of potential exposures. These are aimed at ensuring that no individual is exposed to radiation risks that are judged to be unacceptable from these practices in any normal circumstances. Not all sources are susceptible to control by action at the source and it

## Environment Agency

is necessary to specify the sources to be included as relevant before selecting a dose limit (individual dose and risk limits).

**P2.27** Similarly, for intervention in situations involving radioactive substances, the system of protection recommended by ICRP is based on the following principles:

(a) the proposed intervention should do more good than harm, i.e. the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including social costs, of the intervention;

(b) the form, scale, and duration of the intervention should be optimised so that the net benefit of the reduction of dose, i.e. the benefit of the reduction in radiation detriment, less the detriment associated with the intervention, should be maximised.

**P2.28** ICRP uses the term *intervention* to describe the set of human activities which decrease overall exposure to radiation by removing existing sources of exposure, modifying pathways of exposure, or reducing the number of exposed individuals. Intervention can be either at the source of the exposure or in the environment, where it may for instance restrict individuals' freedom of action. Where possible and barring accidents, intervention *at source* will be least disruptive and most effective.

**P2.29** ICRP 60 also recommended changes in the methodology used to calculate doses. This methodology is now being taken into account in the authorisation of discharges under RSA 93.

**P2.30** The Agency has noted ICRP Publication 77 (*Radiological protection policy for the disposal of radioactive waste, adopted by ICRP in May 1997*). ICRP 77 re-affirmed ICRP's current policy, and clarified the practical application of the policy to disposals of radioactive waste.

**P2.31** The application of the ICRP principles is discussed further in Part 3 of this document.

## Radiological Assessments

### Prospective and Retrospective Assessments

**P2.32** The discharge of radionuclides into the environment results in some exposure of members of the public to radiation. Authorisations issued by the Agency set limits on the quantities of radionuclides that may be discharged into the environment rather than the radiation dose that members of the public may receive. This is because the operator has direct control over discharges. Assessments are needed to estimate the doses to members of the public because it is not practicable to measure their exposures directly. Two forms of assessment are possible, namely *prospective* and *retrospective* assessments.

**P2.33** The form of assessment used when setting the discharge limits in authorisations, to ensure conformity with the dose limit and constraints, is a *prospective* assessment. This is an assessment of doses in the future which will result

## Environment Agency

from the discharges under the new authorisation. It assumes conservatively that discharges are made at 100 per cent of the discharge limits in the authorisation. It does not include current doses received as a result of discharges made in the past, i.e. made before a new authorisation comes into effect.

**P2.34** A *prospective* radiological assessment is carried out in two stages. In the first stage, the activity concentrations of radionuclides in different parts of the environment are predicted based on the quantities of radionuclides discharged and how they disperse. This provides an estimate of the activity concentration of radionuclides in the atmosphere, deposited on surfaces and present in foodstuffs (crops, livestock and seafood). This is required to calculate the radiation dose people receive from radionuclides inside and outside the body. In the second stage, the radiation dose to members of the public is assessed.

**P2.35** A *retrospective* assessment is based on measurements of the external radiation dose and activity concentrations of radionuclides already present in the environment. These result from past discharges from the nuclear site concerned, as well as contributions from other sources. The measurements are then used to assess the radiation dose to members of the public.

### Critical Group Methodology

**P2.36** The radiation dose to members of the public is estimated using:

- data on activity concentrations of radionuclides and external dose rates in the environment;
- results of habit surveys to determine what people eat and drink, and where they spend their time; and
- data on the internal radiation dose received from the intake of radionuclides.

Separate estimates are produced for infants, children and adults.

**P2.37** Those members of the public who share the same habits and receive the highest dose are described as the "critical group". If the dose received by the critical group is less than the dose limit, then so too is the dose received by all other members of the public. Cm 2919 considers it important that the dose limit should be met without imposing restrictions on people's normal behaviour. In applying the critical group methodology to assessing the radiation exposure of the public the regulators should not exclude from consideration any pattern of behaviour which a reasonable person might adopt, whether or not anyone actually engages in that behaviour at a given time. However, behaviour which a reasonable person would regard as extreme and which habit surveys have not revealed need not be considered.

**P2.38** The critical group approach is accepted internationally and is recommended by ICRP. ICRP states that "the critical group should be representative of those individuals in the population expected to receive the highest dose equivalent; the group should be small enough to be relatively homogeneous with respect to age, diet and those aspects of behaviour that affect the doses received" (*ICRP Publication 43. Principles of monitoring for the radiation protection of the public. Annals of the ICRP, 15, No 1, 1985.*). A very similar definition for the most exposed group is given

in the EU Basic Safety Standards Directive (Article 1, Definitions). The Draft UK Government Statutory Guidance to the Environment Agency on the Regulation of Radioactive Discharges from Nuclear Licensed Sites introduces the term "reference group" but treats it as being equivalent to the critical group. The Agency is legally required to assess the dose to such reference groups or critical groups under the *Radioactive Substances (Basic Safety Standards) (England and Wales) Direction 2000*.

**P2.39** In establishing 1 mSv/year as the value for the dose limit for members of the public from man-made (non-medical) sources, ICRP took a number of factors into account, including natural background radiation and the health consequences of continued exposure to additional radiation over a lifetime. Consideration of health consequences included, for example, incidence of non-fatal cancers and possible hereditary effects.

**P2.40** Similar considerations apply to NRPB's recommended upper value for the dose constraint, 0.3 mSv/year. The value was set on the basis of a benchmark average annual risk and from consideration of exposures from natural radiation and their variation. Even if risk factors change, it would seem unlikely that it would be justified to reduce the maximum constraint to below 0.3 mSv/year on the basis that it is a small fraction of natural background radiation.

**P2.41** The values for dose limits and dose constraints take account of continued exposure over a lifetime. In estimating doses for comparison with these criteria, it is important to take account of habits that will, or are likely to, continue over a long period. For this reason, the doses to a representative member of the critical group are calculated. Habits of the most exposed or most vulnerable individual may change with time, whereas the average habits in the critical group are likely to be more robust.

### Collective Dose Methodology

**P2.42** Collective dose is sometimes used as a measure of the radiation detriment to a population. It is an estimate of the total dose received by all members of that population over a specified period of time. Collective dose can be calculated for different populations, for example, the UK, European or world-wide populations. It can also be calculated over different time periods, for example, over a year, a lifetime, five hundred years, or to infinity. For example, the annual collective dose to the UK population resulting from natural background radiation is 143,000 man sievert (manSv), calculated by multiplying the average individual dose received by the size of the UK population (taken as sixty-five million). For comparison the annual collective dose to the UK population from medical exposure is 23,600 manSv (excluding radiotherapy) while that from radioactive discharges from the nuclear industry in total is approximately 18 manSv (*J S Hughes, Ionising Radiation Exposure of the UK Population - 1999 Review, NRPB-R311*).

**P2.43** The Government's Radioactive Waste Management Advisory Committee (RWMAC), an independent committee of experts, has advised that, whilst collective dose is a useful comparative measure of the total radiological impact of a radiation source, there are considerable uncertainties in its calculation and its application. NRPB has given similar advice. The Agency notes that with the introduction of the

## **Environment Agency**

Committee on Radioactive Waste Management (CoRWM) to advise the Government on waste management of more highly radioactive wastes, RWMAC has been put into abeyance for a 2 to 3 year period. During this period CoRWM will be compiling its recommendations on future policy for the long-term management of the UK's higher activity radioactive wastes. At the end of this period the Government intends to further review its advisory systems in the radioactive waste management policy area.

**P2.44** The Agency takes the view that critical group dose is the proper focus of assessments and is the key parameter for comparison with dose constraints and dose limits. As noted above, collective dose is a useful comparative measure of total radiological impact although subject to considerable uncertainty. Collective dose can be useful when considering different options for management of radioactive wastes.

### **Protection of Wildlife**

**P2.45** This issue is addressed under Conservation in Parts 3 and 6A of this document.

## **PART 3 - LEGAL & POLICY FRAMEWORK AND INTERNATIONAL COMMITMENTS**

### **Agency Environmental Vision**

**P3.1** In 2000 the Agency published *An Environmental Vision: The Environment Agency's contribution to Sustainable Development*. The Agency's vision for the environment and a sustainable future is a healthy, rich and diverse environment in England and Wales for present and future generations. The Agency has set out a number of themes for the future, which will contribute to this long-term goal:

- The fundamental goals we want to help achieve:
  - a better quality of life
  - an enhanced environment for wildlife
- The environmental outcomes for which we are striving:
  - cleaner air for everyone
  - improved and protected coastal waters
  - restored, protected land with healthier soils
- The changes we will seek:
  - a 'greener' business world
  - wiser, sustainable use of natural resources
- The risks and problems we will help manage, prevent and overcome:
  - limiting and adapting to climate change
  - reducing flood risk.

**P3.2** In pursuit of its vision, the Agency is committed to improving the effectiveness of regulation, and in operating openly and consulting widely. The Agency's role in the regulation of the nuclear industry relates to a number of the above themes, notably a 'greener' business world. As part of this the Agency is committed to progressive reductions in radioactive discharges where practicable, and in developing the reporting of the environmental performance of the nuclear industry.

### **Regulatory Powers**

**P3.3** Under the Environment Act 1995 (EA 95), the disposal of radioactive waste on or from all nuclear licensed sites in England and Wales is regulated by the Agency, which exercises powers to grant or refuse applications for authorisations under RSA 93. The Agency does not regulate the accumulation of radioactive waste on nuclear licensed sites.

**P3.4** Authorisations are granted under section 13 of RSA 93, subject to such limitations and conditions as the Agency thinks fit. Once an authorisation has been granted, the Agency inspects sites to check their compliance with authorisation conditions and keeps under review the continuing capability of the operator to comply with the authorisation. The Agency can serve enforcement and prohibitions notices, or prosecute for non-compliance. The Agency also has power to vary or revoke an authorisation at any time (section 17).

## **Environment Agency**

**P3.5** The safe operation of nuclear installations, including the storage of radioactive waste, is regulated by the Health and Safety Executive (HSE / NII) under the Nuclear Installations Act 1965 (NIA 65). The Agency and HSE / NII have a Memorandum of Understanding to ensure the effective co-ordination of regulatory activities on nuclear licensed sites.

**P3.6** Within its powers under RSA 93 and EA 95, the Agency also implements relevant Government policy objectives and European legislation. These aspects are considered in more detail below.

## **Government Policy**

**P3.7** The previous Government's 1995 White Paper, "Review of Radioactive Waste Management Policy, Final Conclusions", Cm 2919, (DETR 1995) stated that the Government would maintain and continue to develop a policy and regulatory framework which ensured that:

- radioactive wastes are not unnecessarily created;
- such wastes as are created are safely and appropriately managed and treated;
- the wastes are then safely disposed of at appropriate times and in appropriate ways; so as to safeguard the interests of existing and future generations and the wider environment, and in a manner that commands public confidence and takes due account of costs.

**P3.8** The Agency expects nuclear site operators to choose the Best Practicable Environmental Option ("BPEO") for operations discharging radioactive waste to the environment, and requires use of Best Practicable Means ("BPM") as fundamental requirements of this regulatory framework.

**P3.9** Current Government policy relates closely to the ICRP principles of justification, optimisation and limitation for radiological protection, which have been incorporated into European law. More recently the Government became a signatory to the OSPAR Ministerial agreement on radioactive discharges made at Sintra in Portugal in July 1998 – the "OSPAR Strategy".

**P3.10** In July 2002, the Government published its UK Strategy for Radioactive Discharges, to cover the period 2001 to 2020. The UK Strategy is intended to show how the UK will implement the OSPAR Strategy and to set out a policy basis for future reviews of discharge authorisations by the regulators and for strategic planning by the nuclear operators. It is described later in this Part.

**P3.11** The Government has also published, for consultation, draft Statutory Guidance to the Environment Agency with respect to the Agency's role in the regulation of radioactive discharges into the environment from nuclear licensed sites. The Statutory Guidance will need to be read in conjunction with the UK Strategy for Radioactive Discharges 2001-2020. The draft Statutory Guidance is described in more detail later in this Part.

**P3.12** Cm 2919 sets out the respective roles of government, regulators, and waste producers and owners. The regulators have the duty to ensure that this framework is properly implemented in accordance with their statutory powers.

### **Euratom Basic Safety Standards Directive**

**P3.13** The ICRP principles of **justification**, **optimisation** and **limitation** have been incorporated into European law.

**P3.14** *Council Directive 80/836/Euratom Laying Down the Basic Safety Standards for the Health Protection of the General Public and Workers Against the Dangers of Ionizing Radiation* (the 1980 BSS Directive), as amended by *Directive 84/467/Euratom*, was implemented in the UK in part by the *Ionising Radiations Regulations 1985 (S.I. 1985 No. 1333)* (IRRs 1985), (made under the *Health and Safety at Work etc. Act 1974*), and in part by the Agency in determining authorisations in accordance with RSA 93 and Government policy.

**P3.15** Following the publication of ICRP 60, a revision of the 1980 BSS Directive was formally adopted as *Council Directive 96/29/Euratom* (the 1996 BSS Directive). EU member states were required to implement this Directive before 13 May 2000.

**P3.16** The 1996 BSS Directive has been implemented in the UK, in part, by the *Ionising Radiations Regulations 1999 (S.I. 1999 No. 3232)* (IRRs 1999) and, more particularly (for the Agency's functions in relation to RSA 93 authorisations), *The Radioactive Substances (Basic Safety Standards) (England and Wales) Direction 2000* (BSS Direction 2000).

**P3.17** The BSS Direction 2000, issued on 9 May 2000, requires the Agency to ensure, when discharging its functions under RSA 93, that certain provisions of the 1996 BSS Directive are complied with. In particular it requires the Agency to ensure that the Directive dose limits for members of the public are complied with, that the dose from a single new source of radiation does not exceed 0.3 mSv/year and that the dose from a single site does not exceed 0.5 mSv/year. The Direction also requires the Agency to ensure that exposures of members of the public and the population as a whole resulting from the disposal of radioactive waste are kept as low as reasonably achievable, economic and social factors being taken into account.

### **Justification**

#### **Current and Future Practices**

**P3.18** The radiological protection principle of justification derives from the recommendations of ICRP, expressed in ICRP 60 as clarified by ICRP 77. It is essentially the concept of weighing the benefits from a practice against its detriments in order to consider whether a "net benefit" accrues to society.

**P3.19** ICRP 60 states that: "The Commission recommends that, when practices involving exposure, or potential exposure, to radiation are being considered, the

radiation detriment should be explicitly included in the process of choice. The detriment to be considered is not confined to that associated with the radiation - it includes other detriments and the costs of the practice. Often, the radiation detriment will be a small part of the total. The justification of a practice thus goes far beyond the scope of radiological protection.”

**P3.20** The 1980 BSS Directive incorporated the principle of justification into European law. The 1996 BSS Directive also includes justification as a legal requirement. Article 6 of the 1996 BSS Directive states the following: "1. Member States shall ensure that all new classes or types of practice resulting in exposure to ionising radiation are justified in advance of being first adopted or first approved by their economic, social or other benefits in relation to the health detriment they may cause. "2. Existing classes or types of practice may be reviewed as to justification whenever new and important evidence about their efficacy or consequences is acquired.”

**P3.21** In connection with the implementation of the 1996 BSS Directive in the UK, HSE / NII consulted in 1998 (*Consultative Document: Proposals for revised Ionising Radiations Regulations and Approved Code of Practice*) on proposals that decisions on justification, including reviews of practices which are currently justified, should be taken by the appropriate Secretary of State and not by the regulators (HSE / NII and the Agency). The Agency notes the following:

- (i) The statement made in the House of Commons on 21 June 2000 by the Parliamentary Under Secretary of State for DETR that: “The Health and Safety Executive has already consulted on a proposal that, following the coming into force of the new EURATOM Basic Safety Standards Directive, reviews of the justification of practices will be a matter for the appropriate Secretary of State. A further announcement will be made in due course.”
- (ii) The statement made in the DETR letter (Meacher to Harman) of 16 October 2000 that: “I can confirm that in future justification decisions will be for the appropriate Secretary of State rather than for the Agency.”

**P3.22** During the Agency's consultation on the Springfields authorisations, the Government has been consulting on the application of justification decisions. The 'Justification of Practices Involving Ionising Radiations Regulations 2004 No.1769' has been through the parliamentary process and came into force on 2nd August 2004. Therefore the consideration of justification or any review of existing practices with regard to justification is a matter for the relevant Secretary of State.

## **Radiation Dose Limitation and Optimisation**

### **Dose Limits**

**P3.23** The BSS Direction 2000 requires the Agency to ensure (in discharging its functions in relation to the disposal of radioactive waste under RSA 93) that: “the sum

of the doses resulting from the exposure of any member of the public to ionising radiation should not exceed the dose limits set out in Article 13 of the Directive (subject to the exclusions set out in Article 6(4) [exposures from medical treatment/research]).”

**P3.24** Article 13 of the 1996 BSS Directive is based on ICRP 60 and sets an effective dose limit of 1 mSv/year from all man-made sources of radioactivity (other than medical exposure). Cm 2919 states that the assessments of dose against this limit should include the effects of past discharges.

**P3.25** Article 13 of the 1996 BSS Directive provides that “in special circumstances, a higher effective dose may be authorised in a single year, provided that the average over five consecutive years does not exceed 1 mSv per year.” However, in issuing the Direction to the Agency, the Government stated that its policy is not to allow this flexibility.

### Past Practices

**P3.26** Intervention is often concerned with situations where control at source is no longer possible, for example where radioactivity has already contaminated or accumulated in the environment. ICRP 60 states that dose limits do not apply in the case of intervention because they might involve measures that would be out of all proportion to the benefit obtained and would then conflict with the principle of justification. The 1996 BSS Directive reflects the same position. However, for a past practice where the radioactivity remains contained at source it may be entirely feasible to apply dose limits without involving measures out of proportion to the benefit obtained.

### Optimisation

**P3.27** The 1996 BSS Directive’s provisions on the optimisation of protection from radiation exposure (Article 6) are implemented in the BSS Direction 2000, which requires the Agency to ensure (in discharging its functions in relation to the disposal of radioactive waste under RSA 93) that: “all exposures to ionising radiation of any member of the public and of the population as a whole resulting from the disposal of radioactive waste are kept as low as reasonably achievable [ALARA], economic and social factors being taken into account.”

**P3.28** Article 7(1) of the 1996 BSS Directive states that “dose constraints should be used where appropriate, within the context of optimisation of radiological protection”. The BSS Direction 2000 requires the Agency, in ensuring that exposures are ALARA, to have regard to the following maximum doses to individuals which may result from a defined source, for use at the planning stage in radiation protection:

- 0.3 mSv/year from any source from which radioactive discharges are first made on or after 13 May 2000. A source is defined (Cm 2919) as “a facility, or group of facilities, which can be optimised as an integral whole in terms of radioactive waste disposals”. The doses to be compared with this source-related dose constraint are only those that can be altered by changes in the operating regime of a controlled source. This source constraint thus includes the radiological impact of current

discharges and direct radiation from the source, but excludes the impact of historical discharges. It is intended to guide the process of optimisation relating to the design, construction and operation of the facility. Cm 2919 states that, in general, it should also be possible for existing facilities to be operated within the source constraint of 0.3 mSv/year. However, it recognises that in some cases a realistic assessment of doses might suggest that the facility could not be operated within this figure. In these cases the operator must demonstrate that the doses resulting from the continued operation of the facility are as low as reasonably achievable and within dose limits;

- 0.5 mSv/year from the discharges from any single site. This site-related dose constraint applies to the aggregate exposure resulting from discharges from a number of sources with contiguous boundaries at a single location. It includes the radiological impact of current discharges from the entire site, but excludes the impact of direct radiation and historical discharges. It is particularly relevant to complex sites. The site constraint of 0.5 mSv/year applies irrespective of whether different sources on the site are owned and operated by the same or by different organisations.

**P3.29** The Springfields nuclear site complies with the site constraint. It also complies with the source constraint applicable to older facilities. Radioactive discharges were first made from this site before 13 May 2000 and thus the Government's BSS Direction 2000 to the Agency places no requirement on them to meet the tighter constraint. However, the operator must demonstrate that the doses resulting from continued operation are as low as reasonably achievable and within dose limits. The Agency's new authorisation includes limits and conditions, including a requirement to use BPM to minimise discharges, which will help to ensure that doses to the public are ALARA.

**P3.30** In general, the Agency regards the source-related and site-related dose constraints as upper bounds to the optimisation of the relevant doses received by members of the public. The Agency would expect actual doses to be lower.

**P3.31** Cm 2919 introduced a threshold, or lower bound for optimisation, equivalent to an annual risk of death of around one in a million ( $10^{-6}$  per year). The threshold is set at 0.02 mSv/year. Cm 2919 states that: "If exposures are calculated to be below 0.02 mSv/year, the regulators should not seek to secure further reductions in the exposure of members of the public, provided they are satisfied that the operator is using the best practicable means to limit discharges. However, the regulators will still need to ensure that discharges are properly controlled and monitored and that the radiological assessments submitted to them by the operator are valid."

**P3.32** The Agency notes that this threshold has not been carried forward into draft Statutory Guidance on the Regulation of Radioactive Discharges into the Environment from Nuclear Licensed Sites. However, the draft Statutory Guidance states that: "There is widespread international agreement that doses to members of the public of the order of 0.01 millisieverts per year or less are sufficiently low to be of no regulatory concern."

**P3.33** Existing UK practice on the control of exposure of members of the public from routine discharges is consistent with ICRP recommendations.

**P3.34** On the issue of whether the dose constraint of 0.3 mSv should be used as a limit, it is important to understand that the dose limit and dose constraint have different applications. The dose limit is set so as to prevent exposures that would not be acceptable on any reasonable basis in the normal operation of practices of which the use is a matter of choice. Exposures below the dose limit can be divided into those that are tolerable, meaning that they are not welcome but can reasonably be tolerated, and those that are acceptable, meaning that they can be accepted without further improvement. The dose constraint is set such that the risk from the normal operation at a single new source does not cause concern, and the total risk from all sources subject to control does not become unacceptable. The dose limit and the dose constraint serve different purposes and must not be confused with each other.

**P3.35** The Agency notes that the doses to be compared with the source constraint are only those that can be altered by changes in the operating regime of a controlled source. The source constraint thus includes the radiological impact of current discharges and direct radiation from the source, but excludes the impact of historical discharges. As stated in the same paragraph, the site constraint applies to the aggregate exposure resulting from discharges from a number of sources with contiguous boundaries at a single location. It includes the radiological impact of current discharges from the entire site, but excludes the impact of direct radiation and historical discharges. It is particularly relevant to complex sites such as those with more than one source. This application of the source and site constraints is established regulatory policy.

### **OSPAR Obligations**

**P3.36** The basic obligation of the *Convention for the Protection of the Marine Environment of the North East Atlantic* (the "OSPAR Convention"), contained in Article 2(1), is that: "The Contracting Parties shall, in accordance with the provisions of the Convention, take all possible steps to prevent and eliminate pollution and shall take the necessary measures to protect the maritime area against the adverse effects of human activities so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected."

**P3.37** "Pollution" is defined in Article 1 of the Convention in terms, derived from the *United Nations Convention on the Law of the Sea*, which show that what is to be prevented and eliminated is "introduction by man, directly or indirectly, of substances or energy into the maritime area which results, or is likely to result, in hazards to human health, harm to living resources and marine ecosystems, damage to amenities or interference with other legitimate uses of the sea."

**P3.38** The OSPAR Convention requires the application of the "polluter pays" principle and the precautionary principle (Article 2(2)). It further requires parties, individually and jointly, to adopt programmes and measures which take full account of the use of the latest technological developments and practices designed to prevent and eliminate pollution fully and requires, for this purpose, the definition and application of best available techniques (BAT) and best environmental practices

## Environment Agency

(BEP). The definition of this is to take into account the criteria set out in Appendix 1 to the Convention.

**P3.39** In respect of programmes and measures in relation to radioactive substances, including waste, Article 1(4) of Annex 1 to the Convention requires the Contracting Parties to take account of the recommendations of other appropriate international organisations and agencies and the monitoring procedures recommended by those international organisations and agencies.

### OSPAR Strategy for Radioactive Substances

**P3.40** The UK is a signatory to the strategy on radioactive discharges made at the OSPAR meeting at Sintra, Portugal, in July 1998 - the "OSPAR Strategy". This includes an agreement "to prevent pollution of the maritime area from ionising radiation through progressive and substantial reductions of discharges, emissions and losses of radioactive substances, with the ultimate aim of achieving concentrations in the environment near background values for naturally occurring radioactive substances and close to zero for artificial radioactive substances. In achieving this objective, the following issues should, inter-alia, be taken into account:

- legitimate uses of the sea;
- technical feasibility;
- radiological impacts to man and biota."

**P3.41** The OSPAR Strategy also includes a commitment, by the year 2020, to: "ensure that discharges, emissions and losses of radioactive substances are reduced to levels where the additional concentrations in the marine environment above historic levels, resulting from such discharges, emissions and losses, are close to zero." In addition, the Sintra Statement signed by Ministers of the OSPAR Contracting Parties says that particular attention will be paid to the safety of workers in nuclear installations.

**P3.42** OSPAR negotiations are a matter for Government, with Defra taking the lead. Defra is currently considering the implications of the OSPAR Strategy for UK Government Policy. In *Report by the United Kingdom on Intentions for Action at the National Level to Implement the OSPAR Strategy with regard to Radioactive Substances, DETR Radioactive Substances Division, October 1999*, the former DETR stated its intention to issue a UK Strategy covering the period 2001 to 2020 to achieve the objectives of the OSPAR Strategy.

### UK Strategy for Radioactive Discharges

**P3.43** In July 2002 the Government published its UK Strategy for Radioactive Discharges. The Strategy is intended to show how the Government and the devolved administrations will implement the OSPAR Strategy and to set out a policy base for future reviews of discharge authorisations by the regulators and for strategic planning by the nuclear operators. The UK Strategy extends to both liquid and airborne discharges, although it is assumed that in general liquid discharges will have the largest and most measurable effects in the marine environment. Its guiding principles and aims are: "- the precautionary principle, by virtue of which preventive measures

## Environment Agency

are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects;

“- the polluter pays principle, by virtue of which the costs of pollution prevention, control and reduction measures are to be borne by the polluter;

“- the ALARA principle, whereby radiological doses and risks are kept as low as reasonably achievable, consistent with the relevant dose or target standard and taking account of other factors, including economic and social factors;

“- the aim of progressive and substantial reduction of radioactive discharges and discharge limits;

“- the aim of progressive reduction of human exposure to ionising radiation resulting from radioactive discharges, such that no member of the general public in the UK will be exposed to a dose of more than 0.02 mSv a year from discharges made from 2020 onwards;

“- the aim of progressive reduction of concentrations of radionuclides in the marine environment resulting from radioactive discharges, such that by 2020 they add close to zero to historic levels;

“- a proportionate approach, whereby priority is given to reducing discharges which have greatest radiological significance or which present most risk of damaging the marine environment.”

**P3.44** In the UK Strategy, discharges from six sectors are considered: nuclear fuel production and uranium enrichment; nuclear power production; spent fuel reprocessing; research facilities; defence facilities; and other sources. For each sector, the possibilities for reducing discharges are examined and a projected discharge profile for the period 2001 to 2020 is given. The Springfields site comes under the nuclear fuel production and uranium enrichment sector.

### Draft Statutory Guidance

**P3.45** Under section 4 of EA 95, Ministers can issue Statutory Guidance to the Environment Agency. In October 2000, the former DETR and the Department of Health issued for public consultation draft Statutory Guidance to the Agency on the Regulation of Radioactive Discharges into the Environment from Nuclear Licensed Sites in England. Similar draft Statutory Guidance has also been issued by the National Assembly for Wales. The initial consultation period ended on 31 January 2001; however, the Government has not yet finalised the guidance.

**P3.46** The aim of the Statutory Guidance will be to set out a clear framework within which the Agency will operate when authorising the discharge of radioactivity into

## Environment Agency

the environment from nuclear licensed sites. The draft Guidance draws on existing guidance, including successive White Papers and in particular would supersede the relevant parts (paragraphs 63 to 73) of the 1995 White Paper Cm 2919, Review of Radioactive Waste Management Policy. It also incorporates, where appropriate, additional considerations to aid compliance with the OSPAR Strategy and provide a vehicle for implementation of the UK Strategy for radioactive discharges.

**P3.47** The draft Statutory Guidance sets out a number of general and specific principles that should be applied to regulation of radioactive discharges. It states that radioactive waste management policy should be based on the same basic principles that apply more generally to environmental policy and, in particular, that of sustainable development. The draft Guidance indicates that, when setting new discharge authorisations, the Agency should act within its statutory duties and functions and in a manner that is comprehensive, rigorous, prospective and transparent.

**P3.48** The draft Statutory Guidance identifies several specific principles under the following headings:

- Waste minimisation;
- Best Practicable Environmental Option (consideration of the “concentrate and contain” and the “dilute and disperse” principles);
- Radiological impact on members of the public (critical group, dose limit, dose constraint, collective dose), Community Food Intervention Levels, and impact on other species;
- Environmental Protection (best practicable means, progressive reduction of discharges, UK strategy for radioactive discharges 2001-2020, sociological and economic effects, protection beyond national borders);
- Health and Safety (exposure of workers, risks of accidents);
- Limits and conditions in discharge authorisations (site and plant limits, limits on individual radionuclides, headroom, notification levels, capping discharge limits at design levels);
- Other conditions applied to discharge authorisations (monitoring, research and development, record keeping).

