

EA NORTH WEST



ENVIRONMENT
AGENCY



Radioactive Substances Act 1993

**RESPONSE TO COMMENTS ON THE
“SCOPE AND METHODOLOGY
FOR THE FULL RE-EXAMINATION
OF THE SELLAFIELD AUTHORISATIONS
FOR THE DISPOSAL OF RADIOACTIVE
WASTE”**

EA-North West



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Foreword

The Environment Agency regulates the disposal of radioactive waste from Sellafield to land, sea and air under authorisations issued under the Radioactive Substances Act 1993. The periodic review of these Authorisations is to ensure that the limitations and conditions remain appropriate, that the best practical means are being applied to minimise the creation of radioactive waste, and that discharges are minimised.

As part of our commitment to open and transparent regulation, the Agency published its "Scope and Methodology for the Full Re-Examination of the Sellafield Authorisations for the Disposal of Radioactive Waste". The main purpose of this document was to increase understanding of the issues and the process used by the Agency.

The public and other interested parties were invited to comment on the Scope and Methodology document over an 8-week period. This is the first time the Agency has produced such a document. I am encouraged by the detailed comments we received. This report identifies the issues raised and provides the Agency's responses.

However, the Agency will not be reprinting a revised Scope and Methodology document. This report should therefore be read in conjunction with the original document to provide the overall Scope and Methodology for the re-examination.

The Agency is intending to publish its proposals for reducing Technetium-99 discharges at the end of October 2000, and proposals for other radionuclides will be published in Spring 2001. I look forward to your participation in the further public consultation exercises which will be held on these proposals.



ED GALLAGHER
CHIEF EXECUTIVE

1.0 INTRODUCTION

1.1 Background to the Review

- 1.1.1 On 19 November 1999, when announcing their decision on the variations to the liquid and gaseous authorisations for the Sellafield site, the Secretary of State for the Environment and the Minister of Agriculture Fisheries and Food expressed the desire that the Agency commence a "full review of radioactive discharges from the Sellafield site". On the same day Environment Minister, Michael Meacher wrote to Lord De Ramsey, the then chairman of the Agency, noting that "the Agency will wish to develop the scope and methodology for undertaking the review which will ensure that it is both comprehensive and rigorous"

1.2 Scope and Methodology Document

- 1.2.1 On 21 February 2000 the Environment Agency (the Agency) published its proposed scope and methodology for the full re-examination of BNFL Sellafield's authorisations to dispose of radioactive waste. That document detailed how the Agency proposed to carry out its review, what would be reviewed and the criteria the Agency intended to use to set radioactive discharge limits and conditions in any revised or new authorisations.

2.0 PROCESS USED FOR OBTAINING COMMENTS.

- 2.1 The Scope and Methodology document was made available to the public to inform them of the Agency's intentions and to seek their comments. Comments were invited over an eight-week period, finishing on 17 April 2000.
- 2.2 An information pack containing the Scope and Methodology document was sent to statutory consultees, all local authorities in England, Wales, Scotland and Northern Ireland bordering the Irish Sea and a number of other interested organisations (detailed in the Appendix to this report). The document was and still is available on Agency public registers and on the Agency website www.environment-agency.gov.uk. All comments received have been addressed in this report including a number received after the deadline of 17 April 2000.
- 2.3 Public surgeries were held in Cumbria at Gosforth and Whitehaven on 14 and 15 March respectively, to enable the local population to discuss the review on a one to one basis with Agency staff.

3.0 PUBLIC RESPONSE TO THE COMMENT SEEKING PROCESS AND AGENCY REPLY

3.0.1 The Agency received 42 written responses, 51 people visited the public surgeries and 325 people accessed the Agency website with 127 downloading the document.

3.0.2 The issues raised have been grouped into categories as set out in this report. The Agency response is given in italics. The notation [] denotes the reference number of the respondent which raised that particular issue. Respondents have been notified of their reference number so that they can check that comments they made and points they raised have been addressed. The Agency is subject to Data Protection Act requirements and it is not appropriate to disclose personal data in this document.

3.1 Scope and Methodology Document and Review Process

3.1.1 A number of respondents stated that the Scope and Methodology was comprehensive and clear to understand. Its publication was welcomed and recognised as an important contribution towards the Agency's commitment to open and transparent regulation [9] [12] [38]. A number of other respondents agreed that the document was useful, but believed that additional clarification was required in some areas. These areas include methodology for limit setting [30] [32], justification [23] [30] and the implementation of OSPAR [23]. Other respondents commented favourably on the "informative nature" and "clarity" of the document [9] [3] and one respondent congratulated the Agency on its efforts to produce a "plain English document"[35].