**P3.49** Defra and the Department of Health have indicated that following full consideration of consultation comments received, the Statutory Guidance, amended as appropriate and still in draft, will be laid before both Houses of Parliament for 40 sitting days before it is issued to the Agency. A regulatory impact assessment will be drawn up to reflect any changes necessary, in advance of the draft Statutory Guidance being laid before Parliament.

**P3.50** The Agency takes the approach set out above, which is to use Cm 2919 as a basis for policy, unless subsequent Government statements have modified the policy, and to acknowledge the UK’s 1998 OSPAR commitments.

**P3.51** The future issue of Statutory Guidance to the Environment Agency will provide further clarification of Government policy on radioactive substances and waste. The Agency will be required to have regard to this Statutory Guidance. Meanwhile, the

## Environment Agency

Agency has sought to take account of the principles underlying the draft Statutory Guidance in making its decisions on the BNFL Springfields review. In particular, the Agency has set limits on discharges of radionuclides which are radiologically significant or discharged in large quantities, has sought to apply downward pressure on discharges and discharge limits, and has sought to reduce the "headroom" between discharges and discharge limits.

**P3.52** The Agency recognises that there might be aspects of the Statutory Guidance, when issued, that may not have been fully taken into account in the limits and conditions of the authorisation which the Agency is to issue. If there are such aspects, they can be accommodated subsequently by variations to the authorisation, or during the next review of the authorisation, as appropriate.

## Sustainable Development

**P3.53** A widely quoted definition of sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

**P3.54** The Agency has been given by section 4 of EA 95 a principal aim, namely, "(subject to and in accordance with the provisions of this Act or any other enactment and taking into account any likely costs) in discharging its functions so to protect or enhance the environment, taken as a whole, as to make the contribution toward attaining the objective of achieving sustainable development" as described in Ministerial Guidance. Guidance was issued by the previous Government to the Agency (*The Environment Agency and Sustainable Development, November 1996, 96EP189/1*).

**P3.55** Chapter 4 of the Explanatory Document accompanying that Guidance says, *inter alia*, that: the Agency should take a holistic approach to the protection and enhancement of the environment, striving to optimise benefit to the environment as a whole, taking proper account of all likely costs and benefits; it should take into account long-term implications and effects, especially those which appear likely to be irreversible or which would raise issues of inter-generational equity; it should where possible discharge its regulatory functions in partnership with regulated organisations in ways which maximise the scope for cost-effective investment in improved technologies and management techniques. With specific reference to radioactive substances, Chapter 6 states that: "By exercising its functions in accordance with the White Paper [Cm 2919] (and any other guidance issued to it by the Secretary of State) the Agency will contribute towards sustainable development."

**P3.56** Cm 2919 stated that radioactive waste management policy should be based on the same basic principles as apply more generally to sustainable development. These are that:

- decisions should be taken on the basis of the best possible scientific information and analysis of risks;
- where there is uncertainty and potentially serious risks exist, precautionary action may be necessary;

## Environment Agency

- ecological impacts must be considered, particularly where resources are non-renewable or effects may be irreversible;
- cost implications should be brought home directly to the people responsible as expressed by the "polluter pays" principle.

**P3.57** The Government published its strategy for sustainable development (Cm 4345, *A Better Quality of Life: A Strategy for Sustainable Development for the United Kingdom*) in 1999. Cm 4345 restated the Government's commitment to sustainable development.

**P3.58** The draft *Statutory Guidance on the Regulation of Radioactive Discharges into the Environment from Nuclear Licensed Sites* states that Cm 4345 "complements specific guidance given to the Agency in November 1996 with respect to its objectives and its contribution towards achieving sustainable development". The November 1996 guidance to the Agency on sustainable development is currently being revised to take account of Cm 4345.

**P3.59** The Agency notes that, although the guidance to the Agency on sustainable development is being revised to reflect Cm 4345, the guidance issued in November 1996 is still the current version to which the Agency is required to have regard. Furthermore, the Agency notes that there is considerable commonality between the principles set out in Cm 2919 and those in Cm 4345. Also, the draft *Statutory Guidance on the Regulation of Radioactive Discharges* states that: "Radioactive waste management policy should be based on the same basic principles that apply more generally to environmental policy, and in particular on that of sustainable development. Decisions should be based on the best scientific information and analysis of risks, and their effects should be proportionate to the risks involved. Where there is uncertainty and potentially serious risks exist, precautionary action may be necessary. Ecological impacts must be considered, particularly where resources are non-renewable or effects may be irreversible. Cost implications should be borne directly by those responsible – the polluter pays principle." These basic principles are the same as those set out in Cm 2919.

**P3.60** The references to appraisals in Cm 4345 relate to Government policies and, in particular, to the need for economic, social and environmental impacts to be considered together when policies are being devised or reviewed. Whereas this type of appraisal is not a specific requirement on the Agency in performing its regulatory activities, section 39 of EA 95 requires the Agency to consider the costs and benefits of exercising (or not exercising) its powers and in deciding the manner in which to exercise any such power. Such consideration of costs and benefits is an inherent part of the Agency's regulation of nuclear sites and is embedded in the concepts of "best practicable means" and "as low as reasonably achievable".

## Other Powers and Duties

**P3.61** Section 16(8) of RSA 93 enables the Agency to attach such limitations or conditions as it thinks fit to any authorisation to dispose of radioactive waste that it issues. Section 5 of EA 95 sets out the statutory purpose for which the Agency's

pollution control powers, including its powers under RSA 93, must be exercised, namely “preventing or minimising, or remedying or mitigating the effects of, pollution of the environment”. Under section 39 of EA 95, the Agency has a duty to take into account likely costs and benefits. The Agency also has duties in relation to conservation.

### Conservation

**P3.62** The Agency has various duties in relation to conservation:

- under section 6 of EA 95, the Agency must promote the conservation of flora and fauna which are dependent on an aquatic environment;
- under section 7(1)(b) and (c) and 7(2) of EA 95, the Agency must have regard to conservation and the economic and social well-being of local communities in rural areas;
- under section 11A of the National Parks and Access to the Countryside Act 1949, the Agency must have regard to the purposes of conserving and enhancing the natural beauty, wildlife and cultural heritage of specified areas and of promoting opportunities for the understanding and enjoyment of the special qualities of those areas by the public;
- under section 28G of the Wildlife and Countryside Act 1981, the Agency must take reasonable steps, consistent with the proper exercise of its functions, to further the conservation and enhancement of the flora, fauna, or geological or physiological features, by reason of which a site is of special interest;
- under section 85 of the Countryside and Rights of Way Act 2000, the Agency must have regard to the purpose of conserving and enhancing the natural beauty of relevant Areas of Outstanding Natural Beauty, when exercising its functions.

**P3.63** The Conservation (Natural Habitats, &c.) Regulations 1994 (“the Habitats Regulations”) implement Council Directive 92/43/EEC on “the conservation of natural habitats and of wild fauna and flora” (“the Habitats Directive”). The Habitats Directive aims to establish a network of the most important sites in respect of natural habitats and species of wild fauna and flora. It requires measures to be taken to maintain them at favourable conservation status or, where necessary, restore them by taking remedial action.

**P3.64** The Habitats Regulations impose obligations in respect of “European Sites” as defined by Regulation 10. Sites may be designated as European Sites in respect of the habitats of bird species identified by the Birds Directive (Council Directive 79/409/EEC on “the conservation of wild birds”) (Special Protection Areas - SPAs), or in respect of habitats and species listed in Annexes I and II of the Habitats Directive (Special Areas of Conservation - SACs).

**P3.65** Government policy, as set out in Planning Policy Guidance (PPG) 9 on Nature Conservation, Planning Guidance Wales 1999 and Technical Advice Note (Wales) 5, is that potential SPAs, “candidate” SACs in Wales and listed Ramsar sites (wetlands of international importance designated under the Ramsar Convention 1971) should be treated in the same way as European Sites under Regulation 10.

## **Environment Agency**

**P3.66** The Habitats Regulations (Reg. 50) require that the Agency reviews all European Sites with regard to the impact of existing permissions/authorisations issued by the Agency. Such authorisations may include those issued under RSA 93 for the disposal of radioactive waste. The review process is under way nationally. The Agency also has a general duty to take into account effects on European Sites when reviewing existing permissions/authorisations (Reg. 3).

**P3.67** In collaboration with English Nature and the Countryside Council for Wales, which are the nature conservation bodies with whom the Agency is required to consult, the Agency has developed and published guidance for the review under Regulation 50 of its permissions/authorisations with respect to European sites (see Section 6A of this document).

## **Water Framework Directive**

**P3.68** The Water Framework Directive (WFD) (EU Directive 2000/60/EC) is a key piece of European legislation. The WFD aims to deliver long-term protection of the water environment, promote the sustainable use of water for the benefit of people and wildlife, and improve the quality of all waters - groundwaters and surface waters - and associated wetlands.

**P3.69** The WFD requires member states to undertake the following:

- Identify water bodies;
- Characterise pressures and impacts on water bodies;
- Set ecological objectives for those water bodies;
- Prepare plans to achieve objectives.

**P3.70** The Environment Agency will be responsible for implementing the directive in England and Wales and is carrying out a pilot in the Ribble area which will help define how the Agency will implement the WFD. Across Europe 15 river catchments have been chosen as pilots for the new legislation to ensure the consistency, coherence and harmonisation of national and European guidance. The Ribble and West Lancashire area is the chosen site in the UK.

**P3.71** The Ribble Pilot will test current European guidance on public participation and river basin planning. The tests will finish by the end of 2004, when the Agency will report back to the European Commission. The Environment Agency will also be testing its own guidance in the Ribble area before implementation across England and Wales. These tests will be ongoing over the next few years. The work being done in the Ribble area will go towards a 'prototype' River basin management plan for the Ribble in 2007, which will contribute to the North West's River Basin District Management Plan. The Agency will ensure that relevant impacts from the Springfields site are included in the work covering the WFD.

**Human Rights Act 1998**

**P3.72** The Human Rights Act 1998 (“the HRA”) came into force on 2 October 2000. The HRA incorporates the provisions of the European Convention of Human Rights (“the ECHR”) into domestic law. It is now unlawful (subject to the qualification outlined below) for a public authority to act in a way that is incompatible with a Convention right. A “victim” of such an act (i.e. a person who is “directly affected”) can bring proceedings, or rely upon the Convention right, in the domestic courts. However, a public authority will not be acting unlawfully under the HRA if it is required to act in the manner complained of by some provision of primary legislation. In these circumstances the court may declare that the provision itself is incompatible with a Convention right. However, the act (or omission) complained of will be upheld by the court as lawful, until such time as the legislation is amended or revoked by Parliament.

**P3.73** Certain Convention rights, such as the right to life (Article 2), are absolute. Other Convention rights, such as the right to home and private life (Article 8), are qualified. Interference with a qualified right may be justified if it is in accordance with the law, serves one of the aims set out in the qualification to the relevant Article and is “necessary” in a democratic society. Interference may be considered “necessary” if there is a pressing social need and any interference with individual rights is proportionate to the aim pursued. It is recognised that public authorities, such as the Agency, often have to strike a balance between the general social and economic needs of the community and the specific interests of individuals.

**P3.74** Under the HRA, the Agency must consider whether its decisions in respect of an authorisation under RSA 93 will result in any potential or actual breach of a Convention right. If the Agency does identify such a breach it must then consider whether it has the discretion to act otherwise, as its primary obligation must be to fulfil its statutory duty. Where the Agency does have discretion and the Convention right at issue is not absolute, it must then consider whether its decision is justified.

**Responsibilities of Other Government Bodies**

**P3.75** Appendix 4 provides a general guide to the responsibilities of other Government bodies, including legal powers and duties as appropriate, referred to in this Decision Document.

## **PART 4 - THE AGENCY'S SYSTEM OF REGULATORY CONTROL**

### **Introduction**

**P4.1** Under the Environment Act 1995 the Agency's pollution control powers are to be exercised "for the purpose of preventing or minimising, or remedying or mitigating the effects of, pollution of the environment". The Agency exercises its powers to regulate radioactive waste disposal from nuclear sites under the Radioactive Substances Act (RSA 93).

**P4.2** The system of regulatory control includes:

- deciding whether or not applications for authorisations should be granted, and setting appropriate limits and conditions in any authorisation issued which ensure that the public and the environment are well protected;
- periodically reviewing authorisations and varying them as appropriate to ensure that their conditions are up to date and effective;
- carrying out announced and unannounced inspections;
- investigating incidents;
- using the Agency's powers of enforcement, including prosecution, as necessary; and
- undertaking effluent and environmental monitoring and radiological assessments of exposure of members of the public.

**P4.3** Regulation applies to any phase of the sites life where there are, or could be, discharges of radioactivity into the environment. Accordingly, the Agency will continue to regulate the Springfields nuclear site throughout all phases of its operational lifetime.

**P4.4** The Agency is a non-departmental public body with vested legal duties, responsibilities and powers. The Agency's main sponsor in Government is Defra. The Agency is independent of the industry it regulates. The Agency's regulatory approach includes assessment of information on problems and events, and it has a long established programme for monitoring of discharges and the environment, the results of which are published. It undertakes individual inspections of compliance arrangements and, where necessary and appropriate, team audits. The Agency keeps its regulatory arrangements under review. The Agency staff carrying out regulatory duties at nuclear licensed sites are experienced professionals, with backgrounds in nuclear matters.

### **Authorisation and Review**

**P4.5** Under RSA 93 the Agency is empowered to regulate the disposal of radioactive waste on or from premises situated on nuclear sites in England and Wales. The Agency exercises regulatory control through the limitations and conditions it includes in authorisations granted under RSA 93. It can include any limitations and conditions it thinks fit, subject to the legal test of reasonableness.

## **Environment Agency**

**P4.6** The Agency may review an authorisation at any time at either the Agency's discretion or at the request of the operator. Through conditions in the authorisation, the Agency may require the operator to carry out assessments and produce reports on radioactive waste matters, for example on the application of Best Practicable Means (BPM). These can then be used to inform the review process.

**P4.7** The possible outcomes of the review will be that the current authorisation is satisfactory for the continued regulation of the site, that the authorisation requires revision for whatever reason or that the authorisation requires revision but this will be performed at a later date. It is for this last reason that the full review process should correctly be called the review and re-authorisation process. In 1999 at a previous limited review of the Springfields authorisations, the Agency concluded that the authorisation did require revision but that the full review and re-authorisation process would wait for the introduction of the new integrated authorisation multi-media certificate and also that the re-authorisation of Sellafield would take priority.

**P4.8** If, following a review of any authorisation, the Agency intends to vary its conditions, the Agency will undertake appropriate consultation on the proposed changes. The Agency will consider the responses to the consultation before it makes any final decision on the conditions and limits to be included in any new authorisation.

### **New Integrated Authorisation**

**P4.9** The draft authorisation prepared by the Agency to assist the consultation process and the authorisation that the Agency now intends to issue have been set out according to a new format and model template. The Agency intends to issue all future authorisations in an integrated form, so that all permitted means of disposal are included in a single authorisation. At any one time, this will be the only authorisation for radioactive waste disposal issued for any one site.

**P4.10** The new style of authorisation was developed from the existing authorisations that have been used to permit disposals of radioactive waste via individual routes. Many of the conditions were based on existing conditions, modified where appropriate to:

- improve clarity;
- reflect the multiple disposal routes in the authorisation;
- impose specific requirements for management competence and supervision; and
- impose new requirements arising from implementation of the 1996 Euratom Basic Safety Standards Directive.

**P4.11** As in the current authorisations, the new authorisation requires the operator not only to comply with numerical limits on the levels of activity which may be discharged, but also to use BPM to minimise further the amount of radioactivity discharged. The new template introduces improved conditions which also require the operator:

## Environment Agency

- to use BPM to minimise the activity of radioactive waste produced which will require disposal under the authorisation; and
- to use BPM to minimise the activity of waste disposed of by discharge to the environment and to minimise the volume of radioactive waste disposed of by transfer to other premises.

**P4.12** These conditions provide the main basis for ensuring that the exposures of members of the public are As Low As Reasonably Achievable, economic and social factors being taken into account (ALARA). They also encourage a holistic approach to radioactive waste management, intensify downward pressure on discharges, are consistent with the objectives of the OSPAR Convention and help to ensure that the Best Practicable Environmental Option (BPEO) is attained. Furthermore, the new conditions provide a more explicit statement of the policy requirement to ensure that radioactive wastes are not unnecessarily created.

**P4.13** The Agency considers that the new authorisation template facilitates minor variations to authorisations, as it allows individual schedules to be modified without alteration of the general conditions.

**P4.14** There is no reason why controls would be relaxed under the terms of a new-style authorisation. Within the authorisation there is a Schedule for each disposal route which contains limits specific to that route. There is no mechanism for transferring "unused" limits between disposal routes.

**P4.15** The Agency is satisfied that an integrated authorisation provides a sound basis for the regulation of radioactive waste disposals from these sites. Issues raised about specific conditions of the authorisation are considered in Section 6B & C of this document.

### Inspection

**P4.16** The Agency's specialist nuclear Inspectors (Nuclear Regulators) carry out site inspections covering all plant and processes generating, treating or discharging radioactive waste. Depending on circumstances, inspections are sometimes announced and sometimes unannounced to the operator. Inspections include checks on operational standards, performance of abatement plant and discharge systems, monitoring arrangements and records, for compliance with the authorisation. If it appears that a breach of any condition of an authorisation or an incident has occurred, an Inspector will investigate the circumstances and take enforcement action where appropriate. Occasional 'team audits' of nuclear sites are undertaken, whereby a team of Inspectors may spend up to several days at a site to undertake an in-depth probe of arrangements for compliance with regulatory requirements. The Inspectors are supported by other Agency staff with particular areas of expertise (e.g. radiological impact assessment) and are guided on regulatory policy by advisers in the Agency's Head Office.

**P4.17** The new authorisation introduces specific conditions relating to management systems, organisation and resources. The importance of maintaining ongoing effective

## **Environment Agency**

management, particularly at a time of change, is recognised and Agency inspections early in the life of the new authorisation will focus on this area.

**P4.18** It is a requirement of the new authorisation, as for many of the existing ones, that the operator shall report any discharges which do not comply with authorisation conditions, so that the Agency can investigate the circumstances and take appropriate action.

### **Incidents**

**P4.19** The UK has national arrangements for responding to both domestic and overseas nuclear incidents. These arrangements set out the roles and responsibilities of different organisations, including the Agency, HSE / NII and Local Authorities, depending on the specific nature of the incident. Should an incident occur at a nuclear site the Agency would send its technical specialists to designated support centres. The Agency specialists would provide advice on the management of and recovery from the incident. This advice would cover protection of the environment, water supplies management, radioactive waste disposal and remediation activities such as decontamination and clean up. The Agency would also investigate the circumstances of the incident to identify whether the conditions of the operator's authorisation had been breached. National arrangements also exist for transport incidents involving radioactive materials such as spent fuel and radioactive waste. The Department for Transport (DfT) provides the lead role for Government on transport incidents.

### **Enforcement**

**P4.20** Securing compliance with relevant regulatory requirements makes an important contribution to the Agency's aim of providing a better environment for England and Wales. Although the Agency expects full compliance with relevant requirements it does not hesitate to use its enforcement powers, including prosecution when necessary, to ensure that relevant action is taken by the operator. The powers available include enforcement notices (to secure compliance with authorisation conditions), prohibition notices (where there is an imminent risk of serious environmental damage), revocation of an authorisation, variation of authorisation conditions and the use of legal injunctions. Where the Agency believes a criminal offence has been committed it will consider instituting a prosecution or issuing a prohibition or enforcement notice, formal caution or a warning according to the circumstances.

**P4.21** The Agency has publicly set out its Enforcement and Prosecution Policy and has identified the principles to be applied in achieving firm but fair regulation. These principles are:

- **proportionality** in the application of the law and in securing compliance;
- **consistency** of approach;
- **transparency** about how the Agency operates and what those regulated may expect from the Agency; and
- **targeting** of enforcement action.

## Environment Agency

The principles are applied by the Agency in all its activities, and are explained more fully in the following paragraphs.

**P4.22 Proportionality** is largely in-built into the regulatory system through the balance of action to protect the environment against risks and costs. The Agency's first response to a breach of regulatory requirements is to prevent harm to the environment from occurring or continuing. The enforcement action taken by the Agency will be proportionate to the risks posed to the environment and to the seriousness of any breach of the law.

**P4.23 Consistency** means taking a similar approach in similar circumstances to achieve similar ends. The Agency aims to achieve consistency in the advice it tenders, in its response to pollution and other incidents, in the use of its powers and in its decisions on whether to prosecute. Consistency does not mean simple uniformity. Rather, the scale of environmental impact, the attitude and actions of management, and the history of previous incidents or breaches all need to be taken into account in reaching decisions on enforcement action.

**P4.24 Transparency** means helping those regulated and others to understand what is expected of them and what they should expect from the Agency. It means, for example, making clear why enforcement action is being taken. It includes providing an opportunity to discuss what is required to comply with the law before enforcement action is taken, unless this is precluded by the urgency with which such action is required, and providing a written explanation of any rights of appeal against enforcement action at the time the action is taken.

**P4.25 Targeting** means ensuring that the Agency's regulatory effort is directed primarily towards those whose activities give rise to serious environmental damage or a risk of such damage. Repeated incidents or breaches of regulatory requirements may indicate inappropriate management attitudes, an unwillingness to change behaviour, or an inability to achieve sufficient control over the process concerned. Nuclear installations are among the sites of high potential hazard which receive regular inspection visits so that the Agency can assure itself that the risks are being effectively managed.

**P4.26** Through EA 95 and RSA 93 the Agency has powers to institute criminal proceedings against relevant companies and certain individuals (officers of companies such as Directors, Managers and the Company Secretary). The Agency recognises that the institution of such proceedings is a serious matter. Hence, a decision to prosecute is only taken after full consideration of the implications and consequences, taking account of the Code for Crown Prosecutors. The Agency also needs to be satisfied that there is sufficient admissible and reliable evidence that an offence has been committed and there is a realistic prospect of conviction. In the event of successful prosecution the penalties are, on summary conviction, a fine of up to £20,000 and/or up to six months' imprisonment or, on conviction on indictment, an unlimited fine and/or up to 5 years' imprisonment.

### **Public registers**

**P4.27** The Agency makes strenuous efforts to meet the needs of the general public for information on its activities. In particular, it places a considerable amount of information on radioactive waste discharges on the public registers. This information includes the certificates of authorisation, routine discharge returns as reported by the operators, annual reports of the Agency's own discharge and environmental monitoring and details of any enforcement action taken. The Agency also issues press releases when enforcement action is taken.

**P4.28** The Agency, together with the Food Standards Agency, the Scottish Environment Protection Agency and the Environment and Heritage Service (in respect of Northern Ireland), publishes an annual report on its environmental monitoring results for radioactivity and sends this to all local authorities in England and Wales. It also acquires data on discharges from regulated industrial premises, including radioactive discharges from nuclear sites, for placing on its Pollution Inventory database. This information is accessible via the Agency's web site.

**P4.29** When the Agency consults publicly on applications for changes to authorisations, all information relating to such applications is placed on the relevant public registers except where considerations of national security or commercial confidentiality apply.

**P4.30** Generally nuclear site operators publish annual reports on their environmental performance. They report regularly to the local community via the Local Liaison Committee or Local Stakeholder Group. They may publish newsletters or use the internet as a medium for communications.

## **PART 5 - THE AGENCY'S REVIEW AND RE-AUTHORISATION PROCESS**

### **Introduction**

**P5.1** The Agency's review approach seeks to comply with Government directions, having regard to Government guidance, the implementation of Government policy objectives and European legislation, and takes account of international treaty obligations. Using the information submitted by BNFL Springfields, the Agency has reviewed whether current practices represent the Best Practicable Environmental Option (BPEO) and whether Best Practicable Means (BPM) are being used to minimise radioactive waste disposals.

**P5.2** The Agency has interpreted in the authorisation the meaning of BPEO as "*best practicable environmental option means the radioactive waste management option, for a given practice, that provides the most benefit or least damage to the environment as a whole in the long term as well as in the short term, taking into account operational doses and risks, and social and economic factors.*" This interpretation includes reference to economic factors and is consistent with the Agency's duty under Section 39 of EA 95 to consider costs and benefits of its proposals.

**P5.3** It is the Agency's objective that the application of BPEO and BPM should ensure that radioactive wastes are managed and disposed of in ways, which protect the public, workforce and the environment and are not created unnecessarily.

### **BNFL Springfields Submissions**

**P5.4** On receipt of the BNFL Springfields submissions in March 2002, the Agency sent copies to relevant public registers. In accordance with section 16(4A)(a) of RSA 93, copies of the submissions and subsequent information were sent for consultation purposes to the FSA and to HSE / NII.

**P5.5** The information that BNFL Springfields supplied was the primary information used in the review. The requested information was set out in a series of sections covering the various areas such as past and future discharges, radiological and environmental assessments and BPEO / BPM studies.

**P5.6** The Agency considers that it must have sufficient information from the operator in order to make a proper consideration of all factors relevant to regulation of discharges. The Agency needed to assess this information before making a technical appraisal and arriving at its decisions on the BNFL Springfields review.

### **Consultation with HSE / NII and FSA**

**P5.7** HSE / NII examined the application documents and provided comments on matters falling within its regulatory remit. The FSA assessed the potential impact of discharges on members of the public, including that received via the food chain.

**Requests to BNFL Springfields for Additional Information**

**P5.8** During the review and consideration of the BNFL Springfields submission it became apparent that further supporting information was required. This precipitated a request for further information from the Agency. This information has been incorporated into the review process and has also been sent to statutory consultees and placed on relevant public registers.

**Issues for other regulators**

**P5.9** The HSE / NII has regulatory responsibility for direct radiation from nuclear sites, and the Agency has obtained information from the NII on the level of off-site direct radiation from the Springfields site. This information has been included in the relevant radiological impact assessments.

**P5.10** The Agency has consulted with FSA during the review process. The FSA provided dose assessments based on the Agency's limits as proposed in the draft authorisation. These dose assessments were included in the Explanatory Document.

**The Agency's Considerations Prior to Consultation**

**P5.11** The Agency considered all the information available prior to public consultation and prepared a draft authorisation and an Explanatory Document for the BNFL Springfields review, to inform and assist the consultation process. The Explanatory Documents included information on the concepts, principles, policy and international obligations relating to determination of these applications, a general description of the conditions of the authorisation, and details of the Agency's considerations for the site prior to consultation. The Agency had not made any decisions on the BNFL Springfields review prior to holding the public consultation.

**Public Consultation**

**P5.12** The Agency carried out a public consultation exercise to assist its decision-making process on the BNFL Springfields review. This enabled consultees to draw the Agency's attention to any matters they wished it to consider when reaching its decisions on the applications.

**P5.13** The Explanatory Document and draft authorisation were provided to help members of the public and other consultees to understand the process of review for the Springfields nuclear site and the Agency's considerations prior to consultation.

**P5.14** The Agency consulted with members of the public, national and local public bodies, interested groups and organisations, the Agency's relevant Advisory Committees and Groups, and the Local Liaison Committee for the site. Local authorities at the site and other sites to which waste is transferred were consulted as were all parish councils. The Agency consulted certain local authorities and other public bodies as statutory consultees under section 16 of RSA 93.

## Environment Agency

**P5.15** The consultation documents were made available free to members of the public, on request to the Agency. Requests could be made by telephone, fax, e-mail or by letter. The consultation documents were also made available on the Agency's web site at *www.environment-agency.gov.uk*. The start of the consultation period and the availability of the consultation packages were publicised by the issue of an Agency press release. Additionally, copies of the Explanatory Document were made available at local libraries.

**P5.16** Consultation started on 8 December 2003. As for requests for consultation documents, the Agency accepted responses to the consultation by telephone, fax, e-mail or by letter. The consultation took place over 15 weeks, ending on 19 March 2004, although responses were accepted for a reasonable period after this date.

**P5.17** The Agency's policy is to consult widely and openly. The consultation undertaken by the Agency for the review is proportionate given the radiological significance of discharges from the site and meets with the Agency guidance and legal requirements. The responses received during nuclear site consultations suggest that the public do wish to be involved in the Agency's decision making process. The Agency considers that public consultation helps to inform decision making and also has other important benefits. It increases public understanding of applications and the Agency's role in determining them, alerts the Agency to public concerns, establishes the legitimacy of the decision-making process, helps to enhance public trust and confidence and promotes acceptance of the final decision. The Agency also recognises that there are other requirements which may be relevant; for example the Aarhus Convention, which came into force during 2001, establishing the right of the public to be consulted.

**P5.18** The process of consultation has significant associated costs. These are recovered from the operator via the Agency's statutory charging scheme for radioactive substance regulation. The Agency recognises that the costs of consultation are wider than financial aspects alone, reducing Agency resources available for more direct aspects of regulation and the operator's resources which could potentially be used for direct environmental improvements. It is therefore important to keep consultation practices under review in order to maintain an appropriate balance.

**P5.19** The Agency included the draft authorisation in the consultation documents to inform and assist the consultation process. The draft authorisation helped to show how regulatory controls on radioactive waste disposals from the site might be imposed if the authorisation was issued, and enabled detailed comments on the conditions to be made. The Agency has considered whether or not the draft authorisation should be included in future in such consultation packages and concludes that it is of significance in informing the consultation.

**P5.20** The Agency considers that the review submission necessarily contained technical information because it related to complex issues involving scientific appraisals and assessments. The Agency sought to assist understanding of these issues by producing the Explanatory Documents. This document included an executive summary of the key points of the consultation. The Agency recognises that different consultees will have different needs for information and that the technical content of

## **Environment Agency**

consultation documents can seem inappropriate or even daunting. While the Explanatory Document seeks to assist understanding, the main focus of the consultation must be the review submission itself. However, it could be seen as presumptive, on the part of the Agency, to send only technically limited documents to certain groups of consultees, and not the whole submission. The Agency will in future consider whether operators should be given the opportunity to provide additional summary submission documents to assist consultation.

**P5.21** The Agency also provided a Summary Document that highlighted the main issues involved in the review and outlined the Agency's proposals given in the Explanatory Document. The Agency was not consulting on the Summary Document itself due to its limited and brief format but was using it to help in the consultation process. The Summary Document was 13 pages in length and the Explanatory Document was 205 pages long.

**P5.22** Before granting an authorisation for disposal of radioactive waste from a nuclear site, section 16 of RSA 93 requires that the Agency consults with such local authorities, relevant water bodies or other public or local authorities as appear to the Agency to be proper to be consulted. As such the Agency consults with certain public and local authorities and relevant water bodies under that section. As noted above the Agency has a policy of wide and open consultation and therefore conducts a wide public consultation in addition to that required by section 16. As part of that wider consultation, the Agency consults with all local authorities, i.e. district/borough, county and unitary authorities around the Springfields site and sites to which waste transfers will be made. This is judged by the Agency to reflect the areas most likely to be affected by the new authorisation. Furthermore the Agency provided copies of the consultation documents to members of the public on demand.

**P5.23** The Agency considers that the planned 15 week consultation period was more than proportionate to the level of impacts associated with the Springfields nuclear site's radioactive discharges. The Cabinet Office Code of Practice recommends a minimum period of 12 weeks. The Agency's policy is to continue to accept responses for as long as reasonably practicable after the end of the consultation period.

**P5.24** The Agency's site Inspector gave a presentation about the consultation and the Agency's proposals to Lancashire County Council's Joint Overview and Scrutiny Committee Springfields Task Group. This has members and representatives from local councils and authorities. The Agency consulted directly with local public authorities, parish councils, other organisations and pressure groups who could raise the issue of the review more widely if they considered it appropriate. The Agency also held two public "drop-in" surgeries in Freckleton so that local people could have a chance to talk to Agency staff in person about the proposals, to ask questions and raise issues or concerns.

**P5.25** The Agency considers that it did all it reasonably could to advertise the public consultation and to respond to local concerns. It concludes that it provided adequate opportunity for attention to be drawn to the consultation and for members of the public to make responses if they wished to. The Agency will keep its consultation arrangements under review.

## **Environment Agency**

**P5.26** As the operator of the Springfields nuclear site, BNFL has a legitimate interest in the Agency's consultation and was free to comment on the consultation. The Agency has received a formal response from BNFL Springfields regarding the proposals as set out in the explanatory documents. Some of these are detailed later along with comments from other respondents.

### **Determination Process After Public Consultation**

**P5.27** The purpose of the consultation was to help inform the Agency in reaching its decisions on the review and no decision was reached until it had completed this process. Each response to the consultation has been read and carefully considered by the Agency.

**P5.28** Where issues have arisen which fall outside the Agency's principal responsibilities, and where the Agency has needed the advice of other organisations having expertise in specific topics, the Agency has written to the Government Department or public body concerned to seek its view.

## PART 6 - THE AGENCY'S CONSIDERATIONS AFTER CONSULTATION

### Introduction

**P6.1** This part of the Decision Document sets out the consideration the Agency has given to the review of the BNFL Springfields authorisation. It includes consideration of the matters described in Parts 2 and 3 of this document, together with information provided by other organisations and by respondents to the Agency's consultation. Section 6A summarises the responses received during the consultation and provides comments by the Agency on how the responses have been dealt with. Section 6B describes the Agency's consideration of certain general issues. Section 6C describes the Agency's process of setting limits and notification/advisory levels for radioactive waste disposals in the new authorisation.

## SECTION 6A – CONSULTATION RESPONSES AND AGENCY COMMENT

### Introduction

**P6A.1** The following paragraphs summarise comments made by respondents to the consultation and the Agency's response to those comments. Where appropriate the respondents' comments have been presented as received. There are presented in this section under a series of headings.

**P6A.2** At the start of the consultation 170 packs of information were sent out to named organisations or individuals. The original consultation list included statutory consultees, local councils and parish councils, national and local concerned environmental groups and various other agencies. In total 26 responses were received including from respondents not on the original list.

**P6A.3** A wide range of comments and issues were raised. All comments were considered carefully by the Agency before reaching any conclusions on the future regulation of the Springfields site.

### Justification

**P6A.4** There were several detailed and long responses on the justification case for not only the continued manufacture of Magnox fuel at Springfields but also the whole of the Magnox fuel cycle (Greenpeace) and the cost of the continued operation of the Magnox nuclear power stations (Spotlight On Springfields). There were other comments on the use of nuclear energy as opposed to renewable forms of power - "... nuclear energy should be phased out as fast and as cleanly as possible." (private individual).

**P6A.5** The Agency's position on the consideration of the justification principle was given in the Explanatory Document (paragraphs 5.10 - 5.11):

*"... the Government is best placed to determine the overall balance of advantages and disadvantages from a national perspective. The Government has confirmed to the Agency that justification decisions will*

## Environment Agency

*be for the appropriate Secretary of State to make rather than the Agency. Therefore the Agency has not considered justification in its review."*

**P6A.6** This position was refuted by The Nuclear Free Local Authorities in their response - "... (the) requirement for justification in the Basic Safety Standards Directive has not yet been transposed into UK law ... (it) remains the responsibility therefore of all emanations of the State including the Agency..". During the period of the Agency's consultation on the Springfields authorisation, the Government consulted on new regulations for the application of justification decisions. The 'Justification of Practices Involving Ionising Radiations Regulations 2004 No.1769' has been through the parliamentary process and came into force on 2nd August 2004. The consideration of justification or any review of existing practices with regard to justification is a matter for the relevant Secretary of State as the 'Justifying Authority'.

## Sustainable Development

**P6A.7** Sustainable development was raised as an issue by the Federation of Lancashire Civic Societies who were "... concerned with the stated increasing demand for electricity and the reduction of fuel supplies. Will nuclear energy have a resurgence and is that likely to have a bearing on the proposals?". The Agency's review only considered the current situation at Springfields and BNFL's information on its future plans. Any increase in the supply of energy by nuclear power is an issue of policy for Government and of economics for nuclear operators. The two main regulators, the Agency and the Nuclear Installation Inspectorate, will still regulate current sites, whether in operational or decommissioning mode.

## BPEO / BPM

**P6A.8** Basing the authorisation on the approach of the Best Practicable Environmental Option and Best Practical Means was welcomed by many respondents. However there were concerns about how BPM was considered and that it relied "...very much on what BNFL tell the Agency." (RADMIL report). The Agency takes a proactive role in assessing BPM by on-site inspection and review and does not just take the operator's own view without question. The inspection and regulatory work of the Agency has been discussed earlier in this document. An important part of BPM is the continued improvement of standards over time - what is best practice now may not be in 5 or 10 years time.

**P6A.9** The Agency also notes a comment given by the Joint Overview and Scrutiny Task Group of Lancashire County Council. The Task Group noted "...Councillors questioned how the BPM is reached. It was felt that there should be access to this information. The group is particularly concerned given the fact that best practice methods do not always seem to be used e.g. on a site visit to Springfields it was learnt that the best practice methods for liquid discharges detailed by senior managers was not the practice of discharge being implemented by staff on the ground.". During regulatory inspections the Agency has confirmed to its own satisfaction that the correct discharge regime is being implemented by BNFL.

**P6A.10** There were responses on the application of Best Practicable Environmental Option for decontamination work, especially the principle of 'dilute and disperse' seeming to have a greater priority than the more desirable 'concentrate and contain'. Greenpeace were of the view that the decontamination of equipment and metal using pickling liquors was "... a highly objectionable method of decommissioning...". Decontamination is a significant regulatory regime issue for the Agency. Considering different options for decontamination, involving 'dilute and disperse' and 'concentrate and contain' to varying extents, is required as an integral part of the operator's waste management strategy. To help ensure the continued application of BPEO / BPM, the Agency has specified five Information Requirements on BNFL in Schedule 10 of the authorisation and has set two Quarterly Notification Levels (QNLs) on the new decontamination facility.

**P6A.11** The issue of BNFL's four main abatement options to further reduce liquid discharges, as described in their submission, was raised by many respondents. The comments covered the balance of financial cost versus the reduction in discharges, the perceived lack of stakeholder engagement and the availability of information to aid debate. The Nuclear Free Local Authorities stated for the issue of abatement that "*Public consultation is essential to a BPEO but BNFL failed to undertake this.*". Greenpeace commented that "*BNFL used an expert brainstorming session to draft proposals, rather than involving the public.*". The Irish Government commented that "*...Ireland would reiterate its advocacy of the Best Available Techniques (BAT) principle, as set out in the OSPAR Convention.... However, the documentation does not provide sufficient details as to precisely where the various waste streams arise in the fuel manufacturing process, nor the procedures or technology that will be implemented in reducing the radioactive content of these waste streams.*".

**P6A.12** The Agency recognises the benefits of wide consideration of BPEO issues and encourages operators to undertake stakeholder engagement. However the Agency accepts BNFL's assertion that there could be potential security issues associated with involving the public in all the details of BPEO studies and in providing details of the precise origin of individual waste streams. The Agency has made BNFL's submission available on the public register, in local libraries and on the internet.

**P6A.13** In its submissions to the Agency on the aqueous waste disposal route to the River Ribble, BNFL provided information on the environmental benefits of the abatement options and the disadvantages in terms of capital cost and time scale. BNFL provided more detailed indicative cost estimates and estimated time scales for the most technically achievable options. The four options assessed in more detail were:

- neutralisation and store for beta decay;
- store total effluent for beta decay and then neutralise;
- neutralisation with floc dewatering and encapsulation; and
- evaporation and decomposition of nitrates.

**P6A.14** With regard to cost and time estimates for these potential discharge abatement options BNFL stated in its submission that: "*Since this reduction [of activity due to cessation of uranium hexafluoride (Hex) and Magnox fuel production]*

## Environment Agency

would occur at the latest within 6-12 months of any abatement plant coming into operation, the building of such plant is clearly not justified."

**P6A.15** The Nuclear Free Local Authorities commented that the Agency appeared to have assumed that "... *abatement techniques may not be worthwhile for reducing discharges after 2008.*". This is not the case. The Agency's next review of the authorisation will reconsider the abatement issue for the situation at that time and the level of discharge occurring.

**P6A.16** After again reviewing its statutory duties and Government guidance, the Agency has confirmed its belief that the installation and commissioning of abatement plant is not appropriate given BNFL's publicly stated policy of ending uranium ore processing at Springfields. The cessation of ore processing will significantly reduce radioactive effluent discharges without abatement plant. However this conclusion is applicable for current plant with the currently stated future work programme. If new work is to be undertaken on the site then the conclusion of future BPEO assessments may be different.

### Authorisation Limits

**P6A.17** Greenpeace commented on the Agency's determination of the limits proposed in the new authorisation. In their view "... *there does not seem to have been much attempt to assess the significance of the radionuclides discharged from Springfields.*" In line with the principles provided in the draft *Statutory Guidance on the Regulation of Radioactive Discharges into the Environment from Nuclear Licensed Sites*, the Agency has formulated a set of principles to aid the limit setting process. These were discussed in section 7 of the Explanatory Document. The Agency considers its approach to limit setting for Springfields has been appropriate to the significance of the radionuclides discharged and in line with the limit setting principles used for other sites, e.g. Sellafield.

**P6A.18** One objective of the review was to reduce the headroom in the limits - the margin between the maximum amount allowed to be discharged (the legal limit) and the actual level of the discharge. However BNFL noted that "... *the impact of our discharges is already low and question whether the additional reporting requirements imposed ... will really be a use of our resources that adds value and results in better regulation of our discharges.*" It is the Agency's view that the whole of the new authorisation including the removal of headroom and the additional reporting requirements will aid better regulation, improve transparency and clarity to stakeholders and continue to focus BNFL efforts to further improve the environment by reducing discharges.

**P6A.19** Many responses discussed the issue that the reduction in discharge limits to reduce headroom does not necessarily lead to a reduction in actual discharge. As an example the Joint Overview and Scrutiny Task Group of Lancashire County Council noted that the "... *new proposals only serve to reduce the extensive headroom contained within current authorisation. In fact the proposed changes to the maximum levels of discharge permissible still allow for actual discharges to increase over the next few years.*". The Agency did address this issue within the Explanatory Document.

The Agency acknowledges that the new limits may allow some increase in discharges for a limited time to allow for decommissioning operations and treatment of legacy materials. However, the Agency notes that the overriding BPM conditions also require BNFL to minimise both arisings and disposals of radioactive waste for. Furthermore, Requirement 2 in Schedule 10 requires BNFL to undertake a comprehensive review of national and international developments in best practice for minimising all waste disposals and provide a strategy for achieving reductions in discharges.

**P6A.20** The HSE noted that they "*... are pleased that the proposals acknowledge the possible need for the Agency to increase discharge limits to facilitate measures required to reduce the hazard potential and risks associated (with) waste legacies and decommissioning activities.*". It is believed that the introduction of the multi-media authorisation with site and plant limits provides a robust but flexible framework of regulation. The Agency recognises that plant limits may be challenged from time to time, particularly during decommissioning and clean-up operations. As raised in paragraphs 7.38 and 9.22 in the Explanatory Document, where a justified case can be made by the operator, the Agency would consider increases in plant limits and this would be subject to a 'fast track' consultation process involving statutory consultees. However, for site limits, the Agency confirms to British Waterways and all other stakeholders that they "*...would be consulted on any such increases (in limits)...*" if such increases affected the overall impact of Springfields on the environment. The Agency remains of the view that the new limits and headroom are appropriate.

**P6A.21** The separation of limits into operational and decommissioning components was welcomed. It was considered that they should be "*...valuable and informative criteria...*" for further assessment (Ribby-with-Wrea Parish Council). However BNFL noted that "*...splitting 'historic process residues' ...from 'process residues', as proposed in Table 3, Schedule 8, will present significant practical accountancy difficulties.*". Having investigated this comment and after further discussions with BNFL, the Agency has made changes to the table covering this disposal to Clifton Marsh. The change is discussed in more detail later in this document (see section 6B).

**P6A.22** There were various responses on the level of the limits set in the new authorisation, in addition to the headroom issue discussed above. The HSE noted that, as part of their statutory function, they wished to "*... ensure that the new authorisation will enable the radioactive waste management and decommissioning of redundant plant to proceed as required and that the Agency's proposals should not foreclose any reasonable option for dealing with legacy waste or residue materials.*" In the Explanatory Document the different values for limits that BNFL requested and the Agency proposed were discussed. A private individual noted that "*... relative to the BNFL proposals I find the numbers high. In a bargaining situation, such as this, one would expect that BNFL's initial proposals to be high in the expectation of regulatory reduction.*". This concern is noted. The Agency required BNFL to provide a realistic and reasoned argument for the values it was requesting. As highlighted in the Explanatory Document and this Decision Document, where the Agency has allowed a certain amount of headroom for the uncertainties associated with decommissioning work, the Agency has set more restrictive Quarterly Notification Levels to reinforce the application of Best Practical Means to minimise discharges.

**P6A.23** A private individual noted that "... *the discharge limits are at an extremely small proportion of the total process radioactive capital. Thus small 'incidents' could potentially cause (relatively) large discharges*". The Agency does not authorise discharges from accidents as, by definition, there is no managerial control to the level of discharge. However in setting discharge limits it is expected that there may sometimes be small events in normal operational processes that are considered as unplanned but foreseeable e.g. *minor* spills or leaks when an item of equipment fails. Such minor events are taken into account in limit setting. It should be noted that the overriding requirement for the application of BPM still applies and that enforcement action may be appropriate depending on the circumstances of the event.

### Dose Impact

**P6A.24** In the Explanatory Document the Agency proposed that the liquid discharge limits be reduced even further in 2008 when major processing plants will have closed down, so removing additional headroom for the remaining plants. This proposal was welcomed and was considered "...*a sensible and realistic approach...*" (Ribby-with-Wrea Parish Council). Michael Jack MP queried "...*what the risk levels are if the 2004/2007 situation were to remain.*" and HSE wished that "...*the proposed step reduction in discharge limits in 2008 is kept under review to reflect, for example changes in the sites operational strategy, impact of the Nuclear Decommissioning Authority (NDA) and any significant delays in the current decommissioning / residue treatment programmes.*". The Agency will keep the situation under review. However as discussed later in section 6C, the further reduction set for 2008 would decrease the potential radiological impact to the most exposed individual by more than two-thirds, from 171 to 49 microsieverts. In the Agency's view this is both desirable and achievable.

**P6A.25** As might be expected from such a consultation, many responses raised issues regarding radiation doses. RADMIL's report noted for the many different numerical values of assessed dose that were presented in the Explanatory Document that "*Due to the differing methodologies and the different Agencies choosing different candidate critical groups this again is confusing.*". The Agency understands that presenting the dose assessment from the Foods Standards Agency and BNFL as well as from itself, each with several different sub-assessments, can be confusing. The Agency believes that it is important that all the information should be made available, with appropriate comment to aid understanding and to put the assessments into context.

**P6A.26** Assessments present estimates of future doses to members of the public and are forecasts based on cautious assumptions about the habits and locations of the potentially most exposed members of the public. Habit surveys are used to gather the information which underpin these dose assessments. For example the BNFL Springfields assessment made use of data from two surveys carried out in 2000. It is these habit surveys that are used to identify candidate critical groups of the potentially most exposed people. A private individual was concerned that there was no assessment of workers at the Southport sandwinning depot, RSPB staff, beach workers, dog walkers and holidaymakers including children. The critical group methodology assesses the radiation dose to most exposed groups and therefore, by definition, the radiation dose to other groups, such as those suggested, will be lower.

**P6A.27** The Joint Overview and Scrutiny Task Group of Lancashire County Council raised their "...concerns for wildfowlers on the estuary of the River Ribble for whom exposure levels to the top layers of sediment on the estuary appear to be based on sixty hours per year where as realistically they could spend far longer than that on the estuary in a year.". The Agency believes that the Task Group may have taken the "sixty hours a year" exposure time from that for British Waterways Ribble Link workers spending this amount of time working in muddy areas (Explanatory Document Appendix 2 A2.14). The Agency used in its assessments average exposure times for wildfowlers of 200 hours on mud and 980 hours on sand. In the Food Standards Agency's assessment it was assumed that the most exposed members of the public spend up to 270 hours per year wildfowling (Appendix 3 of Explanatory Document).

**P6A.28** Several of the responses compared the maximum assessed dose for the current authorisations, and for the proposed authorisation, assuming discharges at 100 per cent of the proposed new limits, and compared them to the guidance constraint values. The Nuclear Free Local Authorities noted that the Ribble estuary houseboat dwellers "... would receive 329  $\mu\text{Sv}/\text{yr}$  from liquid discharges from Springfields at the current maximum limits, exceeding the 300  $\mu\text{Sv}/\text{yr}$  maximum dose from a single source; and ... would still receive above 300 microsieverts until 2007 at the proposed new limits when the continuing impact of Magnox discharges from Sellafield is added in.". The Agency notes that the assessed doses are the maximum that could be received if all the liquid discharges were at 100 per cent of the limits. In fact the actual dose to the houseboat dwellers from Springfields discharges is estimated at 75 microsieverts per year. The remainder of the 329 microsieverts per year is assessed to be from Sellafield discharges. When the effects of discharges are summed together (from Springfields and Sellafield) then the appropriate limit to compare the summed dose to is the annual public dose limit of 1000 microsieverts.

**P6A.29** Greenpeace noted that "...it is people living close to the actual site who are receiving most after 2008 - mostly as a result of direct radiation. A farming family local to the site receive up to 90 microsieverts - up to 80 of this dose is direct radiation. The Environment Agency should ask BNFL what measures it proposes to reduce the direct radiation..". As discussed in the Explanatory Document, the direct radiation dose exposure of around 80  $\mu\text{Sv}$  per year is taken from figures derived by the Nuclear Installations Inspectorate who have regulatory responsibility in the matter. The NII believes that doses at this level indicate that the direct radiation exposure to the public from the Springfields site are probably as low as reasonably practicable (ALARP) and that action to reduce doses are therefore unlikely to be required. However the Agency expects that as BNFL cleans up the site by processing the old stored legacy material and decommissioning redundant buildings, that the level of direct radiation exposure will decrease.

**P6A.30** Greenpeace also noted that "...the Government's Radioactive Discharge Strategy has set an objective of achieving doses to all members of the public from authorised discharges by 2020 of less than 20 microsieverts..." and " Even after 2008, Springfields will not have reached the Government's target (sic) of less than 20 microsieverts. The Environment Agency needs to ask BNFL how it envisages being able to achieve further reductions. If they are going to have to do it by 2020, why not

now?". The Agency notes that it is a Government objective, not a target, to achieve doses to all members of the public from authorised discharges by 2020 of less than 20 microsieverts. The Government's Discharge Strategy makes it clear that this level of exposure is seen as a consequence of achieving the Government's targets for reducing radioactive discharges. It is not the intention to impose a general dose limit of 20 microsieverts per year from 2020. The Agency, as part of its regulatory role, will continue to seek further reductions in discharges from the Springfields' site as an important contribution to the Government's policy and commitments for substantial reductions in discharges from the UK nuclear industry.

**P6A.31** The issue of tidal discharge of liquid effluent to the River Ribble was raised. Fylde Borough Council were concerned about "... *the new rolling quarterly limits on aqueous discharges in that they may conflict with BPEO and greater weight should be given to discharging at optimum tidal conditions.*" The Agency agrees that the BPEO / BPM must be used to minimise the potential radiation exposure. As part of their submission to the Agency, BNFL supplied information on a BPEO study from 1999 that concluded that the best dispersion could be achieved by restricting the discharge to a 2 hour period during the incoming tide. The Agency does not believe that the new QNLs restrict the application of BPEO as the QNLs apply to the average of 90 days rather than the tidal cycle of just over 12 hours.

### Disposals to Clifton Marsh

**P6A.32** There was significant response on the issue of disposals of low level radioactive waste to Clifton Marsh. Simonswood Parish Council condemned "... *any radioactive waste being dumped at the Clifton Marsh landfill site...*". The Nuclear Free Local Authorities stated that "... *landfill at Clifton is objectionable ... and could cause unnecessary exposure to those most affected of an additional 2 to 3 microsieverts...*". The Agency has concluded that controlled burial to Clifton Marsh landfill site, with suitable limits and conditions, is an appropriate waste management option and should continue. The Agency also notes that 3 microsieverts is equivalent to about 12 hours of the average annual background radiation exposure in the UK. The Agency has considered British Waterways suggestion that extra specific conditions on the burial of the radioactive waste be included in the new authorisation but do not feel that it is appropriate to introduce these as they would be disproportionate.

**P6A.33** Ribby-with-Wrea Parish Council expressed the view that "... *monitoring and close control of disposals of solid waste to the Clifton Marsh site are needed, but when decommissioning occurs at the site, the BNFL safety criteria will be maintained if they are still allowed to discharge solid waste to Clifton Marsh within the regulated limits of radioactive levels.*". As part of the Agency's routine regulatory work, it will continue to inspect and audit the arrangements and the disposals of radioactive waste to Clifton Marsh.

**P6A.34** The Agency notes that the Nuclear Free Local Authorities believe that "... *on-site storage of wastes is preferable;*..." and that Greenpeace believe that in relation to disposing of radioactive wastes as soon as is practicable that "*This is the kind of thinking which has led to the ridiculous situation at Dounreay with the UKAEA*

*applying to transport low-level waste to Drigg in Cumbria when they have acceptable storage facilities on site. It is likely to force BNFL to send waste to Clifton Marsh and Drigg when on-site storage might be more appropriate.*". The Agency notes that Government policy is for the use of available disposal routes.

**P6A.35** The Agency proposed in the Explanatory Document to remove the restriction on the permitted dose rate from radioactive waste for disposal at Clifton Marsh. RADMIL's report commented that with regard to the removal of the restriction that *"The explanations given in the report are considered to lack sufficient detail to inspire public confidence, and should be supported by scientific evidence."* In its Explanatory Document the Agency considered *"... that this requirement relates primarily to the regulation of radiation doses to workers involved in waste handling operations. As other legislation, namely the Health and Safety at Work Act 1974 and the Ionising Radiations Regulations 1999, already apply to the regulation of worker doses, the Agency does not intend to include this criteria in the new authorisation."* This decision is consistent with the regulatory framework in place at nuclear facilities.

**P6A.36** The option for a change to the concentration criteria defining decommissioning wastes for disposal to Clifton Marsh that the Agency proposed in the Explanatory Document received a range of comments. The Lytham and District Wildfowlers Association stated that *"... with much vehemence that we wholeheartedly (sic) object to this proposed increase in toxic dumping on our doorstep."* Fylde Borough Council were *"...concerned to note the proposed increase in the concentration disposal criteria value for uranium bearing decommissioning wastes and would urge the Agency not to increase the current value without further consideration of the merits and implications of alternative measures to address any perceived shortfall in capacity to accept such wastes at other sites."*

**P6A.37** Greenpeace commented that *"Initially BNFL did not request any increases in disposal limits for Clifton Marsh, but the Agency appears to have persuaded BNFL to apply for authorisation to dispose of larger amounts of uranium bearing waste to Clifton Marsh, although it does say the overall amount of radioactivity to be disposed of should be reduced."* Greenpeace continues *"...it appears that the Agency is trying to create a new category of waste dump by stealth - a dump which can accept waste up to a 10th of the limit for Drigg. This requires much more discussion. This should be put on the agenda of the new Committee on Radioactive Waste Management (CoRWM), and the Agency should put its proposals on hold for the time being."* The Agency questioned BNFL over its approach to the disposal of decommissioning wastes and after some debate BNFL sent a letter requesting the higher value for the concentration criteria. In considering this issue the Agency is taking due regard of draft Statutory Guidance to the Agency from Government in trying to ensure that the BPEO is chosen for the disposal of this type of waste. In its response to the consultation, CoRWM stated that *"we have no comments on the draft Certificate of Authorisation document and think it unlikely that CoRWM will wish to see similar proposals in the future."* The Agency understands that CoRWM is to concentrate its work on Intermediate Level radioactive Waste (ILW) management issues.

**P6A.38** As stated in its response BNFL *"... believe that it is in the national interest to maintain the availability of a local disposal option for very low level radioactive material "* and *"We believe that it will be of benefit to the country if, under the strictly*

*prescribed arrangements, there is an option to send for local disposal, some material in excess of the specified routine solid waste contamination concentration limits. We note that this option, if used, would restrict the total amount of radioactivity that could be sent to the local disposal facility. This will help maximise the availability of the Drigg, Cumbria, disposal facility for more appropriate material".*

**P6A.39** The Joint Overview and Scrutiny Task Group of Lancashire County Council *"...accepted that at a national level there will be a longer term issue relating to the disposal of higher level radioactive solid wastes. This waste could continue to going to Drigg but that site is really intended for higher levels of waste, and further issues will be created once it becomes full'. They (The Task Group) acknowledged that the options of leaving this type of waste at BNFL, Salwick or disposing of it at Clifton Marsh needed to be addressed. Members of the Task Group are also concerned about the lack of clarity in relation to the figures involved in the explanation as to how the levels of radioactivity allowed to be disposed of would be calculated. If this option is to be progressed in any way then the detail should be made completely clear prior to any decision being made in order that consultation could have some validity."*

**P6A.40** On this option RADMIL's report commented that Drigg *"...is seen as a valuable resource that is rapidly being filled"*; and that the Agency is *"... minded to increase the limit ... but with a payback clause, which would reduce the total amount of radioactivity that can be consigned should BNFL use this limit."* RADMIL's report then continues *"At face value this could be viewed as attractive to all parties but is also short-termism. ... BNFL have carried out a radiological risk assessment for disposal at Clifton Marsh, which shows negligible if not imperceptible risk"*. It concludes that *"RADMIL disagrees with the EA proposals for solid waste disposal at Clifton Marsh. There is no risk analysis or scientific evidence to support reducing the limit on very low level radioactive waste going to Clifton Marsh. This could also be seen as short termism and the EA should review this strategy based on likely total waste arisings from the site and the recommendations of RWMAC"*.