3.1.2 In contrast, a respondent complained that the document was not written in a manner that would make much sense to the average member of the public [34]. A further respondent expressed concern about the tendency towards expert language and suggested that some research into how recipients of the Agency's consultation view its clarity might be a worthwhile exercise to aid continuing improvement of procedures [29].

3.1.3 *The Agency welcomes all comments on the document and the process being used in this review and thanks all those who took the time and trouble to respond. Specific comments are addressed in later sections of this report.*

3.1.4 *The Agency is aware that more detail could be added to the Scope and Methodology document on a number of issues, but has tried to strike a balance between overall readability and technical detail.*

3.1.5 *In the interest of transparency, the Agency has commissioned an independent review of this re-examination which will include an evaluation of the Scope and Methodology document in terms of readability and clarity. Issues identified will enable the Agency to improve its consultation documents at subsequent stages in this and other reviews.*

3.2.0 Consultation Process

- 3.2.1 The consultation exercise on the Scope and Methodology document was welcomed by a significant number of respondents. These noted the Agency's commitment to openness and transparency and recognised the importance of consulting the public in this way [26] [27] [12] [29] [7]. One respondent stated that the Agency should send consultation documents to environmental organisations [7]. One respondent welcomed the commitment to consult HSE on matters affecting the exposure of workers and the risk of accidents but noted that it would be beneficial if trade unions were engaged in these discussions [15]. Two responses "condemned the discourtesy shown by the Agency" for failing to consult with local authorities in the Republic of Ireland [39] [42].
- 3.2.2 *This is the first occasion that the Agency has invited comments from the public on the methodology to be used for the re-examination of a nuclear site authorisation. The Scope and Methodology documents were distributed to a wide range of interested parties including environmental organisations (as detailed in the Appendix to this report). The Agency will in future include the trade unions on the Sellafield site in the consultation process. The Agency also consults UK Government Departments, the Government of the Isle of Man via the Home Office and the Government of the Irish Republic (Department of Public Enterprise) via the Foreign and Commonwealth Office. In addition, particularly with respect to the discharges of radioactive liquid waste to the Irish Sea, the Agency consults all United Kingdom local authorities bordering the Irish Sea.*
- 3.2.3 *The Radioactive Substances Act 1993 contains no requirement to consult with local government bodies outside the United Kingdom. Consultation outside the United Kingdom is a matter for the Government. Nonetheless the Scope and Methodology document is available on the World Wide Web for all to respond to. The Agency believes that present arrangements are adequate and that it has consulted widely to capture the views of interested parties.*
- 3.2.4 One respondent believed that the consultation had no value other than as a response to the standard anti-nuclear complaint that "the public weren't properly consulted". The respondent felt that it was of no value technically, operationally or as a means of improving safety. It simply provides yet another platform for anti-nuclear groups to express their total opposition to nuclear plant operations [16].
- 3.2.5 *The Agency disagrees that the document has no value other than to head off a particular complaint. The Scope and Methodology was prepared to better inform the public and other interested parties. It is designed to provide a clear statement of the process and scope of the review. The Scope and Methodology document of itself will not improve safety or deliver a balanced view of the costs versus harm associated with discharges of radioactive waste from Sellafield, but it does provide a clear set of criteria for the Agency to work to and be judged against when any proposals for changes are made.*

- 3.2.6 One respondent questioned if the Agency intended to apply the Selected Licence Procedure (SLP) that was the subject of a public consultation in the latter part of 1999. The question was also raised as to why no reference had been made to the SLP in this consultation exercise on the Scope and Methodology [29].
- 3.2.7 *The SLP process has not yet been formally adopted by the Agency as discussion with Government over funding is ongoing. Nonetheless the principles of that process have and will be followed for this review.*
- 3.2.8 The consultation exercise identified changes to a number of local authority contacts supplied with consultation documents which have arisen from local authority reorganisation. In addition, an omission from the list of libraries in Cumbria supplied with consultation documents was identified [1] [11].
- 3.2.9 *The Agency has noted these amendments and will continue to review circulation lists for consultation documents throughout the subsequent stages of this and other reviews.*