**P6A.41** After considering all the responses on this issue, the Agency has decided not to authorise the option allowing an increased uranium concentration to be used for decommissioning wastes. The Agency believes that the case for its use has not been fully substantiated and considers a wider dialogue with stakeholders is necessary before such proposals can be considered. This is further discussed in section 6C.

**P6A.42** Greenpeace and other respondents welcomed the proposal to revoke the on-site burial authorisation. RADMIL's report noted that the regulation of contaminated earth by treating it as an accumulation (storage) of radioactive waste for which the HSE has regulatory responsibility could seem as if *"... the EA be absolved of responsibility for contaminated earth on site ..."*. This proposal brings the Springfields authorisation into line with the current regulatory situation where the HSE *"... has prime responsibility for the regulation of accumulation of radioactive wastes on nuclear sites and that consultation arrangements between the Agency and HSE are already agreed and described in the Memorandum of Understanding."* (HSE).

**P6A.43** There was significant comment on the relative risks of low level radiation doses and the methodology of assessing doses. Specific concerns were raised about

alpha emitting radionuclides and depleted uranium. Greenpeace and the Nuclear Free Local Authorities both commented that for such material there is a measure of uncertainty in dose assessment when exposures are at very low levels. Since the first Gulf War there has also been concern in some quarters about the health effects from depleted uranium from possible synergistic (i.e. multiplicative) effects when present with other environmental pollutants. As noted at P2.20, a Government committee CERRIE is working on a report covering such risks for consideration by COMARE and the Government.

**P6A.44** The Agency takes advice from the National Radiological Protection Board (NRPB) on risks from ionising radiations. It is the responsibility of NRPB to advise the UK Government on cancer risk estimates and standards for radiation protection. At present there are only small differences in the risk estimates used by different countries world-wide for the protection of their populations – almost all countries follow the recommendations made by the independent International Commission on Radiological Protection (ICRP). The Agency will take into account any changes in standards for radiation protection as recommended by the NRPB.

### Non-human Species

**P6A.45** The issue of the impact of discharges on non-human species was also discussed in the Explanatory Document. Greenpeace commented that "... *this is a hugely controversial area.*". In the UK, advice on the impact of radioactive discharges on environmental ecosystems and on non-human species lies outside the remit of National Radiological Protection Board (NRPB), whose statutory functions focus on the protection of human beings from radiation hazards. In the international arena, the International Commission on Radiological Protection (ICRP) has in the past recommended that radiological protection of human beings also provides protection of non-human species. The ICRP now recognises however, that radiation risks to non-human species require separate assessment and an ICRP Task Group is advising on future recommendations. The Agency considers that there is now a growing recognition that protection of the environment merits attention in its own right.

**P6A.46** A framework for radiological protection of non-human species, with the detailed involvement of the Environment Agency, has been developed under the Euratom 5<sup>th</sup> Framework Programme. The project is known as FASSET (Framework for ASSESSment of Environmental impactT) and its website is at [www.fasset.org](http://www.fasset.org). The FASSET framework links together current knowledge about sources, exposure, dosimetry and environmental effects for reference organisms and ecosystems. The project started in November 2000 and ended in November 2003. The last set of deliverables of the framework, available from the FASSET website are reports on dosimetric models for assessing exposures to biota and of radiation effects on plants and animals. A further project known as ERICA (Environmental Risks from Ionising Contaminants: Assessment and Management) will run for another 3 years under the Euratom 6<sup>th</sup> Framework Programme to develop and extend the FASSET work, also with the detailed involvement of the Agency. A primary objective of ERICA is to provide a scientifically justified system for the assessment of environmental risks, while producing new information and insight on effects of low chronic dose rates,

## Environment Agency

multi-contaminant effects, and gaining new effects and transfer data for wildlife groups.

**P6A.47** FASSET and ERICA are expected to deliver, as an eventual outcome, a systematic basis for regulation to provide protection for non-human species that will be included into the Agency's assessment processes. Spotlight on Springfields commented " *...I would certainly except that it is extremely difficult to work out the potential health effects from Springfields' discharges. However, what the section on "Human and non-health issues" seems to be saying is "We really don't know about the effects of radiation on humans and animals". This section of the explanatory document makes it very clear how little interest there is in research on radiation effects on animals and on human health*".

**P6A.48** Although the Agency agrees that the scientific knowledge is not as comprehensive on the health effects for non-humans as it is for humans; the Agency would disagree with the view that there is very little interest in the subject. There are numerous reports and studies on the impact of environmental radioactive discharges, many of which have been commissioned by BNFL and other nuclear operators. The Agency is also at the forefront of setting guidance for environmental impact assessments, including for nuclear facilities, via its Centre for Risk and Forecasting. However it is recognised that much of the work, by all those involved, is mainly directed at the nuclear and environmental industries and is not widely disseminated within the public domain. The work undertaken to date by Agency in accordance with its Impact of Ionising Radiation on Wildlife, R&D Publication 128, demonstrates that the risk to non-human species is considered acceptable.

### Consultation Process

**P6A.49** There were various comments on the way the Agency conducted the consultation process. Fylde Borough Council noted "*... the efforts made by the Agency to engage the public and other stakeholders in the consultation exercise ...*" and RADMIL's report welcomed "*... the EA's move to transparency and accountability ...*".

**P6A.50** However one respondent, Lytham and District Wildfowlers Association, was "*... more than a little annoyed at not being consulted ...*" and "*... As one of the biggest estuarine (sic) landowners with approximately 6.5 km of river frontage between Lytham and Freckleton we would have expected the courtesy of some consultation.*". The Agency wrote to the Association to apologise for not including them in the initial stakeholder consultation list for the review of the Springfields authorisations, explaining that the Agency aims to contact all relevant stakeholders. To reduce the risk that relevant stakeholder groups were missed, the Agency placed the document in libraries and on its web site, and asked organisations to disseminate the consultation information to other groups that they themselves believed should be contacted.

**P6A.51** The Agency also made efforts to highlight the consultation within the local media. During the consultation period the Agency took part in interviews on radio and also had articles in the local press (Lancashire Evening Post 9 December, Blackpool Evening Gazette 9 December, Lytham St Annes Express 11 December, Blackpool

Evening Gazette 28 January). It also publicised and held two public "drop in" surgeries at Freckleton Village Hall on 27 January and 24 February for the public to come and find out more information about the review process and how to provide a response. We will specifically include the Lytham and District Wildfowling Association in future consultations associated with the site.

**P6A.52** As noted above the Agency placed information on its web site. However there were responses on the availability of that information. Greenpeace had difficulty in finding the documents on the Agency's web site. All the documents are still on the website but now under the 'Closed Consultations' part at:

[www.environment-agency.gov.uk/yourenv/consultations/176875/347099/?lang=e](http://www.environment-agency.gov.uk/yourenv/consultations/176875/347099/?lang=e)

**P6A.53** The Agency received criticism for the length of time that the review process has taken. The start of the process was in October 2001 with the publication of the Agency's Scope and Methodology document with the aim of informing the public of what was to be in the review and how it was to be carried out. In that document the Agency gave an aspirational date of August 2002 for the publication of the Explanatory Document and public consultation. The public consultation started in November 2003. Both Greenpeace and the Nuclear Free Local Authorities complain that this 16 month deferred period was "*...unacceptable...*". The Joint Overview and Scrutiny Task Group of Lancashire County Council also expressed "*...concern by the delays that have formed part of this process of review of authorisations ...*".

**P6A.54** In the original Scope and Methodology document the Agency stated that the aspirational date for the next stage of the review was subject to sufficient and clear information being received in a timely manner. BNFL submitted a first round of information in March 2002 and at the request of the Agency further information at the end of 2002 / early 2003, to expand on that information already supplied and partly to cover emerging issues. The impact of the Landfill Regulations 2002 on disposals to the Clifton Marsh landfill site created uncertainties and until these were resolved it was inappropriate to complete the review.

**P6A.55** The Agency agrees that the review process has taken a substantial period of time and believes it was not excessive given the importance and complexity of the issues involved. However the Agency is reviewing its processes with the objective of completing all such reviews in a more timely manner.

**P6A.56** With reference to a previous (partial) review of the Springfields authorisations, RADMIL's report suggested that "*... confidence in the EA could only be increased if documentation relating to the 1999 review was placed on the public register.*". The full review and re-authorisation process has been described earlier in this Decision Document and the 1999 review was only a partial one that examined the suitability of the authorisations. This limited review concluded that the Springfields authorisations were still adequate but did require a full review and re-authorisation process to be applied. However this full process would not start until the new multimedia authorisation template was available and after the higher priority project to re-authorise Sellafield was mostly completed. As such there was no relevant information or documentation that was required to be placed on the public registers.

## SECTION 6B - GENERAL CONSIDERATIONS

### Government Policy

**P6B.1** The previous Government set out its policy on radioactive waste management in the White Paper, *Review of Radioactive Waste Management Policy: Final Conclusions* (July 1995), Cm 2919. The Agency is using this White Paper as the basis of Government policy except where the present Government has made a specific statement of its policy. Examples of such statements are given in Part 3 of this document. The Agency has noted the UK Strategy for Radioactive Discharges and the draft Statutory Guidance to the Environment Agency which the Government has issued for consultation. The Agency has applied these in setting the limits and conditions in the authorisation for the Springfields nuclear site (see Section 6C of this document).

### Euratom Basic Safety Standards Directive

**P6B.2** Matters relating to **justification** are considered to be a matter for Government as mentioned earlier in this document. Matters relating to **optimisation** and **limitation** are considered in Section 6C.

### OSPAR Obligations

**P6B.3** The UK is a Contracting Party to the OSPAR *Convention for the Protection of the Marine Environment of the North East Atlantic*. The Agency interprets the basic obligation of the OSPAR Convention (see Part 3 of this document) as being to ensure that best available techniques (BAT), as defined under the Convention, are applied while observing the precautionary principle and the "polluter pays" principle, and taking account of the relevant recommendations of the appropriate international agencies. Although the obligations of the OSPAR Convention are not a matter of UK law, the Agency aims to ensure that they are fulfilled through the limits and conditions of its authorisations including, in particular, the requirement placed on the operator to use Best Practicable Means (BPM) to minimise discharges.

**P6B.4** In July 2002, the Government published its UK Strategy for Radioactive Discharges, covering the period 2001 to 2020, and which is intended to implement the OSPAR Strategy. The OSPAR Strategy and the UK Strategy are described in Part 3 of this document.

### Draft Statutory Guidance

**P6B.5** In October 2000, the former DETR and the Department of Health issued, for consultation, draft *Statutory Guidance to the Agency on the Regulation of Radioactive Discharges into the Environment from Nuclear Licensed Sites*. The aim of the Statutory Guidance is to set out a clear framework within which the Agency will operate in England when authorising the discharge of radioactivity into the

## Environment Agency

environment from nuclear sites. The draft Statutory Guidance is described in Part 3 of this document.

### Agency Approach to the UK Strategy & Draft Statutory Guidance

**P6B.6** The Agency considers that its current approach of driving down discharges and discharge limits, and in examining options for improvements, is broadly consistent with the objectives of the OSPAR Strategy, the UK Strategy and the draft Statutory Guidance. The Agency works with Government and with the nuclear site operators to achieve the objectives of the UK Strategy, and has regard to the provisions of the draft Statutory Guidance.

**P6B.7** The Agency recognises that there might be aspects of the Statutory Guidance, when issued, that may not have been fully taken into account in the limits and conditions of the authorisation which the Agency now proposes to issue. If there are such aspects, they can be accommodated subsequently by variations to the authorisation, or during the next review of the authorisation, as appropriate.

**P6B.8** The OSPAR Strategy proposes 0.02 millisieverts/year (mSv/year) as a target dose for a member of the public; this has not been taken forward into the UK Strategy. Nevertheless, it is widely considered that doses below 0.01mSv/year will be of no regulatory concern as long as the principle of BPM is being applied.

**P6B.9** In summary, the Agency considers that the new authorisation for the Springfields nuclear site is consistent with the approach in the UK Strategy for radioactive discharges and the draft Statutory Guidance. These documents are important points of reference for the Environment Agency, which will then consider their implications for all its authorisations issued under RSA 93.

### Sustainable Development

**P6B.10** In its consideration of BNFL Springfields review submission, the Agency took into account the guidance on sustainable development issued to it by the previous Government (*The Environment Agency and Sustainable Development, November 1996, 96EP189/1*) and the principles and policies set out in Cm 2919, to which the 1996 Guidance refers. The Agency also had regard to the Government's strategy for sustainable development - *Cm 4345 A Better Quality of Life: A Strategy for Sustainable Development for the United Kingdom (1999)*. The November 1996 guidance to the Agency on sustainable development is currently being revised to take account of Cm 4345. The Agency considers that, in following the overall approach, it is ensuring that the framework for sustainable development is being properly implemented in accordance with its statutory powers.

**P6B.11** The Agency is satisfied that granting the authorisation to BNFL Springfields is consistent with its principal aim under section 4 of EA 95 and with Government policy requirements on sustainable development.

## **Environment Agency**

### **Other Powers and Duties**

**P6B.12** In considering BNFL Springfields review submission and in preparing the new authorisation, the Agency has had regard to its powers and duties under EA 95 and RSA 93, as identified in Part 3 of this document.

### **Conservation**

**P6B.13** The Ribble Estuary is a designated site of European and international importance, and the impacts of the Springfields nuclear site needs to be addressed.

**P6B.14** There are sites of special scientific interest (SSSIs – of national importance), Natura 2000 sites (including special areas of conservation (SACs under the European Habitats directive), special protection areas (SPAs under the European Birds Directive), of European importance, and Ramsar sites (wetlands of International importance under the Ramsar convention). The review has appropriately assessed the impacts of BNFL Springfields discharges on the sensitive ecology of these areas.

**P6B.15** As stated in Part 3, the Habitats Directive aims to establish a network of the most important sites in respect of natural habitats and species of wild fauna and flora. It requires measures to be taken to maintain them at favourable conservation status or, where necessary, restore them by taking remedial action. The Habitats Regulations impose obligations in respect of “European sites”. The Regulations require that the Agency reviews all European Sites with regard to the impact of existing authorisations issued by the Agency. Such authorisations include those issued under RSA 93 for the disposal of radioactive waste. The assessed impact of discharges from the Springfields nuclear site presents no potential for harm to natural habitats and species of wild fauna and flora within the designated areas.

**P6B.16** Based on the current Agency guidance, using a cautious modelling approach and assuming discharges at 100 per cent of the annual limits given in the authorisation, the dose rate to the most affected wildlife species from aqueous liquid discharges to the estuarine ecosystem is unlikely to have any significant effects on non-human species.

**P6B.17** The Agency is of the opinion that at the discharge limits given in the new authorisation for the Springfields nuclear site, there will be no significant conservation issues.

## **SECTION 6C - LIMITS AND CONDITIONS IN THE AUTHORISATION AND RADIOLOGICAL IMPACTS**

### **Introduction**

**P6C.1** Section 6C sets out the Agency's consideration of BNFL Springfields detailed review submission to dispose of radioactive waste from the nuclear site. It describes how the conditions of the authorisation have been set. It also describes the principles the Agency has applied in setting limits, notification levels and where appropriate advisory levels for radioactive waste disposals. Section 6C has two sub-sections. In the first sub-section issues relating to the general matters and conditions in the authorisation are discussed. The other sub-section deals with specific limits and levels that the Agency has included in its authorisation together with other related matters including improvements and radiological assessments.

**P6C.2** The authorisation for the Springfields nuclear site that the Agency proposes to issue to BNFL is included in this Decision Document as Appendix 6. As noted in Part 4, the authorisation is in a new integrated format covering all the permitted disposal routes of radioactive waste from the site. The authorisation includes a certificate of authorisation (to be signed) followed by a number of schedules. The first schedule contains general conditions, common to all nuclear sites which are authorised under RSA 93. The second schedule identifies each of the permitted radioactive waste disposal routes for the site. The remaining schedules of the authorisation set out the specific limits and conditions applying to each disposal route.

### **General Limitations and Conditions (Schedule 1)**

#### **Requirement for Waste Minimisation and Best Practicable Means (BPM)**

**P6C.3** The Agency considers that it is important to maintain downward pressure on discharges from the site with the objective of securing reductions wherever possible. It takes the view that compliance with conditions requiring the use of BPM and application of suitable annual limits are key aspects of the strategy to achieve this and to comply with the Secretary of State's Direction (see Part 3 of this document) by ensuring that exposures of members of the public are ALARA.

**P6C.4** As described in Part 4, the authorisation includes improved conditions relating to waste minimisation and the application of BPM. These conditions apply in addition to the limits and other conditions placed on each waste disposal. Compliance with waste minimisation and BPM conditions requires that BNFL Springfields keeps under continual review all the operations which give rise to radioactive waste and all the operations which manage such waste. Under the conditions requiring the use of BPM the company, in deciding whether to use any particular measure, will need to take a view on the balance between benefit and cost, taking economic and social factors into account. As regulator, the Agency will also need to take such a view and may require the company to implement further measures.

## **Environment Agency**

**P6C.5** With the objectives of minimising waste creation, applying downward pressure on discharges and ensuring that public exposures are ALARA, the Agency has also included in the authorisation improvement conditions requiring review of certain aspects of the company's waste management strategy. HSE / NII has regulatory responsibility for the radioactive wastes stored on site. The Agency and HSE / NII will require BNFL Springfields to regularly review its strategy for identifying, developing and using techniques to reduce the creation of radioactive waste.

**P6C.6** Authorisations issued by the Agency require operators to use BPM as an overriding condition to ensure that discharges are minimised. Far from relieving the operator of a burden they place a further duty on him, in addition to the requirement to restrict discharges to within the numerical limits set in authorisations. The Agency's non-prescriptive approach requires that operators must review, and be satisfied that BPM is being used at every decision affecting waste creation and discharges. The requirement applies both to large, "strategic" decisions and to the small, day to day, decisions that are made at a nuclear site. What is regarded as the BPM will vary from site to site; a range of factors need to be taken into account and there is a need for professional judgement in considering what is appropriate for the specific circumstances.

**P6C.7** Furthermore, because the BPM requirement is not prescriptive, it enables advantage to be taken of developments in techniques and technology without recourse to frequent changes to the authorisation conditions. Certain improvement conditions included in the authorisation have the objective of ensuring that such developments are identified and reviewed. The Agency has a duty to take into account both costs and benefits when exercising its powers, for example when deciding whether or not further resources should be devoted to managing waste. BPM does not permit operators to use the "cheapest option" but whatever means are used must be reasonably practicable. In the context of BPM, costs include both financial charges and other costs such as for example worker dose. The Agency has expertise in abatement and monitoring technology for radioactive discharges and uses this when carrying out regulatory duties under RSA 93. It commissions its own programme of research and development to aid awareness of best practice.

**P6C.8** The Agency has included a new condition in the authorisation which requires the use of BPM to minimise the activity of radioactive waste produced that will require disposal under the authorisation. The Agency considers that compliance with this condition will require the operator to observe carefully the key elements of the national waste hierarchy; elimination, reduction, recycling, recovery and disposal. For example, with regard to recycling and recovery, the operator should initially seek to reuse items on site where this can be done safely. The 1996 BSS Directive includes criteria for clearance of radioactive waste from regulatory control so that, for example, it may be recycled or recovered off site. In the UK regulatory system the existing Exemption Orders issued under RSA 93 assist in fulfilling this function.

**P6C.9** BPEO - Best Practicable Environmental Option - is a concept developed by the Royal Commission on Environmental Pollution. BPEO involves decisions on waste management being based on an assessment of alternative options evaluated on the basis of factors such as occupational and environmental impacts, costs and social implications. As such it takes a holistic approach to the environment and considers

## Environment Agency

impact overall rather than for just one medium. The Agency considers that the new BPM condition on waste minimisation will help to ensure that BPEO is attained. Consideration of BPEO is best carried out at the design stage of a new plant but can also be reviewed during its subsequent life. To this end the Agency has included in the new authorisation a requirement for BNFL Springfields to review its operations at the site with regard to BPEO.

### Management Conditions

**P6C.10** In order to ensure an appropriate level of management input and control on environmental matters, the integrated authorisation includes a new condition requiring the operator to have a management system, an organisational structure and the resources in place sufficient to achieve compliance with the authorisation. The condition addresses specific aspects, including:

- written arrangements for compliance;
- written operating and maintenance instructions;
- consultation with suitable Radiation Protection Advisers;
- supervision of waste disposal; and
- internal audit and review of the management system.

**P6C.11** The Agency has considered BNFL Springfields past environmental performance, the information on its management systems and organisation, provided in its review submissions, and considers that BNFL Springfields can meet the requirements for effective management and supervision. A key requirement of the Agency's authorisation is that the operator must have written arrangements setting out how it will achieve compliance with each condition of the authorisation. The Agency can require the operator to provide all or part of these arrangements 28 days prior to the first disposal of waste under the new authorisation. The Agency will consider what information it requires from BNFL Springfields and will carefully scrutinise BNFL Springfields arrangements so as to be satisfied that adequate systems are in place. The importance of maintaining ongoing effective management, particularly at a time of change, is recognised and Agency inspections early in the life of the new authorisation will focus on this area.

### Discharge and Environmental Monitoring

**P6C.12** To help ensure that human health and the environment are adequately protected, assessments need to be made of any disposals to the environment and of their impacts. This is primarily carried out by the operator, but the Environment Agency and the Food Standards Agency also carry out their own independent monitoring programmes. In accordance with the "polluter pays" principle, the operator pays for all these monitoring programmes.

**P6C.13** The main environmental releases from the Springfields nuclear site are subject to limits. BPM must be used when carrying out monitoring, sampling and analysis unless a particular method has been specified by the Agency. Such methods are specified when the reported result is dependent on the method of measurement e.g. total alpha. Conditions in the new authorisation also require the operator to inform the Environment Agency in advance and in writing of any changes to the techniques it is

## **Environment Agency**

using for sampling and analysis of disposals. Other conditions in the new authorisation enables the Agency to require the operator to carry out additional sampling and analysis as specified by the Agency.

**P6C.14** The new authorisation requires the operator to provide the Agency, when required, with samples of discharges and wastes for independent analysis. In this context "samples" of waste could include, for example, an entire consignment of waste to Drigg. The results of independent analysis will be compared with analysis results from the operator, to provide a quality check on the operator's analytical techniques and procedures.

**P6C.15** Under the terms of Schedule 1 paragraph 9 of the new authorisation the Agency will require the operator to carry out a specified programme of monitoring radioactivity in the terrestrial and aqueous environment. This will include the monitoring, as relevant, of environmental radiation, local shellfish, silt, and surface freshwaters. The nature and location of the monitoring is reviewed regularly, and effort concentrated in those areas most likely to contribute to public dose.

**P6C.16** The Agency will continue to carry out its own independent programme of monitoring of radioactivity in potable and surface water and sediments. In addition it is anticipated that the Food Standards Agency will carry out its own independent monitoring of radioactivity in locally produced foodstuffs.

**P6C.17** The new authorisation includes a condition, Schedule 1 paragraph 7, requiring the operator to take measurements to determine compliance with the authorisation. Schedule 1 paragraph 15 requires the operator to make and keep records of radioactive discharges and disposals from the site. Under the terms of Schedule 1 paragraph 19 the Agency will require the operator to provide copies of these records and will send this information to the relevant public registers.

**P6C.18** The Environment Agency and Food Standards Agency publish a joint annual report (Radioactivity in Food and the Environment - RIFE) of their environmental monitoring programmes. Copies of the report are placed on the Agency's public registers and sent to each local authority in England and Wales. The report is also available via the FSA web site. The overall conclusions from these programmes are discussed with BNFL Springfields and raised at the Local Liaison Committee.

**P6C.19** The Agency considers that the onus for monitoring discharges so as to demonstrate compliance with the authorisation should be on the operator. This is a key requirement of the authorisation conditions. Furthermore, the new authorisation places a number of duties on the operator relating to monitoring including, for example, the use of BPM for sampling, maintaining in good repair systems for monitoring, regular calibration, and checking that such systems are operating correctly. The Agency considers that its approach is in accordance with the "polluter pays" principle and ensures that where practicable discharges are sampled and monitored continuously and assessed at an appropriate frequency.

**P6C.20** Agency Inspectors scrutinise the operator's monitoring arrangements to ensure that the results adequately reflect actual discharges and, as noted above, the

## Environment Agency

Agency carries out check analyses on discharge samples and an independent environmental monitoring programme.

### Provision of Information to the Agency

**P6C.21** The operator is required to supply the Agency with all the information it (reasonably) requires. Specifically; as noted above, the operator is required to provide disposal records and information on the techniques used to determine the activity of waste disposals. Additionally, the new authorisation requires the operator to inform the Agency without delay of any actual or potential breach of the authorisation conditions. This enables the Agency to ensure that the operator promptly takes any necessary remedial action.

**P6C.22** Having considered all relevant comments from respondents to this and other consultations, the Agency is satisfied that the general limitations and conditions set out Schedule 1 of the new authorisation are appropriate. The Agency considers that the general conditions of the new authorisation will provide a basis for improved regulation compared to the corresponding conditions in the existing authorisations held by BNFL Springfields.

### Improvement and Additional Information Conditions

**P6C.23** Schedule 10 of the new authorisation provides an improvement and additional information programme for BNFL Springfields to undertake. The programme requires the company to undertake assessments, reviews and improvements with the objective of potentially securing further reductions in discharges and providing information for future reviews of the authorisation. In preparing the authorisation conditions for the site, the Agency has taken into account the anticipated forward work programme.

**P6C.24** The draft authorisation provided to assist consultation included the following proposed improvement requirements to:

- provide a report on the review of current disposal routes and whether they still represent the BPEO;
- provide a periodic review of developments in best practice together with a strategy for minimising waste disposals;
- provide a report on best practicable means to assess activity of radionuclides in disposals and to determine compliance with the new authorisation; and
- provide a programme of internal audit of radioactive waste procedures and waste consignments (as a requirement of Schedule 1 paragraph 6).

**P6C.25** Subject to minor re-wording, all these conditions have been retained in the authorisation at Appendix 6. Time scales have been set taking into consideration the total number of improvement conditions to be addressed, the relative importance of each, and the resources required to complete them.

**P6C.26** The initial review of best practice for minimising waste disposals is required to be completed within 3 years. The Agency prefers to retain flexibility thereafter, but

## Environment Agency

the frequency will be at least that necessary to match the authorisation review programme. Rather than taking a prescriptive approach, the Agency takes the view that the operator is best placed to identify means by which discharges can be reduced at its plants and that the onus should be on the operator to keep up-to-date with developments in technology and techniques. The Agency will carefully scrutinise the operator's proposals arising from the improvement conditions.

**P6C.27** The Agency does not consider that the areas to be addressed by the improvement programme represent serious shortfalls in current operation, but rather that they are areas where there is or may be potential for some improvement. This use of improvement conditions reflects the "continuous development" philosophy which underlies BPM.

### Gaseous and Liquid Discharges

**P6C.28** As with any domestic, commercial or industrial activity, operations and processes on the BNFL Springfields site have the potential to produce waste. Some of the waste is released to the environment in the form of gaseous and liquid discharges.

**P6C.29** Taking appropriate measures to minimise waste creation and use of abatement equipment, together with proper management, can keep the level of discharges down, but are unlikely to reduce them to zero since no abatement or treatment plant is 100 per cent efficient. This is recognised in IAEA's "Principles for Radioactive Waste Management" which, though advocating a general "concentrate and contain" approach, state that "as part of radioactive waste management, radioactive substances may be released within authorised limits into the air, water and soil, and also through the reuse of materials".

**P6C.30** The purpose of the Agency's authorisation is to ensure that radioactive discharges are minimised and that the consequent doses to members of the public are within statutory annual limits and relevant constraints, and are ALARA. In assessing doses to members of the public, the Agency has taken account of the range of radionuclides discharged and their differing impacts. As shown later in this section, assessed doses to the critical groups for discharges at the limits set are within the dose limit and the relevant constraint. Direct radiation is regulated by HSE / NII, who have confirmed to the Agency that the dose from direct radiation is broadly ALARA.

**P6C.31** The authorisation for the Springfields nuclear site includes annual limits on specific radionuclides, or groups of radionuclides, that may be discharged or disposed of from the site. The annual limits for discharges apply to rolling 12 month periods, i.e. any period of 12 consecutive calendar months. The use of an annual basis for discharge limits is consistent with the annual basis for the international and national dose limit and constraints described in Part 3.

**P6C.32** The Agency has used the following principles in setting the annual limits on discharges:

- the primary purpose of limits is to ensure the proper protection of human life and the environment;

- limits should be set on the basis of a rolling year, however short-term limits may be set to avoid undesirable short-term peaks in discharges. Consideration should be given to longer-term limits to maintain downward pressure on discharges;
- a cap should be put on discharges from new plants at the levels for which approval is first given, where this reflects full operation of that plant throughout its operating lifetime,
- in the case of existing plant, applications for increases in limits will require a full case to be made by the operator and will only be considered in exceptional circumstances. For example, where increased discharges are the inevitable result of measures to reduce significant risks of with dealing with historic waste legacies and decommissioning of redundant plant;
- limits should not, in general, be set at a level where European Council Food Intervention Levels (CFILs) may be exceeded or the legitimate uses of the seas and land could be prejudiced;
- limits should be set at an overall site level and a plant/group of plants level where reasonably practicable;
- account should be taken of the past disposals performance of the plant and operating future and plans of BNFL;
- headroom (the margin between actual levels of discharges during expected normal plant operation and discharge limits) should be minimised and limits should be established that are no more than strictly necessary for normal plant operation;
- limits need not be set for every individual radionuclide that is discharged but should be applied to radionuclides or groups of radionuclides which:
  - are of significance in terms of radiological impact for humans and non-human species, including those which may be taken up in food;
  - are of significance in terms of quantity of radioactivity discharged;
  - have long half-lives and which may persist and/or accumulate in the environment and may contribute significantly to collective dose;
  - are significant indicators of plant performance and process control; and,
  - provide effective regulatory control and enforcement;
- notification levels may be set for each plant and these will be associated with the need to demonstrate the use of best practicable means in minimising discharges.

**P6C.33** As a starting point for assessing each discharge limit, the Agency takes 1.5 times the average annual level of discharge of the radionuclide shown in recent years. The factor of 1.5 provides an allowance for fluctuations from year to year. The Agency then makes adjustments to this allowance, either upwards or downwards, for any foreseeable variations within normal operation, any trends, future changes (including any improvements to the techniques used by the operator to assess discharges), any specific waste management requirements, e.g. for refurbishment or refitting of specific plant, and the potential for further reductions in discharges. These characteristics vary for different radionuclides and the headroom resulting from such adjustments may be different for each radionuclide.

**P6C.34** The Agency takes the view that sufficient headroom is necessary to accommodate fluctuations and anticipated trends in normal operation and also the possibility of unplanned but foreseeable events. The Agency does not make allowance for "accidents" but for relatively minor events which will almost inevitably occur at some point during the lifetime of the operations at the Springfields site. The overriding requirement to use the best practicable means to minimise discharges means that the limits are unlikely to be approached in the absence of such events. Limits are, in any case, never set at levels which could lead to the public dose limit being exceeded.

**P6C.35** The Agency is not to increase any gaseous or liquid discharge limits from normal production work from the Springfields nuclear site. For gaseous discharges the limits are now being set at an overall level that is 12 per cent lower than the existing limits but this does include a new allowance for decommissioning work. The liquid discharge limits are being significantly reduced by approximately 80 per cent for some radionuclides immediately and by approximately 95 per cent by 2008. This significantly reduces the overall potential dose to the critical group compared to that which might occur from discharges at existing limits. The assessed radiological impact to the most exposed public groups from liquid discharges at 100 per cent of the new limits would be reduced by 48 per cent initially and by 85 per cent from 2008.

**P6C.36** The Agency does not believe that limits significantly lower than those set could currently be met by reasonably practicable means without potentially limiting decommissioning work. However, improvement conditions have been included in the new authorisation to explore the potential for further reductions in discharges.

**P6C.37** As described above, the limits are derived from a methodology that requires the operator to substantiate the operational need for the discharges. The limits must be within the boundaries of dose limits and constraints. The type of radiation and the chemical form of the radionuclide are taken into account when assessing the dose to the critical group that would arise from discharges at any of the limits set. The impact of past discharges is taken into account when comparing the combined dose to the critical group from all relevant sources of exposure against the annual dose limit. The annual dose limit applies to exposures from all man-made sources of radioactivity other than from medical exposure; background and medical doses are thus not taken into account when considering the impact associated with discharge limits.

**P6C.38** As indicated above, the Agency sets limits on radionuclides which are major contributors to public dose or which constitute a large proportion of the discharges in activity terms. Other radionuclides within radioactive wastes are present in sufficiently small quantities to contribute negligibly to the impacts and are therefore not specifically limited. Discharges of all radionuclides, whether numerically limited or not, are subject to BPM requirements. However, where it is seen that a general limit may improve regulatory control a further limit on "other beta emitting radionuclides" or other similar wording may be set.

**P6C.39.** HSE / NII regulate the Springfields nuclear site to ensure that the risk of a significant accident is minimised and tolerable. Minor incidents or operational perturbations leading to increased discharges will potentially trigger a Notification

## Environment Agency

Level (see below), requiring action by BNFL to minimise the release and to demonstrate it has used BPM.

### Notification Levels for Gaseous and Liquid Discharges

**P6C.40** Notification Levels are useful regulatory tools that complement annual limits. Their purpose is to signal circumstances where discharges during any period are above usual levels; in some cases they may give early warning that discharges are running at a significant fraction of the annual limit. They may be set above the levels of discharge for planned events but below the levels for unplanned (but foreseeable) events, such as minor malfunction of abatement equipment. They are usually applied to periods of a week, a calendar month or a rolling quarter (i.e. a period of three consecutive calendar months).

**P6C.41** If a Notification Level is exceeded, the operator is required, under the provisions of the new authorisation:

- To notify the Agency within 14 days of making the record of the occurrence;
- To provide a written report of the means used to minimise discharges in the specific circumstances; and
- To review these means having regard to the BPM conditions of the authorisation.

**P6C.42** In the new authorisation, Quarterly Notification Levels (QNLs) have been applied to certain gaseous and liquid discharges from the Springfields site as an aid to the regulatory regime. The comparison of a cumulative discharge against the QNL will help assess the continued application of BPM. It should be noted that QNLs are **not** limits. An exceedence of a QNL would not normally initiate enforcement action by the Agency. An exceedence should be taken as a trigger for BNFL to formally review the application of BPM for that discharge i.e. a QNL is a formal action level.

**P6C.43** The Agency considers that the notification requirements will help to maintain downward pressure on discharges.

### Waste Transfers

**P6C.44** Operations on the Springfields nuclear site lead to the production of waste, some of which is disposed of by transfer off-site for processing, including compaction, conditioning treatments and disposal. The Agency has included conditions in the new authorisation requiring that BPM is used to minimise the activity of all waste arisings and to minimise the volume of wastes disposed of by transfer off-site.

**P6C.45** For the Springfields nuclear site BNFL is authorised to dispose of solid low level waste by transfer to the national disposal site at Drigg. Disposals to Drigg can also be made via Sellafield to make use of the conditioning plant located there. BNFL also dispose of combustible waste that may arise, which is sent for incineration at BNFL Capenhurst. A limited transfer route for waste solvent disposal at Shanks Chemical Services Ltd is also included in the authorisation.

**P6C.46** The Agency considers that, while in principle it might be possible to store waste at the site this would not be consistent with the policy set out by Cm 2919 and is unlikely to be BPEO. It will also lead to a potential increase in radiological hazard on site. Cm 2919 requires that wastes are "*safely disposed of at appropriate times and in appropriate ways.*" In the case of the waste transfers from BNFL Springfields the final disposal of low level radioactive waste is the subject of an authorisation issued by the Agency to the operator of that disposal route.

#### Limits on Waste Transfers to Drigg, BNFL Capenhurst and Shanks Chemical Services Hythe Incinerator

**P6C.47** Limits on transfers of low level waste are expressed in terms of both a limit on the quantity of each relevant radionuclide or group of radionuclides to be transferred per calendar year and a limit on the total volume of waste to be transferred per calendar year where appropriate. The limit on the quantity of radionuclides transferred helps to provide downward pressure on waste creation and helps to minimise the rate of utilisation of the waste disposal facility. The limit on the total volume transferred helps to minimise the number of waste consignments required and the rate of utilisation of the waste disposal facility.

#### Waste Disposal at Clifton Marsh

**P6C.48** Since 1974 BNFL Springfields has also been authorised to dispose of radioactive waste to the Clifton Marsh landfill site under a disposal practice called 'controlled burial' - burial in landfill but under certain controlled conditions. This type of authorised disposal for the lower activity end of solid low level waste is for large volume, low concentration, radioactive wastes which will have a low impact on the environment. Some BNFL process wastes are disposed of in this manner. However, the majority of material disposed of by BNFL is material from decommissioning activities such as building rubble that is either lightly contaminated or it is not reasonably practicable for BNFL to prove that it is suitable for free release to the satisfaction of the Agency. It is noted that although the Clifton Marsh landfill site is licensed to and operated by SITA Limited, it is BNFL that is authorised to make the actual disposals as opposed to transferring the waste to SITA's operational control.

**P6C.49** The current authorisation is a joint authorisation with BNFL Capenhurst but the review only covered the application of the authorisation in respect of disposals from Springfields. On issuing the new authorisation, the old joint authorisation will be varied to remove Springfields as a named authorised disposer rather than totally revoked, so that BNFL Capenhurst will still be able to utilise the authorisation for their own disposals.

**The Agency's New Authorisation for the Springfields Nuclear Site – Including Limits and Levels for all Disposal Routes, Site Specific Improvements, Site Specific Issues and Radiological Assessments**

**P6C.50** This sub-section deals with the site specific limits and levels that the Agency has included in its new authorisation for the Springfields nuclear site as well as other site-specific matters including improvements and radiological assessments.

**P6C.51** In the BNFL Springfields review submission, the company made proposals for specific limits and levels on certain radionuclides and categories of radionuclides for each of the discharge routes it requested. The company justified and advised how it had derived the limits and levels it proposed. For the site, BNFL Springfields submission proposed reductions in some annual limits and effectively no change in others. The basis of BNFL Springfields proposal was an analysis of past discharges together with allowances for future production and decommissioning operations.

**P6C.52** Following consultation, the Agency has examined recent data for the discharges and all the responses it has received during public consultation and has reviewed the derived limits and levels. Excluding two gaseous limits that have changed due to a re-ordering of gaseous outlets between discharge categories, the limits and levels in the draft authorisation presented in the Explanatory Document have not changed. Although it may seem that there is still plenty of headroom between the limits and the actual discharges, the recent data does confirm that there can be significant uncertainties in the cleanup process for legacy materials and residues for which the headroom is there to cover. The effect of this uncertainty may be more significant in later years when the amount of legacy material processed through the production plants will become a greater proportion of the total amount of material processed.

**P6C.53** The tables below show the limits in the current authorisations held by BNFL Springfields, the limits as applied for, and the limits as specified in the Agency's new authorisation.

**Gaseous Waste Discharges**

**P6C.54** Table 6C.1 sets out a summary of the limits on gaseous discharges the Agency has included in the new authorisation for the Springfields nuclear site. The authorisation includes new limits for gaseous waste discharged from the site overall. The limits are essentially the same as those included in the draft authorisation provided to assist consultation. The two values highlighted have followed the reallocation of a number of minor outlets from the Group 2 to the 'Other Approved Outlets' category. The Agency considers that these limits are consistent with providing minimum headroom without prejudice to site operation.

Table 6C.1 – Numerical Limits for Gaseous Discharges

Outlet or Group of Outlets		Current limit GBq	BNFL proposed limit GBq	Agency new Annual Limit, GBq	Per cent reduction of current limit
Scheduled outlets		3	4	-	-
Group 1 and Group 2 together (inc.NSTS)		-	-	2.7	10%
Other approved outlets		3	2	1.6	50%
Decommissioning outlets		N/A	-	1.0	new
Nuclear Sciences & Technology Services (NSTS)	Tritium	N/A	-	0.1	new
	Carbon -14	N/A	-	0.01	new
	Other alpha emitting radionuclides	N/A	-	0.001	new
	Other beta emitting radionuclides	N/A	-	0.01	new
Comparison of the current aerial limits to the equivalent in the Agency's new authorisation (i.e. excluding the new decommissioning component and NSTS)		6	6	4.3	28%
Comparison of the current aerial limits to the equivalent in the Agency's new authorisation (i.e. including the new decommissioning component but not NSTS)		6	6	5.3	12%

**P6C.55** Before arriving at the above figures, the Agency examined the BNFL Springfields submission and considered uranium discharge returns over the past 14 years. As noted in the Explanatory Document the additional limits for the Nuclear Sciences and Technology Services (previously the research and technology department) were set by reviewing BNFL's information on the predicted work load and comparing this with information on the type of work performed historically at the Berkeley Labs site.

**P6C.56** To assist the regulation of the site's gaseous discharges, the Agency has also introduced individual plant limits for the Group 1 outlets given in Table 1 of Schedule 3 of the authorisation. Group 1 outlets are potentially the major contributors to the total gaseous discharge and such individual limits will help keep pressure on to reduce the overall site discharge.

**P6C.57** Downward pressure on discharges will also be maintained through the introduction of Quarterly Notification Levels (QNLs) for each of the Group 1 outlets. These are not limits but are levels designed to provide an early signal that discharges are running at an enhanced level and should enable the operator to implement early corrective action. They apply to any rolling 3 month period.

**Liquid Waste Discharges**

**P6C.58** Table 6C.2 sets out a summary of the limits on liquid discharges the Agency has included in the new authorisation, and compares them with the current authorised limits. However not all the limits are reduced e.g. the limits for Neptunium-237 and Technetium-99 remain the same to allow for the continued treatment of legacy material and historic residues. The Agency considers that the new limits are consistent with providing minimum headroom without prejudice to the site's operation.

**Table 6C.2 – Annual Limits for Liquid Discharges of Radionuclides**

Radionuclide or Group of Radionuclides	Current limit TBq	BNFL proposed limit TBq	Annual Limit for 2004-2007, TBq	Per cent reduction of current limit %	Annual Limit from 2008, TBq	Per cent reduction of current limit %
Total beta	240	140	140	42%	20	91%
Total alpha	4	0.6	0.550	86%	0.100	97%
Thorium-230	2	0.4	0.400	80%	0.020	99%
Thorium-232	0.2	0.02	0.015	92%	0.015	92%
Uranium	0.15	0.1	0.100	33%	0.040	73%
Neptunium-237	0.04	0.04	0.040	Nil	0.040	Nil
Other trans-uranic radionuclides	N/A	-	0.020	New	0.020	New
Technetium-99	0.6	0.6	0.600	Nil	0.600	Nil

**P6C.59** The new authorisation also contains further reductions in the limits set to become effective on 1 January 2008 to account for a step change in production on the Springfields site, so allowing for an even greater reduction in the allowed headroom. The beta annual limit reduction of 91 per cent by 2008 is a significant contribution to the achievement of the target for beta liquid discharges for the nuclear fuel and uranium enrichment sector given in the UK National Discharge Strategy.

**P6C.60** The Agency will apply QNLs to the main liquid effluent discharges. During this review process the Agency has taken care to ensure that the limits and conditions in the new authorisation do not hinder BNFL in pursuing its programme of decommissioning and the treatment of historic and legacy wastes. In certain cases this has meant that the Agency is including higher limits than may at first sight seem necessary. This is to ensure that there is sufficient headroom to allow for the potentially large uncertainties associated with decommissioning and legacy material treatment.

**P6C.61** The Agency aims to continue to ensure in its regulation of the Springfields site that BPM is applied in respect of all discharges. This will be achieved by regulation through the general BPM condition and specific QNLs for liquid discharges of thorium, uranium, neptunium and technetium set at more restrictive values than the pro rata annual limits. In Schedule 4 Table 2 of the authorisation, these QNLs are set at lower than one-quarter of the annual limit. For Table 3 of that Schedule (the post 2008 limits), the relevant QNL values are set at one-fifth of the

post-2008 annual limit. The Agency considers that this is not over-regulation of BNFL Springfields but a pragmatic and appropriate regulatory method of ensuring that Best Practicable Means are used and formally assessed.

**P6C.62** There is a presumption in radioactive waste management to 'concentrate and contain' activity as opposed to 'dilute and disperse', subject to BPEO and BPM considerations. It is therefore necessary to carefully consider decontamination operations where radioactive contamination is cleaned off material or an item, so that it can be disposed of via a particular route or treated as not longer being radioactive material. To help ensure that such decontamination operations undergo continued deliberation and review by BNFL the Agency has set two QNL's on liquid discharges of total alpha and total beta from the new decontamination facility.

**P6C.63** Additionally to help ensure that there is a carefully managed, relatively uniform discharge profile across the year (i.e. so that there are no very large, short term discharge peaks) the Agency has introduced monthly limits for discharges of total alpha and total beta. In any one month no discharge can be more than twice its pro rata annual limit.

#### **Solid Waste – Drigg Waste destined ultimately for BNFL at Drigg**

**P6C.64** The Springfields nuclear site is currently authorised to transfer low level solid radioactive waste to the BNFL national disposal site at Drigg in Cumbria but the authorisation is in an old style template. The new authorisation updates the template format to include the current standard wording for the routing of radioactive waste and the standard radionuclides for disposal. The current authorised uranium annual limit of 250 GBq is reduced to 100 GBq, the Cobalt-60 limit is reduced from 17.5 GBq to 0.01 GBq and the annual volume limit has been cut from 1000 to 450 cubic metres. Two new disposal limits are included - Carbon-14 at 21 GBq per year and Iodine-129 at 0.01 GBq per year. These limits have not been set on historic disposal rates, which are very low, but on the likely operational and decommissioning requirements for the next few years and the requirement from new NSTS analytical work on the Springfields site.

**P6C.65** Table 6C.3 presents the Agency's limits the new authorisation.

**Table 6C.3 Summary - Numerical Limits for Transfer of Drigg Waste to BNFL (at Sellafield or Drigg) for ultimate disposal at Drigg.**

Radionuclide or Group of Radionuclides	BNFL Springfields Proposed Limits, GBq	Environment Agency Annual Limit, GBq
Uranium	250	100
Radium-226 plus Thorium-232	1.5	1.5
Other alpha emitters	12.5	12.5
Carbon-14	21.0	21.0
Iodine-129	N/A	0.01
Tritium	42.0	42.0
Cobalt-60	17.5	0.01
Other radionuclides	25.0	25.0

**Waste Transfer to other Sites**

**P6C.66** Table 6C.4 summarises the limits placed on transfers of combustible radioactive waste to BNFL Capenhurst and organic liquid wastes to Shanks Chemical Services incinerator, Hythe, Hampshire. The transfer of waste to Shanks is a new route mainly for laboratory solvent wastes arising from the new analytical work conducted by NSTS.

**Table 6C.4 – Summary - Numerical Limits for Transfer of Waste to Other Sites**

Person to whom waste may be transferred	Radionuclide or Group of Radionuclides	Annual Activity Limit, GBq	Annual Volume Limit,
For Category 1 Wastes:  British Nuclear Fuels plc, Capenhurst, Near Chester, CH1 6ER	Alpha emitting radionuclides	30	300 cubic metres
	Beta emitting radionuclides	30	
For Category 2 Wastes:  Shanks Chemical Services Limited, Hardley, Hythe, Southampton, Hants, SO45 3ZA	Alpha emitting radionuclides	0.001	200 litres
	Other beta emitting radionuclides	0.002	
	Tritium	0.012	
	Carbon - 14	0.002	

## Environment Agency

### Waste Disposal at other Sites

**P6C.67** BNFL Springfields is authorised to dispose of radioactive waste to the Clifton Marsh landfill site under a disposal practice called 'controlled burial' - burial in a landfill but under controlled conditions. This type of authorised disposal is for large volume, very low activity solid radioactive wastes which will have a low impact on the environment.

**P6C.68** The authorisation sets out the wastes that can be disposed of at Clifton Marsh and gives the maximum activity concentration and the annual limits of each waste stream. Table 6C.5 and 6C.6 summarise this.

**P6C.69** The waste disposal tables have been split between decommissioning and non-decommissioning generating routes so that regulatory pressure can be applied to the operational generation of solid wastes while allowing more flexibility in the advantageous acceleration of decommissioning operations.

**Table 6C.5 – Summary - Numerical Limits for Non-Decommissioning Solid Waste for Disposal to Clifton Marsh Landfill Site**

<b>Annual Disposal Limits for non-decommissioning radioactive wastes</b>			
<b>Waste</b>	<b>Radionuclide or group of radionuclides</b>	<b>Annual Disposal Limits (TBq)</b>	<b>Concentration Criteria (Bq/g)</b>
Process wastes	Uranium	0.060	50
General wastes	Uranium	0.020	50
	Other alpha emitting radionuclides *	0.001	100
	Other beta emitting radionuclides *	0.005	100
Historic Incinerator Ash	Uranium	0.020	125
Graphite	Uranium	0.020	100
Historic process wastes	Uranium	0.010	100

\* Category applicable to Nuclear Sciences and Technology Services only.

**Table 6C.6 – Summary - Numerical Limits for Decommissioning Solid Waste for Disposal to Clifton Marsh Landfill Site**

Annual Disposal Limits for decommissioning radioactive wastes			
Waste	Radionuclide or group of radionuclides	Annual Disposal Limits (TBq)	Concentration Criteria (Bq/g)
Decommissioning wastes	Uranium	0.200	100
	Neptunium-237	0.010	10
	Technetium-99	0.010	10
	Other trans-uranic radionuclides	0.010	10
	Other beta emitting radionuclides	0.001	100

**P6C.70** Apart from some minor rewording, there are three main modifications in Schedule 8 of the authorisation compared to those set out in the Explanatory Document. Firstly a new Condition 2 on the minimisation of the volume of waste disposed has been introduced to replace the earlier condition and table referring to quarterly notification levels for decommissioning wastes. This provides for more transparent and simpler regulation of the general Best Practicable Means principle of minimising the volume of radioactive waste disposed. The previous condition relied on future estimates of decommissioning wastes from BNFL which could fluctuate with time.

**P6C.71** Secondly in order to simplify accounting, two of the waste categories in Table 6C.5 have been renamed. The term 'residues' in the table has been replaced by 'wastes'. The term 'Process wastes' refers to newly created wastes and those wastes created by the treatment of historic process residues. 'Historic process wastes' refers to those residues currently on site awaiting disposal without any further treatment. With the categorisation change it has been possible to reduce headroom and the combined uranium annual limit for these two wastes by 0.01 TBq (a reduction of 12.5 per cent).

**P6C.72** The third issue is the concentration criteria for the waste categories. In the Explanatory Document, the Agency discussed two disposal options for limits on uranium concentrations in disposals to Clifton Marsh.

**P6C.73** The first option was that the limit was set at the 100 Bq/g level as currently authorised and initially sought by BNFL.

**P6C.74** The second option was to increase the authorised uranium concentration in decommissioning wastes to 400 Bq/g. This followed a request from BNFL to the Agency, to allow decommissioning radioactive waste with uranium activity greater than 100 Bq per gram be disposed of to Clifton Marsh on an agreed case by case

## Environment Agency

basis, so that decommissioning operations would not be adversely affected. In the Explanatory Document the Agency proposed, for this option, the following additional controls such that:

- the Agency must give prior written approval for each (waste stream or building) disposal to take place;
- the activity disposed of in any calendar year using the higher concentration disposal criterion must not exceed 0.01 TBq (5 per cent of original total decommissioning waste activity limit);
- that the uranium activity disposed of in all the decommissioning wastes in total in any year is reduced by 0.02 TBq (10 per cent) This would ensure that there would be no additional radiological impact from any disposals of higher concentration wastes.

**P6C.75** Prior to consultation, the Agency's view was that these slightly higher activity solid wastes were better sent to local landfill under controlled burial conditions rather than transported and disposed of at Drigg.

**P6C.76** A number of consultation responses were returned on this issue as given previously in section 6A.

**P6C.77** After careful consideration, the Agency has decided not to vary the Springfields authorisation to allow an increased concentration of radioactivity in decommissioning wastes to be disposed of at Clifton Marsh. The existing limit of 100 Bq/g on the concentration of uranium is to remain in the authorisation.

**P6C.78** The Agency has noted the consultation comments and considers that the submission received from BNFL does not make a sufficient case that sending a small proportion of wastes of somewhat higher activity to Clifton Marsh, rather than sending these wastes to Drigg, represents the best practicable environmental option (BPEO). This does not prevent BNFL or any future operator of the Springfields site from making an application to the Agency that sending such wastes to Clifton Marsh is the BPEO. Any such application for future variation to the Springfields authorisation would be subject to consultation.

**P6C.79** Schedule 9 in the authorisation specifies that the disposal of radioactive waste by burial on the Springfields site is not authorised. The old authorisation that allowed this practice for very low activity wastes and which has not been used for several decades, is to be revoked when the new authorisation is issued. It is not necessary to include such a 'burial not authorised' page, as the route is not included in Schedule 2 of the new authorisation, but this schedule is included for transparency.

**P6C.80** Schedule 10 of the authorisation allows the Agency to require BNFL to undertake improvements, investigations or supply additional information. Requirements 1, 2, 4 and 5 are specified to ensure that the continuous development aspects of BPM contained within the authorisation are addressed by BNFL and that BPEO is regularly reviewed. These requirements are standard in all nuclear site new authorisations. The reports generated by BNFL will provide a basis for carrying out future authorisation reviews.

**P6C.81** Minor aerial discharges i.e. some stacks and plant/building engineered ventilation outlets, from a number of facilities at Springfields are grouped together and regulated as 'other approved outlets'. Discharges from these outlets are estimated by calculation using information from continuous air sampling at the site perimeter and data from monitored stack discharges. The Agency considers this to be less satisfactory than direct measurement of discharges. Although the Agency believes that this estimation is broadly acceptable, it has specified that BNFL should review the data acquisition and calculation methodology within 6 months of the introduction of the new authorisation.

**P6C.82** The Agency will specify BNFL's monitoring of radioactivity in the environment around the Springfields site, making improvements where necessary. This will ensure that the environmental monitoring arrangements around Springfields represent best practice.

**P6C.83** The Agency considers that BNFL should report (Requirement 6) on research that improves the understanding of the effect of Springfield's radioactive discharges on the environment, on the local population and on non-human species.

**P6C.84** The Agency considers that BNFL should introduce arrangements to ensure that BPEO assessments are routinely undertaken for all new waste streams. Requirement 7 will provide this.

**P6C.85** To ensure that the waste assessment requirements of the new authorisation are in place, Requirement 8 entails BNFL providing a programme for its auditing of radioactive waste arrangements as in Condition 6(a)(vii) of Schedule 1 of the Certificate of Authorisation.

**P6C.86** To ensure that BNFL undertake assessments of potential future radioactive waste disposals from Nuclear Sciences and Technology Services (NSTS) on the Springfields site, Requirement 9 directs BNFL to introduce appropriate arrangements to provide to the Agency a written estimate of the likely level of waste disposals for each disposal route for the forthcoming calendar year. The estimate will be an indicator of the future disposals, not an application for authorisation or approval of the waste disposals. The aim of the requirement is to ensure that BNFL introduce procedures to assess any new or novel work, as well as routine work, that may be performed in each forthcoming calendar year by NSTS. It should be noted that the emphasis of this requirement has changed from that in the draft certificate, from the provision of an estimate itself to BNFL having suitable arrangements in place to generate an estimate each year.

### Dose Assessment

#### Human dose

**P6C.87** Assessments of the radiological impact on the public of prospective discharges from the Springfields nuclear site have been carried to confirm that the discharge limits are set at a level such that, even if discharges were made at 100 per

## Environment Agency

cent of those limits, the doses to the public would not exceed the relevant annual dose limits and constraints. Radiological protection principles and the background to dose assessments, both prospective and retrospective, are described in Part 2 of this document. A summary of the Agency's radiological assessments is given below.

**P6C.88** According to the strict ICRP definition of "critical group", there is only one such group of members of the public for any one site. Therefore in this document this term is reserved for the group assessed to receive the highest dose overall.

**P6C.89** BNFL, the Agency and FSA all calculated doses to adults, children and infants as part of their dose assessments. The results of a dose assessment depend on the assumptions made in the assessment. Although the general approach used was the same in each case, the organisations used different detailed models and assumptions. This means that each organisation has obtained different results for the dose assessments. Although this may initially seem inconsistent, the approach provides independent and confirmatory illustration of the potential level of radiological impact.

**P6C.90** Table 6C.7 and 6C.8 summarise the Agency's assessed doses to the most exposed groups for discharges from the nuclear site at the limits in the current authorisations held by BNFL Springfields, and also at the limits for the new authorisation. Direct radiation dose from the Springfields site, as assessed by the HSE, has been taken into account for the most exposed group near the boundary of the Springfields site. The radiological impact assessments undertaken by the FSA and BNFL were discussed in detail in the Explanatory Document and are therefore not repeated here.

**P6C.91** Radiation dose is measured in units of microsieverts - ( $\mu\text{Sv}$ ). The Agency has assessed the potential doses that a range of most exposed groups may receive from the discharges from Springfields if the discharges are at 100 per cent of the authorised annual limits. It is very unlikely that the discharges actually made will be at 100 per cent of each of the authorised limits. Calculating an assessment assuming that all discharges made are at the maximum limits is therefore likely to lead to an overestimate of doses.