3.3 Publicity

- 3.3.1 One respondent commented that the existence of the Scope and Methodology document and the local surgeries was not widely known. The suggestion was made that flyers would be a better method of alerting the public [7].
- 3.3.2 *The Agency used a number of ways to inform the public, both locally, regionally and nationally. Public notices were placed in local Cumbrian and main national newspapers and news releases were issued explaining the review process. In advance of the surgeries, posters were placed in local shops and post offices and advertisements placed in local Cumbrian newspapers. Local radio and TV stations were informed and they ran stories covering the review and surgeries. The Scope and Methodology Document was made available on the World Wide Web and the address of the Agency web site was trailed in all press notices and news releases. We also informed local MPs. A full list of consultees is given in the Appendix to this report.*
- 3.3.3 *The way in which Agency interacts with the public is always under review with the aim of making information and opportunity to comment easily accessible, in a cost effective way, to as many people as possible. The Agency believes that it has made progress in this area but is always willing to consider comments and suggestions which may improve future consultations. The use of flyers will be one method considered for future consultations.*

3.4 Justification/Reprocessing and Alternatives.

3.4.1 In the Scope and Methodology document it was stated that the Agency did not propose to consider a review of the factors affecting justification on the Sellafield site. A number of respondents disagreed with the stated intention, questioning the legality of this decision. Respondents regarded this position as contradictory to that of the Magnox merger review and statements given in the 1998 decision document for the Sellafield variations [17] [18] [19] [20] [24] [23] [29] [30] [33] [34] [36] [37] [38] [39] [42].

3.4.2 *Justification is one of the ICRP principles of radiological protection. The Agency recognises the importance of justification in the context of this review. The 1996 Basic Safety Standards Directive (the "BSS Directive") requires EU Member States to ensure that exposure to ionising radiation is justified, i.e.*

3.4.3 *"6.1 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."*

3.4.4 *"6.2 Existing classes or types of practice may be reviewed as to justification whenever new and important evidence about their efficacy or consequences is acquired."*

3.4.5 *The current status at Sellafield with relation to justification is as follows. In 1993 the then Secretary of State for the Environment and Minister of Agriculture, Fisheries and Food considered the wider policy issues concerning the Sellafield nuclear fuel reprocessing activities, and THORP in particular (i.e. beyond those relating to the environmental and health effects of discharges). These issues were addressed by the Government Ministers in their decision document issued in December 1993, and were grouped under the headings of Spent Fuel Management, Waste Management, Decision to Reprocess, Economic Aspects, Transport and Non Proliferation. The Ministers reached a decision that there was a sufficient balance of advantage in favour of the operation of THORP, and expressed themselves satisfied that the activities giving rise to the discharges permitted by the Sellafield authorisations were justified. The Agency interprets this as referring to all activities on the Sellafield site contributing to discharges permitted by the authorisations in 1993.*

3.4.6 *It follows therefore that a review of the Ministers' 1993 decision would be required by the BSS Directive if there is "new and important evidence as to the efficacy or consequences" of reprocessing spent nuclear fuel and other activities at Sellafield. Some of the issues which have been raised since 1993 include:*

- *the value of plutonium which has been separated from spent fuel, noting that the UK has a large surplus;*

- *the international concern over reprocessing at Sellafield. A significant number of countries are opposed to reprocessing; in June this year three quarters of OSPAR contracting parties agreed that discharge authorisations for reprocessing facilities should be reviewed by national authorities with a view to implementing the non reprocessing option, ie dry storage, for spent fuel management. The UK and France abstained from this decision.*
- *the economics of reprocessing spent fuel.*
- *climate change issues and replacement of fossil fuel reliance.*
- *refusal of the planning application for the NIREX rock characterisation facility.*
- *transport of radioactive materials and waste.*
- *employment in West Cumbria.*

3.4.7 *Given the wide nature of the issues encompassed by the justification principle, including those relating to government policy, the Agency considers that the Government is better placed both to assess and take into account these issues and considerations and to determine the overall balance of advantages and disadvantages from a national perspective.*

3.4.8 *As explained in the Scope and Methodology document (paragraph 3.5), HSE consulted in 1998 on the proposal that reviews of, and decisions on justification should be taken by the appropriate Secretary of State, and not by the regulators - HSE and the Agency/SEPA would be statutory consultees. This accorded with the Agency's view. The Parliamentary Under Secretary of State for DETR stated in the House of Commons on 21 June 2000 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".*

3.4.9 *The Agency does not, therefore, propose to undertake a justification exercise at this stage of its review, pending the decision by Government on implementing the justification requirements of the BSS Directive. Nevertheless, the Agency would wish to have a role as a consultee in any government review of justification of practices on the Sellafield site. The Agency will be able to comment to government on environmental aspects of justification from work carried out as part of its re-examination. The public and other interested parties will have the opportunity to contribute to the Agency's information on these aspects.*

3.4.10 *One respondent felt that the Agency needs to take a clear position on whether the Magnox stations consultation or the consultation on this re-examination should include a consideration of the justification for Magnox stations from operation to reprocessing [36]. The respondent refers to the ICRP77 statement that waste management and disposal should not be considered in isolation from the practice that creates the waste.*

- 3.4.11 *The Agency's consultation on the Magnox stations includes consideration of the wider benefits and detriments of the stations and those associated with the fuel cycle as a whole, including reprocessing of magnox fuel.*
- 3.4.12 Some respondents expressed dissatisfaction that the Agency does not propose to consider alternatives to reprocessing as part of its re-examination [21] [8]. One respondent noted that dry storage of spent fuel, which is practised in most other countries with nuclear programmes, should be formally considered as a practical approach, as the safest course is for reprocessing to cease, and for spent Magnox fuel and AGR fuel to be dry stored [8]. A further respondent stated that the current consultation on BPEO for Dounreay spent fuel includes the storage alternative [36]. In contrast one respondent agreed with the Agency position that alternatives concerning spent nuclear fuel can only be addressed as part of government policy [15]. One respondent believed that failure to consider alternatives to reprocessing breaches the Agency's legal obligations under section 5(1) Environment Act 1995 (prevention logically and legally has priority over minimisation) [33].
- 3.4.13 *As stated in paragraph 3.6 of the Scope and Methodology Document, the Agency's view is that whether spent nuclear fuel should be reprocessed or stored pending the chosen long-term waste management option is more appropriately addressed by government in the context of policy on radioactive waste management. The Agency understands that the government will be consulting on the management of radioactive waste in the near future.*
- 3.4.14 *The Agency will have due regard to the requirements of section 5(1) of the Environment Act 1995.*
- 3.4.15 One respondent identified that the scope of this review needs to include a realistic assessment of the need for, and the viability of, staffed supervision and security measures during the 100–1000 years in which the waste will remain radioactive. This should include its vulnerability to terrorism, coastal erosion, sea level rise and earth tremors over such a period [28].
- 3.4.16 *For the medium term, High Level and Intermediate Level waste will need to be stored on-site at Sellafield. The Nuclear Installations Inspectorate (NII) of the HSE regulates storage of waste on the licensed site. Members of NII are involved in the Agency's project teams for the Sellafield review. If the waste were to be disposed of in a future waste repository, the safety case for the disposal facility would need to ensure that the continued isolation of the waste from the environment did not depend on activity by future generations to maintain the integrity of the disposal system (see "Disposal Facilities on Land for Low and Intermediate Level Radioactive Wastes", Guidance on Requirements for Authorisation, published by the Environment Agency, Scottish Environment Protection Agency (SEPA) and Department of the Environment for Northern Ireland).*

3.4.17 One respondent questioned whether the continued storage of historical waste and the decommissioning of redundant facilities were new practices requiring justification [20]. Another respondent held the view that Sellafield should be closed down entirely [10], and a further respondent expressed the view that THORP should close [24].

3.4.18 *These responses primarily raise issues of justification of practices at Sellafield; the Agency's position on which is set out above.*

3.5 Integrated Certificates

3.5.1 One respondent expressed concern about "blanket" authorisations for solids, liquids and gases and argued for individual limits being retained [1]. In contrast, a number of respondents considered that bringing together the regulation of liquid, aerial and solid waste into one authorisation will assist in considering waste management options in a more holistic way [35] [29] [32].

3.5.2 *The Agency is committed to an integrated approach to regulating the disposal of radioactive waste from nuclear sites. The purpose of integrated certificates of authorisation is to ensure that one set of standard general conditions is used in all authorisations (eg conditions relating to record-keeping) and to encourage a more holistic approach to radioactive waste management. In addition to general conditions, site specific conditions are included in any integrated certificate. Individual limits would continue to be applied to solid, liquid and gaseous discharges from Sellafield and also to individual plants where that is appropriate.*

3.5.3 One respondent suggested that instead of a single certificate, Agency should consider the possibility of integrated certificates for 'certain activities' ie. individual plants or processes, to avoid wholesale re-examination and re-issue of the Sellafield authorisation for a minor variation to discharge limits for a single plant [29].