**Table 6C.7 & 6C.8 - Results of the Agency's Assessment of Dose to the Most Exposed Groups for the Springfields site at Existing Limits, and at Limits in the Agency's New Authorisation**

Agency Radiological Assessment from Liquid Discharges - Doses in $\mu\text{Sv}$ per year						
Most Exposed Groups	Age group	Doses at 100% of current limits	Doses at new limits from Springfields liquid discharges 100% limits (percentage of dose at current limits)		Total dose from Springfield discharges at new limits and Sellafield discharges at concentrations found in 2000/2001 (percentage of dose at current limits and Sellafield component)	
			Up to 2007	2008 & onwards	Up to 2007	2008 and onwards
Houseboat dwellers in the Ribble Estuary	Adult	329	171 (52%)	29 (9%)	305 (~69%)	163 (~37%)
Angler in the Ribble Estuary	Adult	268	147 (55%)	23 (9%)	185 (~60%)	62 (~20%)
Fisherman in the Ribble Estuary	Adult	126	78 (62%)	49 (39%)	81 (~64%)	52 (~41%)
Wildfowlers	Adult	110	60 (55%)	16 (15%)	Not calculated	
	Child	99	49 (49%)	21 (21%)		
Ribble Link workers	Adult	42	24 (58%)	4 (10%)	27 (~60%)	7 (~16%)

Agency Radiological Assessment from Aerial Discharges and Direct Radiation*			
Most Exposed Groups	Age Group	100% Current Limits	100% New Limits
Doses due to discharges to atmosphere and direct radiation - Doses in $\mu\text{Sv}$ per year			
Householder, SW corner of the site	Infant	91	88
	Child	93	90
	Adult	91	88
Farming family SE corner of the site	Infant	85	84
	Child	86	85
	Adult	86	85
Signal box operatives, NW corner of the site	Adult	22	22

\* Direct radiation from Springfields site assessed by Nuclear Installations Inspectorate, taken as  $80\mu\text{Sv}$  per year.

**P6C.92** The potential impact for new work transferred to Springfields NSTS from BNFL's Berkeley Centre was not originally included in the dose assessment due to the time it was submitted to the Agency. It has been taken into account by reducing the main uranium discharge limit for Springfields by an amount equivalent to the 0.13 microsieverts attributable to the new work.

**P6C.93** The Agency's assessment indicates that at the limits set till 2007, the critical group is houseboat dwellers on the Ribble Estuary, exposed to liquid discharges from the site. The dose to this group is assessed as  $171 \mu\text{Sv}/\text{y}$ . For all the most exposed groups, the assessment shows that significant dose reductions may be expected at the new authorised limits for liquid discharges. For the houseboat dwellers in the Ribble

## Environment Agency

Estuary the dose reduction is 48 per cent for the new limits up to 2007 and 91 per cent for the limits from 2008.

**P6C.94** The Ribble Estuary also contains radionuclides from discharges from Sellafield. The Agency's assessment includes the total dose to people from the combination of Springfields and Sellafield's discharges. The highest total dose is 305  $\mu\text{Sv/y}$  to houseboat dwellers assuming discharges at the limits set till 2007 with the additional contribution of discharges from Sellafield. This total dose is less than the dose limit for members of the public of 1000  $\mu\text{Sv/y}$ . From 2008 onwards the total dose to houseboat dwellers reduces to 163  $\mu\text{Sv/y}$ .

**P6C.95** By 2008 the critical group is expected to change from the houseboat dwellers to a group local to the Springfields site. This is due to the reduction in liquid discharges to the Ribble. The dose, assessed as 90  $\mu\text{Sv/y}$ , to the new critical group is dominated by the direct radiation exposure from the site. However as the site is remediated and stored waste is disposed of, the direct radiation exposure may have reduced by 2008. The dose contributions from aerial discharges from the site at current and new limits are 13  $\mu\text{Sv/year}$  and 10  $\mu\text{Sv/year}$  respectively.

### Comparison with Source Constraint

**P6C.96** The BSS Direction 2000 requires the Agency, in ensuring that exposures are ALARA, to have regard to a constraint on the maximum doses to individuals, for use at the planning stage in radiation protection, of 300 microSv/year from any source from which radioactive discharges are first made on or after 13 May 2000. A source is defined (Cm 2919) as "*a facility, or group of facilities, which can be optimised as an integral whole in terms of radioactive waste disposals*". The doses to be compared with this source-related dose constraint are only those that can be altered by changes in the operating regime of a controlled source. This 'source constraint' thus includes the radiological impact of current discharges and direct radiation from the source, but excludes the impact of historical discharges. It is intended to guide the process of optimisation relating to the design, construction and operation of the facility or site. Cm 2919 and DETR's draft Statutory Guidance to the Agency state that, in general, it should also be possible for existing facilities to be operated within the source constraint of 300 microSv/year. However, it is recognised that in some cases a realistic assessment of doses might suggest that the facility could not be operated within this figure. In these cases the operator must demonstrate that the doses resulting from the continued operation of the facility are as low as reasonably achievable and within dose limits.

**P6C.97** For a source which was in existence before 13 May 2000, the Government's BSS Direction 2000 to the Agency places no requirement to comply with the 300  $\mu\text{Sv/year}$  source constraint.

### Comparison with Site Constraint

**P6C.98** The BSS Direction 2000 imposes a "site constraint" of 500 microSv/year on discharges from an entire site. The site constraint includes the radiological impact of

current discharges from the entire site, but excludes the impact of direct radiation and historical discharges. All the assessed doses for the Springfields site are below the site constraint.

### Comparison with Annual Dose Limit

**P6C.99** The BSS Direction 2000 sets a dose limit for members of the public of 1 millisievert/year (1000 microsieveverts/year) from all man-made sources of radioactivity other than from medical exposure.

**P6C.100** The contribution to the total dose to members of the public arising from all man-made sources, including historical discharges, may be estimated by combining retrospective and prospective dose assessments. Retrospective assessments are based on environmental monitoring data. Environmental monitoring is carried out by BNFL, the Food Standards Agency and the Environment Agency. The Agency and FSA results are published annually in the RIFE report. The total doses are all below the annual dose limit.

### Collective Dose Assessments

**P6C.101** Taking all routes into account, the total collective dose associated with a year of discharges at the new limits is significantly below 1 mansievert per year of practice, which is a criterion suggested by the International Atomic Energy Agency.

### Dose to non-human species

**P6C.102** The Agency has assessment guidance for conservation areas designated under the European Habitats and Birds Directives. While there are designated sites in the area of the Springfields nuclear site, screening assessments using reference radionuclides, demonstrate that there will not be significant effects on non-human species in the terrestrial and freshwater aquatic environment.

### Conclusion

**P6C.103** The Agency is satisfied that it is appropriate to issue an authorisation under RSA 93 to BNFL for the Springfields nuclear site. The authorisation includes new conditions placing requirements on BNFL Springfields to have a management system, organisational structure and resources which are sufficient to achieve compliance with the limits and conditions of the authorisation. BNFL is required to inform the Agency of the arrangements it intends to employ to achieve compliance with the authorisation at least 28 days before disposals of waste made under that authorisation (unless otherwise specified by the Agency). It is also required to advise the Agency, at least 28 days in advance, of any changes to these arrangements which might significantly affect how it complies with the authorisation.

## **Environment Agency**

**P6C.104** Through its inspection activities, the Agency will focus on the arrangements for compliance with the new authorisation.

**P6C.105** The Agency also notes that due to the arrangements caused by the formation of the Nuclear Decommissioning Authority (NDA) there is the intention to use the powers within the Energy Act 2004 for a new operator and BNFL to jointly apply to have the authorisation transferred from BNFL to a new operator. This transfer will be subject to limited consultation only on the issue of the transfer, not of the limits or conditions contained within the authorisation.

## **PART 7 - THE AGENCY'S DECISIONS**

### **Introduction**

**P7.1** This Part provides a summary of the Agency's main conclusions and decisions on the authorisation review for the BNFL Springfields nuclear site.

**P7.2** The Agency exercises regulatory control over disposals of radioactive waste through the limits and conditions in the authorisations it issues under the Radioactive Substances Act 1993. The Agency's main tasks during the review are to decide whether an authorisation should be issued and, if so, what its terms and conditions should be so as to provide proper protection of members of the public and the environment.

**P7.3** In reaching a view on whether an authorisation should be issued to BNFL Springfields the Agency has considered the practices on site in terms of optimisation and limit setting. The Agency recognises that the issue as to whether the practice is justified, i.e. whether the benefits outweigh the detriments, is a matter for Government. The former Department of the Environment, Transport and the Regions (DETR) advised the Agency in February 2001 that, consistent with new regulations, decisions on justification will be taken by Government. During the Agency's consultation on the Springfields authorisation, the Government has consulted on new regulations for justification decisions. The 'Justification of Practices Involving Ionising Radiations Regulations 2004 No.1769' has been through the parliamentary process and came into force on 2nd August 2004. Therefore the consideration of justification or any review of existing practices with regard to justification is a matter for the relevant Secretary of State as the 'Justifying Authority'.

**P7.4** Certain powers relating to the determination process for nuclear sites in England fall to the Secretary of State for Environment, Food & Rural Affairs and the Secretary of State for Health. The Agency has passed copies of the consultation documents to these Secretaries of State.

### **Risks from Radiation Exposure**

**P7.5** The Agency has carefully considered the points raised by respondents on risks from radiation exposure. It has based its decisions in this document on the current advice on radiological risk factors from NRPB.

**P7.6** Although the Agency does not anticipate any substantial changes in future to the advice it is currently receiving from NRPB on risks from exposure to low level radiation, it will remain alert to developments in this area and, if appropriate, will review relevant authorisations under RSA 93 accordingly.

### **Justification, Optimisation and Limits**

**P7.7** The Agency has not addressed the issue of justification of the practices in the review of BNFL Springfields authorisation. Justification is the process of weighing benefits against detriments for a given practice, and the Agency recognises that this is an issue for Government.

**P7.8** The Agency has carefully considered the information provided in the BNFL Springfields submissions, together with that provided in consultation responses and additional information obtained from BNFL and other organisations. For the purposes of considering optimisation, the Agency has taken into account the levels of discharges (past and present), the plant, process, engineering and managerial techniques and approaches used to abate waste discharges, the means to control, monitor and record discharges, and the impact of discharges from the site. At the present time the Agency believes that BNFL is applying BPEO and using BPM at the Springfields nuclear site, but it will keep these issues under review.

**P7.9** The Agency concludes that the discharge limits in the draft authorisation in the Explanatory Document (November 2003) remain valid and appropriate to the current and prospective levels of operation at the Springfields nuclear site. The Agency has decided to set these limits within a new multi-media authorisation certificate for the site. The limits provide an appropriate level of headroom to the operator such that BNFL Springfields can successfully manage its operational and decommissioning work, and the Agency can apply the appropriate level of regulatory control, while still maintaining a downward pressure on discharges.

### **RSA 93 Authorisation**

**P7.10** The Agency exercises regulatory control through the limits and conditions it includes in authorisations granted under RSA 93 for the disposal of radioactive waste. It can include any limits and conditions it thinks fit, subject to the legal test of reasonableness. The Agency may review an authorisation at any time. It aims to review each nuclear site authorisation regularly.

**P7.11** The Agency sets limits on discharges such that, even if discharges were made at the limits, the doses to members of the public would not exceed the relevant annual dose limit and constraints, and that are therefore well within internationally accepted safety levels. The Agency sets limits and conditions which are consistent with European and UK law, international treaty obligations, Government policy objectives, and protection of public health, the food chain and the environment.

### **New Integrated Authorisation**

**P7.12** Currently, there are seven separate authorisations issued to BNFL for the Springfields nuclear site with, in general, one for each type of waste and disposal route. Six of these authorisations were included in the review. The seventh is to be separately revoked as it is no longer appropriate. The new authorisation is in an integrated form, so that all permitted means of disposal for each site are included in a

single authorisation. It will be the only authorisation for radioactive waste disposal issued for the site.

**P7.13** The template for the integrated authorisation consists of:

- a certificate page;
- schedule 1 containing conditions applicable to all disposals;
- schedule 2 specifying the types of waste that may be disposed of and by which routes;
- further schedules containing conditions applying to individual disposal routes; and
- the last schedule setting out a programme for improvements and additional information.

**P7.14** The Agency is satisfied that an integrated authorisation provides a sound basis for the regulation of radioactive waste disposals from the Springfields site.

### **General Limitations and Conditions (Schedule 1)**

**P7.15** The new authorisation requires the operator not only to comply with numerical limits on the levels of activity which may be discharged, but also to use BPM to minimise further the amount of radioactivity discharged. This is consistent with the current authorisations. The integrated authorisation certificate introduces improved conditions which also require the operator:

- to use BPM to minimise the activity of radioactive waste produced which will require disposal under the authorisation; and
- to use BPM to minimise the activity of waste disposed of by discharge to the environment and to minimise the volume of radioactive waste disposed of by transfer to other premises.

**P7.16** These conditions provide the main basis for ensuring that the exposures of members of the public are as low as reasonably achievable (ALARA). They also encourage a holistic approach to radioactive waste management, intensify downward pressure on discharges, are consistent with the objectives of the OSPAR Convention and help to ensure that the best practicable environmental option (BPEO) is attained. Furthermore, the new conditions provide a more explicit statement of the policy requirement to ensure that radioactive wastes are not unnecessarily created.

**P7.17** A new condition in the integrated authorisation certificate addresses arrangements for management and supervision. This requires the operator to have a management system, an organisational structure and resources in place sufficient to achieve compliance with the authorisation. Specific aspects addressed in the condition include:

- written arrangements for achieving compliance with the limits and conditions of the authorisation;
- written operating and maintenance instructions;

## **Environment Agency**

- consultation with expert advisers where appropriate;
- supervision of waste disposal; and
- internal audit and review of the management system.

**P7.18** The Agency can require the operator to provide all or part of the written arrangements 28 days prior to the first disposal of waste under the new authorisation. The Agency will consider what information it requires from BNFL and will carefully scrutinise its arrangements so as to be satisfied that adequate systems are in place to meet the requirements of the new authorisation. The importance of maintaining ongoing effective management, particularly at times of change, is recognised and Agency inspections early in the life of the new authorisation will focus on this area.

**P7.19** Schedule 1 of the new authorisation includes further conditions relating to measurement and assessment of discharges, record keeping and provision of information to the Agency. The Agency considers that the general conditions of the new authorisation will provide a better basis for regulation than the corresponding conditions in the existing authorisations held by BNFL.

### **Schedules for Individual Disposal Routes**

**P7.20** The schedules for individual disposal routes each include limits and conditions applying exclusively to that route. The principal issues for the Agency are to decide whether a disposal route should be permitted and, if so, what limits should be applied. Disposal limits set by the Agency have taken into account a number of factors, including radiological impact on humans and the environment, safety, operational need and cost implications, legal requirements, Government policy and international commitments.

**P7.21** The Agency has carefully scrutinised BNFL Springfields review submission and all responses to the consultation with the objective of setting limits on discharges to the environment, at the minimum level which permits normal operation of the Springfields nuclear site together with processing of legacy wastes and decommissioning. The Agency's aim is to apply downward pressure on discharges. The level of discharge depends on detailed design features and other factors, including:

- the production or operational throughput of plant;
- installed facilities for controlling waste creation;
- installed systems and facilities to sample and measure discharges; and
- operational history.

**P7.22** The new authorisation will place limits on all authorised waste routes. Existing limits on discharges to the environment are being reduced. The transfer limits to the Shanks Chemical Services incinerator are new from work recently transferred to the Springfields site.

## **Environment Agency**

**P7.23** The Agency is satisfied that the disposal routes for the site and the discharge and disposal limits it has included in the new authorisation are consistent with European and UK law, international treaty obligations, Government policy objectives, and protection of public health, the food chain and the environment.

### **Improvement and Additional Information Requirements**

**P7.24** The final schedule of each authorisation requires the operator to carry out a programme of investigations and improvements, all to specified timetables. Examples are:

- reviews of whether the current disposal routes continue to represent BPEO;
- reviews of developments in best practice for minimising all waste disposals, together with a strategy for achieving reductions in discharges; and
- comprehensive review of discharge assessment methods, including details of internal audits.

**P7.25** The Agency is satisfied that the early introduction of such conditions together with the new limits as described above will provide potentially significant environmental improvements.

### **New Authorisation for the Springfields Nuclear Site**

**P7.26** For the Springfields nuclear site, the sections below identify the disposal routes included in the new authorisation and provide comments on limits for discharges. The radiological impact of the site, in the context of dose limits and constraints is also set out.

**P7.27** The disposal routes included in the Agency's new authorisation for the Springfields nuclear site are:

- Discharge of gaseous waste to the atmosphere;
- Discharge of aqueous waste to the River Ribble;
- Disposal of combustible waste by transfer to BNFL Capenhurst, Chester and to Shanks Chemical Services Limited, Hythe, for the purposes of disposal by incineration;
- Disposal of solid low level waste destined for final disposal at BNFL Drigg by transfer to BNFL at Sellafield or Drigg; and
- Disposal of solid low level waste at Clifton Marsh landfill site.

**P7.28** The main limit changes in the new authorisation for the Springfields nuclear site are:

- The separation of operational and decommissioning disposal limits;
- Lower limits on liquid discharges, supplemented by notification levels;
- Lower discharge limits for gaseous waste for the site overall;

## Environment Agency

- The introduction of gaseous discharge limits and notification levels for individual stacks;
- New limits on transfers of combustible wastes to Shanks incinerator;
- Reduced disposal limits for transfers to Drigg; and
- The reformatting of the Clifton Marsh disposal limits to more appropriate units to achieve consistency within the authorisation.

**P7.29** The Agency considers that the new authorisation will:

- Reduce the radiological impact, especially on those people near the Springfields site. In particular, the decrease in authorised radioactive discharges to the River Ribble from Springfields will ensure reductions of 48 per cent initially, and 85 per cent from 2008, in the assessed radiological impact to the most exposed public groups from discharges at 100 per cent of the new limits;
- Ensure that potential radiation doses from discharges continue to be below national limits and constraints;
- Reduce the annual liquid discharge limit for total beta by 42 per cent initially and by 91 per cent from 2008;
- Reduce the annual liquid discharge limit for total alpha by 86 per cent initially and by 97 per cent from 2008;
- Improve regulation by the introduction of discharge limits to individual plants;
- Provide a more transparent approach to the regulation of the site;
- Strengthen the BPM conditions by requiring waste minimisation at source, which will maintain downward pressure on waste disposals below the limits imposed by the authorisation and will minimise the environmental and radiological impact;
- Encourage BNFL's progress in treating historic legacy wastes and residue materials;
- Promote BNFL's decommissioning programmes for redundant plants;
- Not place a grossly disproportionate additional burden on BNFL's staff resources in meeting the requirements for information in the draft authorisation; and
- Not involve grossly disproportionate expenditure for any additional sampling or monitoring and managerial control of discharges.

### The Agency's Determination Process

**P7.30** The Agency carried out a public consultation exercise to assist its decision-making process on the BNFL Springfields review. The Agency made the consultation documents available both locally and nationally and provided copies to members of the public and interested stakeholders. The Agency held two public drop-in surgeries for members of the public to discuss the review and ask questions of Agency staff. Prior to public consultation, the Agency had not made any decisions on the outcome of the review.

**P7.31** Responses to the consultation could be made by a number of routes. This enabled consultees to draw the Agency's attention to any matters they wished it to

consider when reaching its decisions on the review. The Agency received a number of responses, which commented on matters associated with BNFL Springfields submissions, and the consultation documents. None of these included any requests for a public inquiry to be held, or for the Secretary of State to make the decisions on the review. All consultation responses were considered carefully.

**P7.32** The Agency is satisfied that the public consultation process has provided sufficient opportunity for members of the public and interested groups to make full and informed representations. It has carefully assessed and weighed all the points raised during the consultation. Many of the issues have been discussed in more detail in previous Agency documents. As such the full review and re-authorisation process should be taken as a trilogy of the Scope and Methodology document, the Explanatory Document and this Decision Document.

### Conclusion

**P7.33** Before implementing its final decisions the Agency will send this Decision Document to the Secretary of State for Environment, Food and Rural Affairs and the Secretary of State for Health. This will enable them to determine whether they wish to exercise their statutory powers to give a policy direction or guidance to the Agency on the decisions. Subject to the implications of any interventions by the Secretaries of State, the Agency will issue a new certificate of authorisation as provided in Appendix 6 to BNFL for the Springfields site.

**P7.34** In parallel to issuing a new certificate of authorisation, the Agency will also revoke the current certificates of authorisation which will have been superseded. The joint authorisation with BNFL Capenhurst for solid waste disposals to Clifton Marsh will be revoked in so far as the certificate applies to disposals from Springfields.

**P7.35** The Agency believes that the new certificate of authorisation has been appropriately generated, and is suitable, robust and proportionate. It will provide significant regulatory and potential environmental benefits, and will take the regulation of the Springfields nuclear site by the Environment Agency under the RSA93 forward to 2008 and beyond.

**APPENDIX 1: GLOSSARY**

**Agency:** unless the context refers otherwise, the word Agency refers to the Environment Agency as established under the Environment Act 1995. Among its pollution control powers are those under the Radioactive Substances Act 1993.

**Alpha activity:** some radionuclides decay by emitting alpha particles, which consist of two neutrons and two protons.

**As low as reasonably achievable (ALARA):** Radiological doses 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.

**Authorisation:** Permission given by regulatory authority (the Environment Agency in England and Wales) to dispose of radioactive waste; in practice, when given, always subject to conditions which must be met.

**Basic Safety Standards (BSS):** European Basic Safety Standards for the Health Protection of the General Public and Workers Against the Dangers of Ionising Radiation. Standards were first adopted in European Law in 1980 (Directive 80/836/Euratom), and revised in May 1996 (Directive 96/29/Euratom), for adoption in Member States by May 2000.

**Becquerel (Bq):** The standard international unit of radioactivity equal to one radioactive transformation per second.

- Megabecquerel (MBq) - 1 million transformations per second
- Gigabecquerel (GBq) - 1 thousand million transformations per second
- Terabecquerel (TBq) - 1 million million transformations per second.

**Best Practicable Environmental Option (BPEO):** A concept developed by the Royal Commission on Environmental Pollution which involves decisions on waste management being based on an assessment of alternative options evaluated on the basis of factors such as the occupational and environmental impacts, the costs and social implications.

**Best Practicable Means (BPM):** Within a particular waste management option, the BPM is that level of management and engineering control that minimises, as far as practicable, the release of radioactivity to the environment whilst taking account of a wider range of factors, including cost-effectiveness, technological status, operational safety, and social and environmental factors.

**Beta activity:** Some radionuclides decay by emitting a beta particle (normally a negatively-charged electron, but when positively-charged, the particle is termed a positron).

**British Nuclear Fuels plc (BNFL):** The company operating numerous nuclear sites in the UK including the Springfields site and low-level radioactive waste facilities at Drigg in Cumbria.

**Cm 2919:** A Government White paper published in 1995 entitled "Review of Radioactive Waste Policy: Final Conclusions".

**Collective Dose:** The dose received by a defined population from a particular source of public exposure, obtained by summing the dose received by each individual in the population and expressed in units of man-sieverts (man-Sv). Within limits, collective dose can be thought of as representing the total radiological consequences of the source on the group, over some period of time.

**CoRWM:** Committee on Radioactive Waste Management – see Appendix 4 for relevant responsibilities.

## Environment Agency

**Critical Group:** A group of members of the public whose radiation exposure is reasonably homogeneous and is typical of people receiving the highest dose from a given source.

**Decommissioning:** The process whereby a nuclear facility, at the end of its economic life, is taken permanently out of service and its site made available for other purposes. In the case of a nuclear plant this is normally seen to comprise of three different stages of clearance. Immediately after the final closure, radioactive material such as nuclear fuel and operational waste is removed; the ancillary buildings / plant surrounding the active facility are dismantled; and finally the active plant itself is dismantled.

**Department of Health (DoH):** See Appendix 4 for relevant responsibilities.

**Department for Environment, Food and Rural Affairs (DEFRA):** See Appendix 4 for relevant responsibilities.

**Department for Transport, Local Government and the Regions (DTLR):** See Appendix 4 for relevant responsibilities.

**Department of the Environment, Transport and the Regions (DETR):** See Appendix 4 for relevant responsibilities.

**Department of Trade and Industry (DTI):** See Appendix 4 for relevant responsibilities.

**Direct radiation:** Radiation received directly from a source such as a nuclear facility, instead of indirectly as a result of radioactive discharges.

**Discharge:** The release of aerial or liquid waste to the environment.

**Disposal:** for solid waste, disposal is the emplacement of waste in an authorised land disposal facility without intent to retrieve it at a later time (retrieval may be possible but, if intended, the appropriate term is **storage**). Alternatively it can relate to aerial waste (gases, mists and dusts) and liquid waste when it refers to releases to the environment (i.e. emissions and discharges). Similarly it can also relate to any transfer of waste, together with responsibility for that waste, to another person. Such transfer might be for the purpose of incineration.

**Dose:** A general term used as a measure of the radiation received by man and usually measured in Sieverts.

**Dose Constraint:** A restriction on annual dose to an individual from a single source applied at the design and planning stage of any activity in order to ensure that when aggregated with doses from all sources, excluding natural background and medical procedures, the dose limit is not exceeded. The dose constraint places an upper bound on the outcome of any optimisation study and will therefore limit any inequity which might result from the economic and social judgements inherent in the optimisation process.

**Dose Limit:** For the purposes of discharge authorisation, the UK has (since 1986) applied a limit of 1mSv/y to members of the public from all man-made sources of radiation (other than from medical exposure). This limit is now incorporated within UK law.

**Environment Act 1995 (EA 95):** The main piece of legislation giving the Environment Agency its powers, aims and objectives.

**Euratom Treaty:** Within the European Union, nuclear matters are the subject of a separate Treaty dating from 1957. This established the European Atomic Energy Community (EAEC) or Euratom, which was set up to encourage progress in the field of nuclear energy.

**Fingerprint:** Term used to describe the relative ratios of various radionuclides within a waste or material.

**Fission:** Splitting of atomic nuclei.

**Fission products:** Radionuclides produced as a result of fission.

**Food Standards Agency (FSA):** See Appendix 4 for relevant responsibilities.

**Health and Safety Executive (HSE):** See Appendix 4 for relevant responsibilities.

**Nuclear Installations Inspectorate (NII):** A part of the Nuclear Safety Division of HSE. See Appendix 4 for relevant responsibilities.

**High level waste (HLW):** Waste in which the temperature may rise, as a result of its radioactivity, to an extent that it has to be accounted for in designing storage or disposal facilities.

**International Atomic Energy Agency (IAEA):** The United Nations Agency whose principal objective is to 'accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world'.

**International Commission on Radiological Protection (ICRP):** An independent group of experts, founded in 1928, which provides guidance on principles and criteria in the field of radiation protection. The recommendations are not legally binding but are generally followed by the UK in legislation.

**ICRP 60:** 1990 ICRP Recommendations on Radiation Protection.

**ICRP 77:** 1997 ICRP Recommendations on Radiation Protection for Waste Disposal

**Intermediate level waste (ILW):** Waste with radioactivity levels exceeding the upper boundaries for low level waste but which does not require heat generation by the waste to be accounted for in the design of disposal or storage facilities

**Ionising Radiations Regulations 1999 (IRR 99):** These regulations under the Health and Safety at Work etc Act 1974 in part implement the European Basic Safety Standards Directive of 1996.

**Ionisation:** The process by which a neutral atom or molecule acquires an electric charge.

**Inter-generational equity:** It is an internationally agreed principle that radioactive waste shall be managed in such a way that predicted impacts on the health of future generations will not be greater than relevant levels of impact that are acceptable today.

**Justification (of a Practice):** An ICRP radiological protection principle which states that no practice involving exposures to radiation should be adopted unless it produces sufficient benefit to the exposed individuals or to society so as to offset the radiation detriment it causes.

**Legacy waste:** In the context of the BNFL Springfields authorisation, this means historic uranium ores, process residues and other material.

**Liquid Scintillation Counting:** A technique used to accurately measure radioactivity.

**Low level waste (LLW):** Waste containing levels of radioactivity greater than those acceptable for disposal with normal refuse but not exceeding 4 GBq/tonne alpha-emitting radionuclides or 12 GBq/tonne beta-emitting radionuclides.

**Man-sievert (manSv):** A measure of collective dose.

**National Assembly for Wales (NAW):** See Appendix 4 for relevant responsibilities.

**National Radiological Protection Board (NRPB):** See Appendix 4 for relevant responsibilities.

**OSPAR Convention:** The Oslo Paris Convention, where contracting parties (including the UK) agreed to take all possible steps to prevent and eliminate pollution and to take all necessary measures to protect the maritime area against the adverse effects of human activities so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected.

## Environment Agency

**Practice:** Human activity which may result in an overall increase, or likelihood of increase, in the exposure or the number of people exposed to a radiation dose.

**Quarterly notification levels (QNLs):** Three-monthly emission levels that the Agency specifies in an operator's authorisation and which, if exceeded, are to be reported to the Agency.

**Radioactive Waste:** Material that contains radioactivity above levels specified in the Radioactivity Substances Act 1993 and for which there is no use foreseen by the producer or handler.

**Radioactive Waste Management Advisory Committee (RWMAC):** See Appendix 4 for relevant responsibilities.

**Radioactivity:** The property of some radionuclides to spontaneously disintegrate emitting radiation such as alpha particles, beta particles and gamma rays.

**Radiological assessment:** An assessment of the radiation dose to members of the public including that from discharges, which will result from operation or decommissioning of a facility.

**Radionuclide:** A general term for an unstable atomic nuclide that emits ionising radiation.

**Sievert (Sv):** A measure of radiation dose received.

- **millisievert (mSv):** one thousandth of a sievert.
- **microsievert (microSv or  $\mu$ Sv):** one millionth of a sievert.

**Sustainable Development:** This is often defined as 'Development that meets the needs of the present generation without comprising the ability of future generations to meet their own needs'.