3.5.4 *The Agency has wide powers under section 17 of the Radioactive Substances Act 1993 to vary an authorisation. Where appropriate a minor variation to an integrated certificate could be issued without the need for an extensive re-examination and re-issue of the whole certificate*

3.6 Best Practicable Means/Best Practicable Environmental Option

3.6.1 One respondent felt it was not immediately clear that implementing the Best Practicable Means (BPM) would ensure that Best Practical Environmental Option (BPEO) was chosen for the waste and that the primary purpose of an integrated certificate should be to ensure that BPEO is chosen [22].

3.6.2 *The application of BPEO and BPM with respect to the disposal of radioactive waste means that the best disposal route should be selected (BPEO) and the best practical means (BPM) should be used to minimise the activity in waste which is disposed of. An integrated certificate should assist consideration of*

the BPEO for the management of radioactive waste in that disposals via all routes (and their environmental impact) are regulated by the same authorisation at the same time. The Agency is requiring BNFL to undertake BPEO assessments for all major waste streams.

- 3.6.3 One respondent identified that in the interests of transparency, the Agency must make clear at the outset the precise set of criteria that are being used to decide whether BPM is being employed and frame the reasons for its eventual decision in terms of these criteria. This respondent also noted that overseas practices should be reviewed to help decide whether BPM is being applied [29].
- 3.6.4 *The Agency produces technical documents on the abatement and monitoring of radioactive discharges from nuclear facilities which will assist in the review. However, BPM is subject to continual improvement as management practices, engineering controls and abatement techniques develop with time and can be unique to a specific waste stream. However, in assessing whether best practicable means is being employed by BNFL at Sellafield the Agency will consider the best available technology and overseas practices. In particular, the COGEMA plant at La Hague will be considered, as this is the only other major commercial reprocessing plant in the world. The Agency's review will include an appraisal of what it considers to be BPM for minimising radioactive waste disposal from the Sellafield site, and how this has been assessed.*
- 3.6.5 One respondent enquired how BPM would be incorporated in integrated certificates of authorisation [32].
- 3.6.6 *This is addressed in section 3.1 of the Scope and Methodology document. Such conditions have already been incorporated into the new integrated certificates for the Atomic Weapons Establishments (AWE), at Aldermaston and Burghfield and the draft certificates for BNFL/Magnox Stations. The latter certificates are currently the subject of public consultation*
- 3.6.7 One respondent considered that there was a need for independent expertise when developing and monitoring the use of BPM, as assessments of BPM and feasibility are especially vulnerable to organisational inertia, culture and mindset [28].
- 3.6.8 *The Agency seeks independent advice where it does not have the competence to assess information and make informed decisions. In assessing the BPM cases and feasibility studies presented by BNFL, the Agency will consider whether it would be appropriate to seek independent advice. Monitoring the ongoing use of BPM is part of the Agency's day to day regulation of the site.*
- 3.7 OSPAR/Government Policy**
- 3.7.1 A number of respondents noted the Agency's stated intentions regarding consistency with government policy and in particular with the OSPAR Sintra agreement [18] [15]. One respondent believed that the Agency should form a view

on the definition of "close to zero" which should be made available during this process [23].

- 3.7.2 *The Oslo and Paris Convention is concerned with protection of the marine environment of the North East Atlantic. The 1998 OSPAR strategy for radioactive substances, calls for reductions in radioactive discharges by the year 2020 to levels where the additional concentrations in the marine environment, above historic levels, are "close to zero".*
- 3.7.3 *Discussions are ongoing in OSPAR Working Groups on defining these terms. Agency staff have taken part in these discussions in the OSPAR working groups and will continue to contribute to them. While this work is continuing it would be inappropriate for the Agency to apply a unilateral view. The Agency will have regard to the application of the OSPAR strategy in the UK Strategy and the government's Statutory Guidance to the Agency, as those documents develop. (See paragraph 3.7.8)*
- 3.7.4 A respondent stated that the term 'marine environment' needs to include estuarine deposits and mudbanks, the coastal sand dunes and the tidal flood plains, and the air breathed on coastal paths and towns [28].
- 3.7.5 *The OSPAR definition of maritime area includes intertidal waters up to the high water limit. This would encompass estuaries and areas subject to tidal inundation. The Agency's environmental monitoring programmes for radioactivity cover public exposure in the coastal area near to Sellafield. This information will be used in the assessment of dose to the public.*
- 3.7.6 One respondent believed it would be inappropriate for decisions regarding regulatory control to be taken before the Secretary of State's guidance to the Environment Agency on the determination of discharge authorisations and the National Discharge Strategy for compliance with the OSPAR Sintra agreement have been agreed and published [29].
- 3.7.8 *The Government published a draft document "UK Strategy for Radioactive Discharges 2001 - 2020" on 21 June 2000 and is consulting on the strategy until 22 September. The Government intends to publish the final version of the strategy towards the end of this year. The Government has also indicated that it will shortly publish a second consultation document being draft statutory guidance to the Environment Agency to help them take account of radiological principles and environmental policy objectives when determining authorised limits for radioactive discharges. The Statutory Guidance will provide the vehicle through which the UK National Discharge Strategy will be implemented by the Agency in issuing and reviewing RSA93 authorisations to dispose of radioactive waste. The Agency's programme for the review allows for account to be taken of these documents as they develop. In addition, draft copies of the Scope and Methodology document were provided to DETR prior to its publication.*