**Weekly Advisory Levels (WALs):** i.e. weekly emission values which, if exceeded, are to be reported to the Environment Agency and the Food Standards Agency (not used in the Springfields authorisation).

**APPENDIX 2: LIST OF CONSULTEES**

## Environment Agency

### List of Current Stakeholders Involved in the Environment Agency's Review of BNFL Springfields' Nuclear RSA93 Authorisations

Department for Environment, Food and Rural Affairs	Radioactive Waste Management Advisory Committee (RWMAC)
Department of Health	Department of Trade & Industry
The Rt Hon Michael Jack, MP	Committee on Radioactive Waste Management (CoRWM)
Mark Hendrick, MP	Gorden Marsden, MP
Colin Pickthall, MP	David Borrow, MP
Acting Business Manager for Consumer Well – Being and Protection, Fylde Borough Council	The Rt Hon Sir Robert Atkins, MP
Chris Davies, MEP	Lord Inglewood, MEP
David Sumberg, MEP	Terry Wynn, MEP (for Labour NW MEPs)
Government Office for the North West	Regional Waste Officer North West Regional Assembly
English Nature	Waterway Manager British Waterways
Asset Management Director United Utilities	CEFAS
North Western & North Wales Sea Fisheries Committee	Chief Inspector Nuclear Installations Inspectorate / HSE
Food Standards Agency	Save Our Shoreline
Nuclear Free Local Authorities Secretariat	NFU Headquarters
NFU North East & North West Regions	Spotlight on Springfields
Liabilities Management Unit c/o DTI	Chief Executive Preston Borough Council
Chief Executive West Lancashire District Borough Council	Chief Executive Blackpool Unitary Authority
Acting Head of Paid Service Wyre Borough Council	Senior Emergency Planning Officer Lancashire County Council

## Environment Agency

Greenpeace	SITA
Chief Executive Ellesmere Port & Neston Borough Council	Blackpool Central Library
Cleveleys Library	Harris Library
Lytham Library	St Annes Library
Warton Library	Councillor Breakell South Ribble Borough Council
County Councillor Pimblett Lancashire County Council	Councillor D Bretherton South Ribble Borough Council
Lead Officer South Ribble Borough Council	Lancashire Association of Parish & Town Councils
Ormskirk Friends of the Earth	Southport Friends of the Earth
Save Our Shoreline - Lytham	Friends of the Earth North West
Principal Officer, Overview & Scrutiny Lancashire County Council	Councillor D Ellis Dalton Parish Council
Executive Manager, Environmental Services West Lancashire District Council	Councillor J Baldock West Lancashire District Council
Councillor V Hopley West Lancashire District Council	Principal Engineer Fylde Borough Council
Executive Director Fylde Borough Council	Springfields Local Liaison Committee
BNFL	BNFL Staff & Unions
Cumbria County Council	New Forest District Council
Copeland Borough Council	
Cumbria & Lancashire Health Protection Unit	National Radiological Protection Board (NRPB)
<u>West Lancashire Parish Councils</u>	
Aughton Parish Council	Bickerstaffe Parish Council
Burscough Parish Council	Hesketh with Beconsall Parish Council

## **Environment Agency**

Lathom Parish Council

North Meols Parish Council

Simonswood Parish Council

### Wyre Parish Councils

Bleasdale Parish Council

Forton Parish Council

Hambleton Parish Council

Myerscough Parish Council

Pilling Parish Council

### South Ribble Parish Council

Farington Parish Council

Muche Hoole Parish Council

### Preston Parish Councils

Barton Parish Council

Lea Parish Council

### Fylde Parish Councils

Elswick Parish Council

Little Eccleston with Larbeck Parish Council

Ribby-with-Wrea Parish Council

Staining Parish Council

Other stakeholders were:

- The members of the Environment Agency's North West Region Central Area Environment Group
- 2 private individuals
- Lytham and District Wildfowlers Association (not included in initial phase of consultation).

Newburgh Parish Council

Parbold Parish Council

Wrightington Parish Council

Catterall Parish Council

Great Eccleston Parish Council

Inskip with Sowerby Parish Council

Nether Wyresdale Parish Council

Penwortham Town Council

Grimsargh Parish Council

Greenhalgh with Thisleton Parish Council

Newton with Clifton Parish Council

Singleton Parish Council

**APPENDIX 3: ORGANISATIONS AND INDIVIDUALS  
RESPONDING TO THE CONSULTATION**

## **Environment Agency**

### **Organisations And Individuals Responding To The Consultation**

**BNFL**

**British Waterways**

**Committee on Radioactive Waste Management (CoRWM)**

**Department of Health**

**Department of Trade and Industry**

**Federation of Lancashire Civil Societies**

**Fylde Borough Council**

**Greenpeace**

**Chief Inspector NII HSE**

**Irish Government (Dept of the Environment, Heritage and Local Government)**

**Rt Hon Michael Jack MP**

**Joint Overview & Scrutiny Task Group of Lancashire County Council**

**Lancashire Authorities Steering Committee (endorsed RADMIL's report)**

**Lancashire County Council (endorsed RADMIL's report)**

**Lea Parish Council**

**Lytham & District Wildfowlers Association**

**National Farmers Union**

**NRPB**

**Nuclear Free Local Authorities**

**Preston City Council (endorsed RADMIL's report)**

**Ribby-with-Wrea Parish Council**

**Simonswood Parish Council**

**Spotlight on Springfields**

**3 private individuals.**

**APPENDIX 4: RESPONSIBILITIES OF GOVERNMENT  
DEPARTMENTS AND PUBLIC BODIES**

**RESPONSIBILITIES OF GOVERNMENT DEPARTMENTS AND PUBLIC BODIES**

This Appendix provides a general guide to the responsibilities of other Government bodies, including legal powers and duties as appropriate, referred to in this Decision Document. The responsibilities identified are only those which relate to the Environment Agency's task to determine the BNFL Springfields review under RSA 93 to dispose of radioactive waste from the Springfields nuclear site. For more specific information on a particular body's responsibilities, reference should be made to that body itself.

**Department for Environment, Food & Rural Affairs (Defra)**

Defra is the sponsoring Department for the Environment Agency. It has a crucial role in promoting sustainable development, both in the UK and internationally. Its aims and objectives relate to enhancing the quality of life through promoting:

- a better environment;
- thriving rural economies and communities;
- diversity and abundance of wildlife resources;
- a countryside for all to enjoy; and
- sustainable and diverse farming and food industries that work together to meet the needs of consumers.

Defra was formed from parts of the former Department of the Environment, Transport & the Regions (DETR), together with the former Ministry of Agriculture, Fisheries & Food (MAFF), after the General Election of June 2001. Defra is responsible for (among other matters) environmental policy in England, including policy for the management and disposal of radioactive waste. Bodies sponsored by Defra include the Radioactive Waste Management Advisory Committee (RWMAC - see below). The Secretary of State for Environment, Food & Rural Affairs exercises powers together with the Secretary of State for Health to call in applications or direct the Environment Agency with respect to authorisations under RSA 93 for nuclear sites in England. Information about Defra may be found on its website [www.defra.gov.uk](http://www.defra.gov.uk).

**Department for Transport, (DfT)**

DfT has policy responsibility for transport in England. DfT was formed from the former Department for Transport, Local Government & the Regions (DTLR). Transport regulation includes regulation of the transport of radioactive materials and radioactive waste. Information about DfT may be found on its website [www.dft.gov.uk](http://www.dft.gov.uk).

**Department of Trade & Industry (DTI)**

DTI is responsible for (among other matters) energy policy in England and is the shareholder of BNFL on behalf of the UK Government. Among its aims for the period 2001-2004 are to:

- Ensure competitive gas and electricity prices in the lower half of the EU/G7 basket, while achieving security of supply and social and environmental objectives;

## **Environment Agency**

- Improve the environment and the sustainable use of natural resources, including by reducing greenhouse gas emissions by 12.5 per cent from 1990 levels and moving towards a 20 per cent reduction in CO<sub>2</sub> emissions by 2010. This is a joint target with Defra.

With regard to the nuclear industry in England, Wales and Scotland, DTI is responsible for overseeing industry compliance with safeguards requirements against the diversion of nuclear materials and for the regulation of security in the industry, including security at sites.

Information about DTI may be found on its website [www.dti.gov.uk](http://www.dti.gov.uk).

## **Department of Health (DoH)**

DoH is responsible for health policy in England. It is the sponsoring Department for the National Radiological Protection Board (NRPB - see below) and the Committee on Medical Aspects of Radiation in the Environment (COMARE - see below). The Secretary of State for Health exercises powers together with the Secretary of State for Environment, Food & Rural Affairs to call in applications or direct the Environment Agency with respect to authorisations under RSA 93 for nuclear sites in England. Information about DoH may be found on its website [www.doh.gov.uk](http://www.doh.gov.uk).

## **National Assembly for Wales**

The National Assembly for Wales is responsible for (among other matters) environment, transport, energy, health, agriculture, fisheries and food policy in Wales. The Assembly exercises powers to call in applications or direct the Environment Agency with respect to authorisations under RSA 93 for nuclear sites in Wales.

Information about the National Assembly for Wales may be found on its website [www.assembly.wales.gov.uk](http://www.assembly.wales.gov.uk).

## **Scottish Parliament**

The Scottish Parliament is responsible for (among other matters) environment, transport, energy, health, agriculture, fisheries and food policy in Scotland. The Scottish Parliament exercises powers to call in applications or direct the Scottish Environment Protection Agency (SEPA – see below) with respect to authorisations under the Radioactive Substances Act 1993 for nuclear sites in Scotland.

Information about the Scottish Parliament may be found on its website [www.scottish.parliament.uk](http://www.scottish.parliament.uk).

## **Scottish Environment Protection Agency (SEPA)**

SEPA is a sister body to the Environment Agency, performing similar functions in Scotland. Information about SEPA may be found on its website [www.sepa.org.uk](http://www.sepa.org.uk).

## **Health & Safety Executive (HSE)**

HSE, set up under the Health & Safety at Work Etc. Act 1974, is responsible for ensuring that risks to people's health and safety from work activities are properly controlled. HSE includes a Nuclear Safety Directorate (NSD), which incorporates the Nuclear Installations Inspectorate (NII) and which is responsible for regulating the safe operation of nuclear installations under the Nuclear Installations Act 1965 (NIA). NSD's stated mission is: "To secure the maintenance and improvement of standards of safety at nuclear installations and the protection of workers and members of the public from ionising radiations." Under the provisions of the NIA, a site in England, Wales or Scotland cannot have nuclear plant on it unless the user has been granted a

## **Environment Agency**

site licence by HSE. Aspects regulated by HSE include the storage of radioactive waste on nuclear sites and direct radiation from sources on nuclear sites. The legal regime just described is complemented by the Ionising Radiations Regulations 1999 (IRRs) which provide for protection of workers in all industries from ionising radiations and by the generality of health and safety regulation which the NSD also enforces on nuclear sites. HSE and the Environment Agency regulate nuclear sites under a joint Memorandum of Understanding. HSE is a statutory consultee of the Environment Agency on applications for authorisation under RSA 93 to dispose of radioactive waste in England and Wales.

Information about HSE may be found on its website [www.hse.gov.uk](http://www.hse.gov.uk).

## **Food Standards Agency (FSA)**

The FSA became a new non-ministerial government department on 3 April 2000 and is answerable to Parliament through the Secretary of State for Health. The FSA was created to protect public health from risks which may arise in connection with the consumption of food, and otherwise to protect the interests of consumers in relation to food. By virtue of the Food Standards Act 1999, the FSA is a statutory consultee of the Environment Agency and SEPA on authorisations to dispose of radioactive waste, as well as on the revocation and variation of such authorisations. The FSA, including its Welsh and Scottish Executives as appropriate, considers the food safety implications of proposed authorisations, etc., and makes comments to the Environment Agency or SEPA. In England the powers to call in applications or direct the Environment Agency with respect to authorisations under RSA 93 for nuclear sites reside with the Secretary of State, which includes the Secretary of State for Health. In Wales and Scotland, these powers reside with the National Assembly for Wales and Scottish Ministers respectively who are advised by the FSA together with their appropriate Public Health and Environment Divisions.

Information about the FSA may be found on its website [www.food.gov.uk](http://www.food.gov.uk)

## **National Radiological Protection Board (NRPB)**

NRPB was created under the Radiological Protection Act 1970. Its statutory functions under this Act are:

- By means of research and otherwise, to advance the acquisition of knowledge about the protection of mankind from radiation hazards; and
- To provide information and advice to persons (including Government Departments) with responsibilities in the United Kingdom in relation to the protection from radiation hazards either of the community as a whole or of particular sections of the community.

Information about NRPB may be found on its website [www.nrpb.org.uk](http://www.nrpb.org.uk).

## **Radioactive Waste Management Advisory Committee (RWMAC)**

RWMAC was a non departmental public body (NDPB) sponsored by Defra. It was a committee of independent experts set up to advise the UK Government on matters associated with radioactive waste management. Its terms of reference were: "To advise the Secretary of State for Environment, Food and Rural Affairs, and, in relation to devolved matters, to advise the Transport and Environment Minister in Scotland and the Assembly Secretary responsible for environmental policy in Wales, on the technical and environmental implications of major issues concerning the development and implementation of an overall policy for all aspects of the management of civil radioactive waste, including research and development; and on any such matters

referred to it by these persons.". In March 2004 the Government announced that RWMAC should be put into abeyance for the 2-3 year period during which CoRWM will be compiling its recommendations on future policy for the long-term management of the UK's higher activity radioactive wastes. At the end of this period the Government intends to carry out a further review of Government advisory machinery needs in the radioactive waste management policy area.

Further information is on RWMAC's website [www.defra.gov.uk/rwmac/index.htm](http://www.defra.gov.uk/rwmac/index.htm).

#### **The Committee on Radioactive Waste Management (CoRWM)**

CoRWM is a committee of experts appointed jointly by Ministers of the UK Government and devolved administrations of Northern Ireland, Scotland and Wales, to oversee a review of options for managing solid radioactive waste in the UK and to recommend the option, or combination of options, that can provide a long term solution, providing protection for people and the environment. The review of options must be open, transparent and inclusive, engaging members of the UK public and other key stakeholder groups. CoRWM's objective is to arrive at recommendations which can inspire public confidence and are practicable in securing the long term safety of the UK's radioactive wastes.

Information about CoRWM may be found on its website [www.corwm.org.uk](http://www.corwm.org.uk)

#### **Committee on Medical Aspects of Radiation in the Environment (COMARE)**

COMARE is an independent expert advisory committee with members chosen for their medical and scientific expertise and recruited from Universities, Research and Medical Institutes. It offers the UK Government independent medical and scientific advice on the health effects of ionising and non-ionising radiation in the environment, whether natural or man-made. Its terms of reference are:

"To assess and advise Government on the health effects of natural and man-made radiation in the environment and to assess the adequacy of the available data and the need for further research.". Information about COMARE may be found on its website [www.doh.gov.uk/comare.htm](http://www.doh.gov.uk/comare.htm).

#### **English Nature**

English Nature is the statutory body responsible for promoting the conservation of England's variety of wild plants and animals - the country's biodiversity - and its natural features. It is the Government's statutory adviser on nature conservation in England and its responsibilities include the protection of designated sites in England. Information about English Nature may be found on its website [www.english-nature.org.uk](http://www.english-nature.org.uk).

#### **Countryside Council for Wales**

The Countryside Council for Wales is the Government's statutory adviser on sustaining natural beauty, wildlife and the opportunity for outdoor enjoyment in Wales and its inshore waters. It is the Welsh national wildlife conservation authority and its responsibilities include the protection of designated sites in Wales.

Information about the Countryside Council for Wales may be found on its website [www.ccw.gov.uk](http://www.ccw.gov.uk).

**APPENDIX 5: LIST OF CHANGES MADE TO THE DRAFT  
AUTHORISATION**

List Of Changes Made To The Draft Authorisation.

Place	Change	Reason for change
Throughout certificate.	Specified 01/11/04 as effective date.	Effective date has been decided upon.
Throughout certificate.	"Springfields site" changed to "Springfields"	Better grammar as also use 'nuclear site' in same sentence.
Throughout certificate.	"Research & Technology " changed to "NSTS"	Name changed by BNFL.
Throughout certificate.	Some numbers reformatted by number of decimal places used but without any change in value i.e. '0.01' reformatted to '0.010'.	For ease of comparison and consistency within tables.
Schedule 1.	No change.	-
Schedule 2.	No change.	-
Schedule 3	<p>Re-categorising and removal of some named outlets in Table 2 to 'Other approved outlets' generic term in Table 3. Resultant change to values in Table 4 from 2.88 &amp; 1.5 to 2.7 &amp; 1.6.</p> <p>Newly inserted Condition 4 - a standard worded paragraph.</p> <p>Table 4 - terms 'other alpha emitters', and 'other beta emitters' changed to 'other alpha emitting radionuclides', and 'other beta emitting radionuclides'.</p>	<p>Done as the re-categorised stacks are more appropriately regulated as 'Other approved places'.</p> <p>To allow Agency to specify the measurement technique of 'other alpha emitting radionuclides', and 'other beta emitting radionuclides'.</p> <p>Better terminology.</p>
Schedule 4.	<p>Condition 8 reworded as per the standard paragraph wording.</p> <p>Table 1. Change "NRG" to "NGR".</p>	<p>For consistency through the certificate.</p> <p>Typographic error.</p>
Schedule 5.	No change.	-
Schedule 6	Table 1. Limits for Iodine-129 and Cobalt-60 set at 0.01 GBq.	New allowance for waste disposals for new NSTS analytical work.
Schedule 7.	<p>Condition 4 &amp; 5 reworded to remove the term 'consignment'</p> <p>Condition 6 reworded as per the standard paragraph wording.</p>	<p>The term 'consignment' specifically refers to disposals to Drigg - "Drigg wastes" in Schedule 6.</p> <p>For consistency through the certificate.</p>

Environment Agency

<p>Schedule 8.</p>	<p>Throughout schedule - 'waste type' renamed as 'waste'.</p> <p>Newly inserted Condition 2 (general BPM) replacing previous condition 4, previous condition 6 and previous Table 5.</p> <p>'Calendar year' replaced by 'year'.</p> <p>'Concentration Disposal Criteria' renamed as 'Concentration Criteria'.</p> <p>Newly inserted Condition 6 - a standard worded paragraph.</p> <p>Conditions 5 &amp; 7 reworded to remove the term 'consignment'.</p> <p>In Table 3 'Process residues' and 'Historic process residues' redefined as 'Process wastes' and 'Historic process wastes' with associated change in annual limits.</p> <p>Table 3 - term 'other beta emitters' changed to 'other beta emitting radionuclides'.</p> <p>Table 4 - terms 'other alpha emitters', and 'other beta emitters' changed to 'other alpha emitting radionuclides', and 'other beta emitting radionuclides'.</p> <p>Removal of Table 4 footnote on applicability to NSTS.</p> <p>Removal of disposal option "new condition 3" for concentration criteria for decommissioning.</p>	<p>For consistency through the certificate.</p> <p>More transparent and simpler regulation of waste disposals under general BPM condition as opposed to a linkage to a variable work programme.</p> <p>For a consistent rolling 12-month basis throughout certificate.</p> <p>Better terminology.</p> <p>To allow Agency to specify the measurement technique of 'other alpha emitting radionuclides', 'other beta emitting radionuclides' and 'other trans-uranic radionuclides'</p> <p>The term 'consignment' specifically refers to disposals to Drigg - "Drigg wastes" in Schedule 6.</p> <p>For better regulation of waste categories and associated change (with reduction) in limits due to removal of separate headroom for uncertainties in residues.</p> <p>Better terminology.</p> <p>Better terminology.</p> <p>To allow NSTS facilities and wastes to be decommissioned when no longer used by NSTS, as NSTS may no longer exist at the time of decommissioning.</p> <p>Not authorised as sufficient case not made.</p>
<p>Schedule 9.</p>	<p>No change.</p>	<p>-</p>
<p>Schedule 10</p>	<p>Requirement 3 - standard wording added to completion time scale.</p> <p>Requirement 9 - rewording of requirement and time scale.</p>	<p>To allow Agency to specify further (repeat) work in the future.</p> <p>Reworded to change the emphasis onto the arrangements for producing an estimate rather than just the production of the estimate itself. Time scale changed to relate to the arrangements rather than the date require for the generation of the estimate.</p>

**APPENDIX 6: THE NEW AUTHORISATION FOR THE BNFL  
SPRINGFIELDS NUCLEAR SITE**

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**ENVIRONMENT  
AGENCY**

**RADIOACTIVE SUBSTANCES ACT 1993**

**CERTIFICATE OF AUTHORISATION  
AND  
INTRODUCTORY NOTE**

**DISPOSAL OF RADIOACTIVE WASTE  
FROM NUCLEAR SITE**

**BRITISH NUCLEAR FUELS PLC**

**SPRINGFIELDS**

**SALWICK PRESTON  
LANCASHIRE PR4 0XJ**

**AUTHORISATION NUMBER BX0075**

## INTRODUCTORY NOTE

- IN 1.** The following Certificate of Authorisation is issued by the Environment Agency under the provisions of section 13 of the Radioactive Substances Act 1993 ("the Act"). The Authorisation permits the disposal of the specified radioactive wastes from the specified site, subject to limitations and conditions.
- IN 2.** The Act is concerned with the control of radioactive material and accumulation and disposal of radioactive waste. The requirements of the Act relating to control of radioactive material and accumulation of radioactive waste do not apply to sites licensed under the Nuclear Installations Act 1965 because these matters are regulated under the terms of the site licence. The conditions attached to this Authorisation are, therefore, concerned only with matters that relate to the disposal of radioactive waste from BNFL's Nuclear Site at Springfields.
- IN 3.** The main undertakings at the Springfields site to which this certificate relates are:
- Conversion of uranium ore concentrate to uranium tetrafluoride;
  - Manufacturing of uranium hexafluoride;
  - Manufacturing of Magnox fuel;
  - Manufacturing of Advanced Gas-cooled Reactor (AGR) and Pressurised Water Reactor (PWR) fuels;
  - Processing of waste materials and residues;
  - Decommissioning of redundant plant, operational clean-up, legacy issues and land remediation;
  - Research, development and analytical testing.

Radioactive wastes are produced as by-products of these undertakings in gaseous, aqueous and solid waste forms. Gaseous wastes are discharged to the atmosphere via stacks and outlets. Aqueous wastes are discharged via two underground pipelines to the River Ribble. Low-level solid wastes (e.g. general trash, soil and process wastes) are disposed of to a designated landfill at Clifton Marsh. Low-level solid wastes are disposed of by transfer to BNFL Drigg for burial. Low-level combustible wastes are transferred to BNFL Capenhurst for incineration. Organic liquid wastes are transferred to Shanks Chemical Services Limited, Southampton for incineration.

- IN 4.** The Certificate of Authorisation comprises a signed certificate together with 10 schedules. Schedule 1 contains general conditions that are applicable to all authorised waste types. Schedule 2 specifies the categories of radioactive waste and the disposal routes that are authorised. Schedules 3 to 9 include limitations and conditions on the radionuclides in the waste and the physical nature of the waste streams. Schedule 10 specifies information to be supplied and improvements to be carried out.
- IN 5.** The Authorisation allows the Agency to place requirements on the Operator to carry out various actions. Details of current requirements, associated specifications and approvals are placed on relevant public registers. Certain information provided by the Operator in response to Authorisation requirements will also be placed on the registers.
- IN 6.** This note does not form part of the Certificate of Authorisation.



**ENVIRONMENT  
AGENCY**

**RADIOACTIVE SUBSTANCES ACT 1993**

**Authorisation to Dispose of Radioactive Waste  
from the premises of BNFL on the Nuclear Site at Springfields**

**British Nuclear Fuels plc**

**BX0075**

This certifies that the Environment Agency in exercise of its powers under sections 16(2) and 16(8) of the Radioactive Substances Act 1993 ("the Act") has authorised

**British Nuclear Fuels plc  
(Company Registration No 1002607)  
("the Operator")**

whose Registered Office is

**Risley  
Warrington  
Cheshire WA3 6AS**

under sections 13(1) and 13(3) of the Act to dispose of radioactive waste from its premises which are on the Nuclear Site at

**Springfields  
Salwick Preston**

subject to the limitations and conditions in the Schedules to this Certificate of Authorisation.

This Authorisation shall come into effect on **1st November 2004.**

Signed .....  
Authorised to sign on behalf of the Environment Agency

Dated the .....

**Schedule 1****GENERAL LIMITATIONS AND CONDITIONS****DISPOSAL**

1. The Operator shall use the best practicable means to minimise the activity of radioactive waste produced that will require disposal under this Authorisation.
2. The Operator shall use the best practicable means to:
  - (a) minimise the activity of gaseous and aqueous radioactive waste disposed of by discharge to the environment;
  - (b) minimise the volume of radioactive waste disposed of by transfer to other premises;
  - (c) subject to paragraph 5 in this Schedule, dispose of radioactive waste at times, in a form, and in a manner so as to minimise the radiological effects on the environment and members of the public;where the relevant waste types and disposal routes are specified in the Table in Schedule 2.
3. The Operator shall maintain in good repair the systems and equipment provided:
  - (a) to meet the requirements of paragraphs 1 and 2 in this Schedule;
  - (b) for the disposal of radioactive waste.
4. The Operator shall check, at an appropriate frequency, the effectiveness of systems, equipment and procedures provided:
  - (a) to meet the requirements of paragraphs 1 and 2 in this Schedule;
  - (b) for the disposal of radioactive waste.
5. If required by the Agency, the Operator shall only dispose of radioactive waste at such times, in such a form and in such a manner as the Agency specifies.

**MANAGEMENT**

6. The Operator shall:
  - (a) have a management system, organisational structure and resources which are sufficient to achieve compliance with the limitations and conditions of this Authorisation and which include:
    - (i) written arrangements specifying how the Operator will achieve compliance with each limitation and condition of this authorisation, to include arrangements for control of modifications to the design and operation of systems and equipment;

- (ii) provision for consultation with such suitable RPAs, or other such qualified experts approved by the Agency in writing, as are necessary for the purpose of advising the Operator as to compliance with the limitations and conditions of this Authorisation and, in particular, on the matters addressed in paragraphs 1, 2, 4, 12 and 13 in this Schedule;
  - (iii) written Environmental Operating Rules and operating instructions;
  - (iv) a written maintenance schedule and instructions;
  - (v) adequate supervision of the disposal of radioactive waste by suitably qualified and experienced persons, whose names shall be clearly displayed with each copy of the Certificate of Authorisation that is posted on the premises as required by section 19 of the Act;
  - (vi) adequate supervision by suitably qualified and experienced persons of the operation and maintenance of the systems and equipment provided to meet the requirements of paragraphs 1 and 2 in this Schedule and for the disposal of radioactive waste;
  - (vii) internal audit and review of the Operator's management system;
- (b) inform the Agency in writing, at least 28 days or such shorter period agreed by the Agency before the first disposal of radioactive waste is made under the terms of this Authorisation, of the organisational structure and resources, together with such parts of the management system as the Agency specifies, provided to achieve compliance with the limitations and conditions of the Authorisation;
- (c) inform the Agency, at least 28 days in advance or, where this is not possible, without delay, of any change in the management system, organisational structure or resources, which might have, or might reasonably be seen to have, a significant impact on how compliance with the limitations and conditions of this Authorisation is achieved.

#### **SAMPLING, MEASUREMENTS, TESTS, SURVEYS AND CALCULATIONS**

7. The Operator shall take samples and conduct measurements, tests, surveys, analyses and calculations to determine compliance with the limitations and conditions of this Authorisation.
8. The Operator shall use the best practicable means when taking samples and conducting measurements, tests, surveys, analyses and calculations to determine compliance with the limitations and conditions of this Authorisation, unless particular means are specified in this Authorisation.
9. If required by the Agency, the Operator shall take such samples and conduct such measurements, tests, surveys, analyses and calculations, including environmental measurements and assessments, at such times and using such methods and equipment as the Agency specifies.

10. If required by the Agency, the Operator shall, as the Agency specifies:
  - (a) keep samples;
  - (b) provide samples;
  - (c) dispatch samples for tests at a laboratory and ensure that the samples or residues thereof are collected from the laboratory within three months of receiving written notification that testing and repackaging in accordance with the appropriate transport regulations are complete.
11. The Operator shall maintain in good repair systems and equipment provided for:
  - (a) carrying out any monitoring and measurements necessary to determine compliance with the limitations and conditions of this Authorisation;
  - (b) measuring and assessing exposure of members of the public and radioactive contamination of the environment.
12. The Operator shall have and comply with appropriate criteria for the acceptance into service of systems, equipment and procedures for:
  - (a) carrying out any monitoring and measurements necessary to determine compliance with the limitations and conditions of this Authorisation;
  - (b) measuring and assessing exposure of members of the public and radioactive contamination of the environment.
13. The Operator shall carry out:
  - (a) regular calibration, at an appropriate frequency, of systems and equipment provided for:
    - (i) carrying out any monitoring and measurements necessary to determine compliance with the limitations and conditions of this Authorisation;
    - (ii) measuring and assessing exposure of members of the public and radioactive contamination of the environment;
  - (b) regular checking, at an appropriate frequency, that such systems and equipment are serviceable and correctly used.

**RECORDS**

14. The Operator shall, subject to paragraph 18 in this Schedule:

- (a) make and retain records sufficient to demonstrate whether the limitations and conditions of this Authorisation are complied with;
- (b) retain records made in accordance with any previous Authorisation issued to the Operator and related to the premises covered by this Authorisation;
- (c) retain records transferred to the Operator by any predecessor operator which were made in accordance with any previous Authorisation related to the premises covered by this Authorisation.

15. The Operator, not later than 14 days after the end of each month or within such longer period as the Agency may approve in writing, shall in respect of all disposals of radioactive waste made during that month:

- (a) make a record of each measurement, analysis, test and survey conducted for the purpose of this Authorisation in relation to those disposals;
- (b) make a record which shows clearly and legibly:
  - (i) the type of waste and the disposal route;
  - (ii) the name of each radionuclide or group of radionuclides, specified in the relevant Table in the relevant Schedule, which is present;
  - (iii) the activity of each such radionuclide or group of radionuclides per cubic metre of the waste, unless otherwise agreed in writing by the Agency;
  - (iv) for Drigg waste, the activity of each such radionuclide or group of radionuclides per tonne of the waste, unless otherwise agreed in writing by the Agency;
  - (v) the total activity of each such radionuclide or group of radionuclides;
  - (vi) the total volume in cubic metres, unless otherwise agreed in writing by the Agency;
  - (vii) for Drigg waste, the total mass in tonnes;
  - (viii) the date and time on which or period during which the disposal took place;
  - (ix) any other information the Agency may specify.

16. If the Operator amends any record made in accordance with this Authorisation it shall ensure that the original entry remains clear and legible.

17. The Operator shall keep the records referred to in paragraph 15 in this Schedule in a manner and place approved by the Agency.

18. The Operator shall retain the records referred to in paragraphs 14 and 15 in this Schedule until notified in writing by the Agency that the records no longer need to be retained.

### PROVISION OF INFORMATION

19. The Operator shall supply such information in such format and within such time as the Agency may specify.
20. The Operator shall inform the Agency in writing, at least 14 days before the first disposal of radioactive waste is made under the terms of this Authorisation, of the techniques being employed to determine the activity of radioactive waste disposals and shall inform the Agency in writing in advance of any modifications to those techniques.
21. The Operator shall inform the Agency without delay if the Operator has reason to believe that disposal of radioactive waste is occurring, has occurred or might occur which does not comply with the limitations and conditions of this Authorisation, and shall report the circumstances in writing to the Agency as soon as practicable thereafter.

### INTERPRETATION

22. (1) In this Certificate of Authorisation -

- (a) except where otherwise specified, words and expressions defined in the Radioactive Substances Act 1993 shall have the same meanings when used in this Certificate of Authorisation as they have in that Act;

"activity", expressed in becquerels, means the number of spontaneous nuclear transformations occurring in a period of one second;

"the Agency" means the Environment Agency;

"aqueous waste" means radioactive waste in the form of a continuous aqueous phase together with any entrained solids, gases and non-aqueous liquids;

"Authorisation" means an authorisation issued under the Radioactive Substances Act 1993 or the Radioactive Substances Act 1960;

"best practicable environmental option" means the radioactive waste management option, for a given practice, that provides the most benefit or least damage to the environment as a whole in the long term as well as in the short term, taking into account operational doses and risks, and social and economic factors.

"Bq, kBq, MBq, GBq, TBq and PBq" are used as abbreviations meaning becquerels, kilobecquerels, megabecquerels, gigabecquerels, terabecquerels and petabecquerels respectively;

"BNFL" means British Nuclear Fuels plc;

"calendar year" means a period of 12 consecutive months beginning on 1. January;

"consignment" means an individual shipment of radioactive waste not greater in volume than 40 cubic metres or such lesser volume as specified in writing by the Agency;

"Drigg Waste" means solid radioactive waste, including any immediate package, intended by the Operator for final disposal at BNFL's site at Drigg;

"environment" means all, or any, of the media of air, water (to include sewers and drains) and land;

"Environmental Operating Rule" means a mandatory restriction on operation, established by the Operator, which is necessary to ensure compliance with this Authorisation;

"gaseous waste" means radioactive waste in the form of gases and associated mists and particulate matter;

"maintenance instructions" means instructions for carrying out any maintenance that may have an effect on compliance with this Authorisation;

"maintenance schedule" means a programme for maintenance of all systems and equipment that contribute to achieving compliance with this Authorisation;

"month" means calendar month (i.e. 1-31 January, 1-28/29 February, 1-31 March, etc);

"operating instructions" means instructions for carrying out any operation that may have an effect on compliance with this Authorisation;

"organic liquid waste" means radioactive waste in the form of liquid, not being aqueous waste, containing one or more organic chemical compounds;

"package" includes any sack, drum, container or wrapping;

"quarter" means any period of three consecutive months;

"RPA" means a Radiation Protection Adviser appointed under Regulation 13 of the Ionising Radiations Regulations 1999;

"samples" includes samples that have been prepared or treated to enable measurements of activity to be made;

"Schedule" means a Schedule forming part of this Certificate of Authorisation;

"week" means a period of 7 consecutive days commencing at a day and time to be notified in writing to the Agency by the Operator at least 14 days before any disposal of radioactive waste is made under the terms of this Authorisation, any subsequent change being notified in writing to the Agency at least 7 days in advance;

"year" means any period of 12 consecutive months, unless otherwise stated;

- (b) "Decommissioning wastes" means radioactive wastes arising from decommissioning work and excludes wastes from production operations, care and maintenance actions and the treatment of historic or legacy materials; such decommissioning wastes including but not limited to building rubble, soil and general wastes from decommissioning operations;

"Uranium" means a mixture of radionuclides arising from the processing of uranium, mainly but not wholly inclusive of Uranium-234, Uranium-235, Uranium-238, and the decay products that would be present through radioactive decay.

"calendar quarter" means a period of 3 consecutive calendar months beginning on either 1 January, 1 April, 1 July or 1 October.

- (2) In this Certificate of Authorisation the Interpretation Act 1978 shall apply as it does to an Act of Parliament and in particular words in the singular include the plural and words in the plural include the singular.
- (3) (a) In determining whether particular means are the "best practicable" for the purposes of this Authorisation, the Operator shall not be required to incur expenditure whether in money, time or trouble which is, or is likely to be, grossly disproportionate to the benefits to be derived from, or likely to be derived from, or the efficacy of, or likely efficacy of, employing them, the benefits or results produced being, or likely to be, insignificant in relation to the expenditure.
- (b) Where reference is made to the use of "best practicable means" in this Certificate of Authorisation, the means to be employed shall include:
  - (i) the provision, maintenance and manner of operation of any relevant plant, machinery or equipment;
  - (ii) the supervision of any relevant operation.

**Schedule 2**

**AUTHORISED RADIOACTIVE WASTE TYPES AND DISPOSAL ROUTES**

1. Subject to paragraph 2 in this Schedule, the Operator is authorised to dispose only of the radioactive waste types identified in the Table in this Schedule and only by the relevant disposal route(s) specified in the Table.
2. The Operator may dispose of radioactive waste, not being waste otherwise authorised to be disposed of, which is collected as a result of the user's participation in the National Arrangements for Incidents involving Radioactivity provided that the Operator:
  - (a) transfers the waste to a person whom the Environment Agency has agreed in writing may receive that waste;
  - (b) as soon as practicable provides available details in writing of the nature of the radioactive waste, the radionuclides present, their activities and the manner and date of disposal.

Table

Radioactive Waste Type	Disposal Route
Gaseous Waste	Discharge to the environment
Aqueous Waste	Discharge to the environment
Organic Liquid Waste	Transfer to Shanks Chemical Services Limited, Hythe, Southampton for the purpose of incineration
Solid Waste	Transfer to BNFL at Sellafield or Drigg for the purpose of final disposal at BNFL Drigg
	Transfer to BNFL Capenhurst for the purpose of incineration
	Disposal at SITA Clifton Marsh landfill site

## Schedule 3

**LIMITATIONS AND CONDITIONS RELATING TO DISPOSAL OF  
RADIOACTIVE GASEOUS WASTE BY DISCHARGE TO THE ENVIRONMENT**

1. The Operator shall only discharge radioactive gaseous waste to the environment by means of the outlets identified in Tables 1, 2, or 3 in this Schedule and such other outlets as the Agency may approve in writing.
2. The Operator shall not in any year, from any outlet or group of outlets specified in Tables 4 or 5 in this Schedule, discharge gaseous waste in which the activity of any radionuclide or group of radionuclides specified in the relevant Table exceeds the relevant Annual Limit.
3. If, in any quarter, the activity in gaseous waste discharged from any outlet or group of outlets specified in Table 5 in this Schedule of any radionuclide or group of radionuclides specified in that Table exceeds the relevant Quarterly Notification Level (where specified), the Operator shall provide the Agency with a written submission which includes:
  - (a) details of the occurrence;
  - (b) a description of the means used to minimise the activity of gaseous waste discharged;
  - (c) a review of those means having regard to paragraphs 1 and 2 in Schedule 1;
 not later than 14 days from making the record which demonstrates such excess.
4. For the purposes of demonstrating compliance with the limitations and conditions of this Authorisation relating to "uranium", "other alpha emitting radionuclides" and "other beta emitting radionuclides" in radioactive gaseous waste, the Operator shall measure the activities of samples collected for these purposes by any suitable counting system, which has been agreed in writing by the Agency.

Table 1

<b>Authorised Gaseous Discharge Outlets – ‘Group 1 outlets’</b>
A684 Wet Stack
A684 Dry Stack
A654 Main Stack
A338 Line 1 Build-Up & Breakdown
A338 Line 2 Build-Up & Breakdown
A338 Line 1 Tipping
A338 Casting Rotoclone
A686 General Extract

Table 2

Authorised Gaseous Discharge Outlets - 'Group 2 outlets'
A336 Ore Tipping
A337 Powder Handling Stack
A397 Chemical Services No 1 Stack
A615 Chemical Services No 2 Stack
A612 Main Stack
A686 Main Extract
A686 Kiln Scrubber
A686 Emergency Hex Scrubber
A633 Main Stack
A709 Stacks

Table 3

Authorised Gaseous Discharge Outlets - 'other outlets'
Other approved outlets
Decommissioning outlets

Table 4

Outlet or Group of Outlets	Radionuclide or Group of Radionuclides	Annual Limit, GBq
All Group 1 and Group 2 outlets	Uranium	2.7
Other approved outlets	Uranium	1.6
Decommissioning outlets	Uranium	1.0
Nuclear Science & Technology Services	Tritium	0.100
	Carbon -14	0.010
	Other alpha emitting radionuclides	0.001
	Other beta emitting radionuclides	0.010

Table 5

<b>Outlet or Group of Outlets</b>	<b>Radionuclide or Group of Radionuclides</b>	<b>Annual Limit, GBq</b>	<b>Quarterly Notification Level, GBq</b>
A684 Wet Stack	Uranium	0.93	0.23
A684 Dry Stack	Uranium	0.15	0.04
A654 Main Stack	Uranium	0.23	0.06
A338 Line 1 Build-Up & Breakdown	Uranium	0.23	0.06
A338 Line 2 Build-Up & Breakdown	Uranium	0.26	0.07
A338 Line 1 Tipping	Uranium	0.24	0.06
A338 Casting Rotoclone	Uranium	0.27	0.07
A686 General Extract	Uranium	0.05	0.01

## Schedule 4

**LIMITATIONS AND CONDITIONS RELATING TO DISPOSAL OF  
RADIOACTIVE AQUEOUS WASTE BY DISCHARGE TO THE ENVIRONMENT**

1. The Operator shall only discharge radioactive aqueous waste to the environment through the systems specified in Table 1 in this Schedule and such other systems as the Agency may approve in writing.
2. The Operator shall use the best practicable means to exclude all entrained solids, gases and non-aqueous liquids from radioactive aqueous waste prior to discharge to the environment.
3. Subject to paragraph 6, the Operator shall not in any year discharge radioactive aqueous waste in which the activity of any radionuclide or group of radionuclides specified in Table 2 in this Schedule exceeds the relevant Annual Limit.
4. Subject to paragraph 6, the Operator shall not in any month discharge radioactive aqueous waste in which the activity of any radionuclide or group of radionuclides specified in Table 4 in this Schedule exceeds the relevant Monthly Limit.
5. Subject to paragraph 6, if, in any quarter, the activity in radioactive aqueous waste discharged of any radionuclide or group of radionuclides specified in Table 2 in this Schedule exceeds the relevant Quarterly Notification Level (where specified), the Operator shall provide the Agency with a written submission which includes:
  - (a) details of the occurrence;
  - (b) a description of the means used to minimise the activity of aqueous waste discharged;
  - (c) a review of those means having regard to paragraphs 1 and 2 in Schedule 1;not later than 14 days from making the record which demonstrates such excess.
6. On 1st January 2008 Table 2 and Table 4 in this Schedule shall be replaced for the purposes of compliance with the authorisation by Table 3 and Table 5 respectively in this Schedule.
7. If, in any quarter, the activity in radioactive aqueous waste of any radionuclide or group of radionuclides discharged from the effluent discharge point of the new decontamination facility, exceeds the values specified in Table 6 in this Schedule the Operator shall provide the Agency with a written submission which includes:
  - (a) details of the occurrence;
  - (b) a description of the means used to minimise the activity of aqueous waste discharged;
  - (c) a review of those means having regard to paragraphs 1 and 2 in Schedule 1;not later than 14 days from making the record which demonstrates such excess.

8. For the purposes of demonstrating compliance with the limitations and conditions of this Authorisation relating to "total beta", "total alpha", "uranium" and "other trans-uranic radionuclides" in radioactive aqueous waste, the Operator shall measure the activities of samples collected for these purposes by any suitable counting system, which has been agreed in writing by the Agency.

Table 1

<b>Authorised Aqueous Discharge System(s)</b>
2 pipelines from final effluent point system provided by the Operator for the discharge of the effluent from the Springfields site to the River Ribble at NGR SD472286.

Table 2

<b>Radionuclide or Group of Radionuclides</b>	<b>Annual Limit for 2004-2007, TBq</b>	<b>Quarterly Notification Level, TBq</b>
Total beta	140	45
Total alpha	0.550	0.150
Thorium-230	0.400	0.080
Thorium-232	0.015	0.004
Uranium	0.100	0.030
Neptunium-237	0.040	0.008
Other trans-uranic radionuclides	0.020	0.005
Technetium-99	0.600	0.130

Table 3 – for 2008 onwards

<b>Radionuclide or Group of Radionuclides</b>	<b>Annual Limit for 2008 onwards, TBq</b>	<b>Quarterly Notification Level, TBq</b>
Total beta	20	4
Total alpha	0.100	0.020
Thorium-230	0.020	0.004
Thorium-232	0.015	0.003
Uranium	0.040	0.008
Neptunium-237	0.040	0.008
Other trans-uranic radionuclides	0.020	0.004
Technetium-99	0.600	0.120

Table 4

<b>Radionuclide or Group of Radionuclides</b>	<b>Monthly Limit, TBq</b>
Total beta	23.300
Total alpha	0.090

Table 5 - for 2008 onwards

<b>Radionuclide or Group of Radionuclides</b>	<b>Monthly Limit, TBq</b>
Total beta	3.330
Total alpha	0.016

Table 6 - discharge from new decontamination facility

<b>Radionuclide or Group of Radionuclides</b>	<b>Quarterly Notification Level, TBq</b>
Total beta	1.0
Total alpha	0.005

**Schedule 5**

**LIMITATIONS AND CONDITIONS RELATING TO  
DISPOSAL OF RADIOACTIVE WASTE BY INCINERATION ON THE PREMISES**

1. Disposal of radioactive waste by incineration on the premises is not authorised.

**Schedule 6****LIMITATIONS AND CONDITIONS RELATING TO  
DISPOSAL OF RADIOACTIVE WASTE BY TRANSFER TO  
BNFL AT SELLAFIELD OR DRIGG FOR THE PURPOSE OF  
FINAL DISPOSAL AT BNFL'S SITE AT DRIGG  
(Drigg Waste)**

1. The Operator shall not:
  - (a) transfer any consignment of Drigg Waste in which the activity of alpha emitting radionuclides exceeds 4 gigabecquerels per tonne or the activity of all other radionuclides exceeds 12 gigabecquerels per tonne;
  - (b) in any calendar year transfer Drigg Waste in which, in total, the activity of any radionuclide or group of radionuclides listed in Table 1 in this Schedule exceeds the relevant Annual Limit;
  - (c) in any calendar year transfer Drigg Waste in which, in total, the volume of the waste exceeds the Annual Limit specified in Table 2 in this Schedule.
  
2. The Operator shall not transfer Drigg Waste:
  - (a) unless it has been treated or packaged in such a way as to render it, so far as is reasonably practicable, insoluble in water and not readily flammable;
  - (b) which contains any of the following materials, unless otherwise agreed in writing by the Agency:
    - (i) metals and other materials which readily react either with water or air with the evolution of heat or flammable gases;
    - (ii) explosive materials;
    - (iii) liquids with flashpoint less than 21 °C absorbed on solid materials;
    - (iv) strong oxidising agents;
    - (v) pressurised gas cylinders or pressurised aerosol containers;
    - (vi) materials which generate or are capable of generating toxic gases, vapours or fumes harmful to persons handling the waste;
    - (vii) chemical complexing or chelating agents.
  
3. The Operator shall ensure that the transfer of Drigg Waste is in accordance with the directions of the person to whom the waste is transferred.

4. The Operator shall:

- (a) ensure that the person to whom Drigg Waste is transferred receives at the time of transfer of each consignment a clear and legible note signed on the Operator's behalf stating:
  - (i) that the activity of alpha emitting radionuclides in the consignment does not exceed 4 gigabecquerels per tonne and that the activity of all other radionuclides does not exceed 12 gigabecquerels per tonne;
  - (ii) the total activity in the consignment of each radionuclide or group of radionuclides listed in Table 1 in this Schedule;
- (b) obtain a record signed on behalf of the person to whom Drigg Waste is transferred, at the time of transfer, stating that the transfer has taken place.

5. If required by the Agency, the Operator shall ensure that any consignment or part of any consignment of Drigg Waste found, following transfer, not to be in accordance with the limitations and conditions of this Authorisation:

- (a) is packaged in accordance with the appropriate transport regulations;
- (b) is returned as soon as is reasonably practicable to the Springfields site.

Table 1

Radionuclide or Group of Radionuclides	Annual Limit, GBq
Uranium	100.0
Radium-226 plus Thorium-232	1.5
Other alpha emitters <sup>1</sup>	12.5
Carbon-14	21.0
Iodine-129	0.01
Tritium	42.0
Cobalt-60	0.01
Other radionuclides <sup>2</sup>	25.0

1 "other alpha emitters" means alpha-emitting radionuclides with half-lives greater than three months excluding uranium, radium-226 and thorium-232

2 "other radionuclides" means:

- (a) iron-55 and beta-emitting radionuclides with half-lives greater than three months unless individually specified in this Table and
- (b) any other radionuclides specified in writing by the Agency

Table 2

Annual Limit, cubic metres
450

## Schedule 7

**LIMITATIONS AND CONDITIONS RELATING TO  
DISPOSAL OF RADIOACTIVE WASTE BY TRANSFER TO OTHER PREMISES**

1. The Operator shall only transfer to a person specified in Table 2 in this Schedule radioactive waste of the categories specified in Table 1 in this Schedule and such other categories as the Agency may approve in writing.
2. The Operator shall not in any calendar year transfer waste in which, in total:
  - (a) the activity of any radionuclide or group of radionuclides listed in Table 2 in this Schedule exceeds the relevant Annual Activity Limit; or
  - (b) the volume of the radioactive waste and its immediate packaging exceeds the Annual Volume Limit specified in Table 2.
3. The Operator shall ensure that the transfer of radioactive waste is in accordance with the directions of the person to whom the waste is transferred.
4. The Operator shall:
  - (a) ensure that the person to whom radioactive waste is transferred receives at the time of transfer of the radioactive waste a clear and legible note signed on the Operator's behalf stating the total activity in the waste of each relevant radionuclide or group of radionuclides listed in Table 2 in this Schedule;
  - (b) obtain a record signed on behalf of the person to whom radioactive waste is transferred, at the time of transfer, stating that the transfer has taken place.
5. If required by the Agency, the Operator shall ensure that any radioactive waste found, following transfer, not to be in accordance with the limitations and conditions of this Authorisation:
  - (a) is packaged in accordance with the appropriate transport regulations;
  - (b) is returned as soon as is reasonably practicable to the Springfields site.
6. For the purposes of demonstrating compliance with the limitations and conditions of this Authorisation relating to "alpha emitting radionuclides", "beta emitting radionuclides" and "other beta emitting radionuclides" in radioactive waste specified in this Schedule, the Operator shall measure the activities of samples collected for these purposes by any suitable counting system, which has been agreed in writing by the Agency.

Table 1

<b>Authorised Waste Categories</b>
<b>Category 1 Wastes:</b> Low Level Combustible radioactive waste consisting of general materials such as paper, polythene, cloth, wood and oil.
<b>Category 2 Wastes:</b> Organic liquid wastes including waste solvents and Liquid Scintillation Counter waste scintillant.

Table 2

<b>Person to whom waste may be transferred</b>	<b>Radionuclide or Group of Radionuclides</b>	<b>Annual Activity Limit, GBq</b>	<b>Annual Volume Limit,</b>
For Category 1 Wastes: British Nuclear Fuels plc, Capenhurst, Near Chester, CH1 6ER	Alpha emitting radionuclides	30	300 cubic metres
	Beta emitting radionuclides	30	
For Category 2 Wastes: Shanks Chemical Services Limited, Charleston Road, Hardley, Hythe, Southampton, Hants, SO45 3ZA	Alpha emitting radionuclides	0.001	200 litres
	Other beta emitting radionuclides	0.002	
	Tritium	0.012	
	Carbon - 14	0.002	

## Schedule 8

**LIMITATIONS AND CONDITIONS RELATING TO  
DISPOSAL OF RADIOACTIVE WASTE BY CONTROLLED BURIAL AT  
CLIFTON MARSH LANDFILL SITE.**

1. The Operator shall only dispose of radioactive waste by causing or permitting its removal to the premises specified in Table 1 in this Schedule if it is of a waste specified in Table 3 or 4 in this Schedule, or such other waste as the Agency may approve in writing.
2. The Operator shall use the best practicable means to minimise the volume of radioactive waste disposed of to the premises specified in Table 1 in this Schedule.
3. The Operator shall ensure that the radioactive waste is disposed of in accordance with the directions of the Disposal Site Operator specified in Table 2 in this Schedule.
4. The Operator shall not in any year dispose of radioactive waste specified in Table 3 or 4 in this Schedule, to the premises specified in Table 1 in this Schedule, if:
  - (i) the total activity of any radionuclide or group of radionuclides listed in the relevant Table exceeds the relevant Annual Limit; or
  - (ii) the average activity concentration of any radionuclide or group of radionuclides listed in the relevant Table exceeds the relevant Concentration Criteria;
5. The Operator shall ensure -
  - a. that the Disposal Site Operator is given at least 14 days notice, or such shorter time as the Disposal Site Operator may agree, of the intention to dispose of each transport of radioactive waste;
  - b. that the radioactive waste is removed to such parts of the landfill site and at such time or times as may be specified by the Disposal Site Operator;
  - c. that the radioactive waste is disposed of in bags or packaged so far as is reasonably practicable;
  - d. that, after leaving the Operator's premises until it is disposed of, the radioactive waste is under the supervision of a competent officer designated by the Operator for this purpose;
  - e. that on the day of its disposal the waste is buried beneath at least 1.5 metres of earth or of refuse which is not radioactive waste.
6. For the purposes of demonstrating compliance with the limitations and conditions of this Authorisation relating to "uranium", "other alpha emitting radionuclides", "other beta emitting radionuclides" and "other trans-uranic radionuclides" in radioactive waste as specified in this Schedule, the Operator shall measure the activities of samples collected for these purposes by any suitable counting system, which has been agreed in writing by the Agency.

7. If required by the Agency, the Operator shall ensure that any radioactive waste found, following transfer, not to be in accordance with the limitations and conditions of this Authorisation:

- (a) is packaged in accordance with the appropriate transport regulations;
- (b) is returned as soon as is reasonably practicable to the Springfields site.

Table 1

<b>Premises Where Disposal is Authorised</b>
Clifton Marsh Landfill site, Clifton Marsh, Preston, Lancashire

Table 2

<b>Disposal Site Operator</b>
SITA Ltd.

Table 3

<b>Annual Disposal Limits for non-decommissioning radioactive wastes</b>			
Waste	Radionuclide or group of radionuclides	Annual Disposal Limits (TBq)	Concentration Criteria (Bq/g)
Process wastes	Uranium	0.060	50
General wastes	Uranium	0.020	50
	Other alpha emitting radionuclides *	0.001	100
	Other beta emitting radionuclides*	0.005	100
Historic Incinerator Ash	Uranium	0.020	125
Graphite	Uranium	0.020	100
Historic process wastes	Uranium	0.010	100

\* Category applicable to Nuclear Science and Technology Services only.

Table 4

Annual Disposal Limits for decommissioning radioactive wastes			
Waste	Radionuclide or group of radionuclides	Annual Disposal Limits (TBq)	Concentration Criteria (Bq/g)
Decommissioning wastes	Uranium	0.200	100
	Neptunium-237	0.010	10
	Technetium-99	0.010	10
	Other trans-uranic radionuclides	0.010	10
	Other beta emitting radionuclides	0.001	100

**Schedule 9**

**LIMITATIONS AND CONDITIONS RELATING TO  
DISPOSAL OF SOLID RADIOACTIVE WASTE BY BURIAL ON THE PREMISES**

1. Disposal of solid radioactive waste by burial on the premises is not authorised.

Schedule 10

**IMPROVEMENT AND ADDITIONAL INFORMATION REQUIREMENTS**

1. The Operator shall complete the requirements specified in the Table in this Schedule, and as specified in more detail by the Agency in writing, by the relevant completion date and, where relevant, shall notify the Agency, in writing, within 14 days of the completion of each of those requirements.

Table

Requirement	Completion Date
1. The Operator shall provide the Agency with a full report of a comprehensive review of whether the current disposal routes continue to represent the best practicable environmental option for waste disposal from the site, together with a programme for carrying out any necessary changes identified by the review.	3 years from the effective date of this Authorisation and at such intervals thereafter as the Agency specifies in writing.
2. The Operator shall provide the Agency with a full report of a comprehensive review of national and international developments in best practice for minimising all waste disposals, together with a strategy for achieving reductions in discharges.	3 years from the effective date of this Authorisation and at such intervals thereafter as the Agency specifies in writing.
3. The Operator shall review the data acquisition and calculation methodology for the discharge calculation for 'other approved outlets' and as appropriate make improvements to the assessment process.	6 months from the effective date of this Authorisation and at such intervals thereafter as the Agency specifies in writing.
4. The Operator shall provide the Agency with a full report of a comprehensive review of the means used to assess the activity of radionuclides in disposals and to determine compliance with this Authorisation including consideration of national and international developments in best practice.	3 years from the effective date of this Authorisation and at such intervals thereafter as the Agency specifies in writing.
5. The Operator shall establish and carry out a programme of research and development in support of items 1, 2 and 4 in this Table. The programme and reports on the work carried out shall be provided to the Agency.	Initial programme to be provided within 3 months of the effective date of this Authorisation. Programme updates and R&D reports to be provided annually, thereafter.

<p>6. The Operator shall provide a summary report which comprises a compilation of the findings of research relevant to Springfields discharges that could lead to the improvement of the understanding of the effect and extent of plant discharges on the environment, on the local population and on non-human species. Where this demonstrates a potentially serious impact on any special habitat site proposals for appropriate monitoring will be developed.</p>	<p>2 years from the effective date of this Authorisation and at such intervals thereafter as the Agency specifies in writing.</p>
<p>7. The Operator shall introduce appropriate management arrangements and written procedures that require Best Practicable Environmental Option / Best Practicable Means assessments to be carried out for all new waste streams (arising from new or modified plant or operations) requiring disposal.</p>	<p>12 months from the effective date of this Authorisation</p>
<p>8. The Operator shall provide a programme and report of its internal audit of radioactive waste procedures and transports of waste carried out under the requirement of Condition 6 in Schedule 1.</p>	<p>3 months from the effective date of this Authorisation and at such intervals thereafter as the Agency specifies in writing.</p>
<p>9. The Operator shall introduce appropriate management arrangements and written procedures to provide the Agency, by 1 December each year, a written estimate of the radioactive waste disposals to be made by each disposal route from the Nuclear Sciences and Technology Service on the Springfields site for the forthcoming calendar year. The estimate to report against all relevant parameters for each Schedule in the Authorisation.</p>	<p>By 1 December 2004.</p>

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For general enquiries please call your local Environment Agency office. If you are unsure who to contact, or which is your local office, please call our general enquiry line.

**ENVIRONMENT AGENCY  
GENERAL ENQUIRY LINE**

**0645 333 111**

The 24-hour emergency hotline number for reporting all environmental incidents relating to air, land and water.

**ENVIRONMENT AGENCY  
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