3.7.9 The recommendation in the recent House of Lords inquiry that a new commission is established to oversee preparation and implementation of a national radioactive strategy was noted as significant by one respondent [32].

3.7.10 *The Agency will take account of developing government policy during the course of the review.*

3.8 BNFL Management Issues

3.8.1 In view of the recent data falsification and the publication of the NII reports the need for independent check monitoring and auditing was identified as very important by a large number of respondents as was the need for verification of all data submissions received from BNFL [6] [19] [22] [12] [14] [24] [34] [38] [28].

3.8.2 *The Agency agrees that independent checks by Agency staff and auditing of BNFL's monitoring procedures are an important part of site regulation. As part of its ongoing regulatory duty, the Agency reviews its practice in respect of monitoring and auditing at the Sellafield site, and where necessary, enhances existing practice. Key data submitted by BNFL for the current review is being verified by a team of Agency staff by accessing primary data held by BNFL.*

3.8.3 A respondent identified that the Scope and Methodology states "The application of BPM involves a level of management and engineering control to minimise as far as practicable the release of radioactivity to the environment....." This respondent commented that "In light of the NII team inspection report and its criticisms of BNFL management, I as a member of the public, am worried that the Agency will have difficulty reaching its aims"[34].

3.8.4 *Management and engineering control are considered as part of the Agency's normal regulation of the site. BNFL's managerial arrangements relating to the disposal of radioactive wastes are being examined as part of this review. The Agency will consider whether specific conditions regarding management systems should be included in the authorisation, as with those already in place for the AWE sites and proposed in the consultation for the Magnox sites.*

3.9 Monitoring

3.9.1 One respondent recommended that the Environment Agency should conduct spot sampling, measurements, tests and surveys commensurate with the risks to public health and the environment rather than rely on the operator's reporting systems [6].

3.9.2 *The Agency has a programme of analysis by independent laboratories of samples by BNFL of the Sellafield liquid and solid radioactive waste disposals. It is planned to implement in 2000 a programme of independent sampling of discharges to air. Spot samples are also taken as part of the normal regulation of the site. In addition, the Environment Agency, the Food Standards Agency (FSA) and some local authorities conduct routine monitoring of a wide range of environmental materials and foodstuffs around the Sellafield site. Such programmes have been in place for many years*

enabling monitoring to be targeted at areas which reflect the radiological impact of discharges. The scope of the Agency's programme is regularly reviewed to ensure it reflects current best knowledge. In addition, a wide range of research projects have been undertaken over many years, to provide more detailed information on specific issues. The emphasis of these projects has been to provide a detailed understanding of the fate and behaviour of the discharges in the environment and their impact on man.

- 3.9.3 One respondent stated that for both public safety and tourist revenue, the scope of the review needs to include establishing some clarification on safety and some future co-ordination between the radiological and non-radiological monitoring of beaches [28]. This respondent felt the scope of the review needs to include the option for the Agency (when increased discharges are permitted) to openly inform the public, or at least ensure the removal of blue flags and other signs suggesting that bathing water is safe [28].
- 3.9.4 *The Agency ensures that members of the public are properly protected from the effects of routine operational releases from nuclear sites by regulating the amount of radioactive waste discharged to the environment. The current impact of Sellafield discharges, both past and present, has been assessed to be significantly below the international and national dose limits in all situations including the recreational use of beaches. The Agency will pass on this suggestion to the Tidy Britain Group who issue blue flags who may wish to consider it further. The Agency will be happy to assist this Group in considering the issue.*
- 3.9.5 One respondent believed that the Agency should take the opportunity to draw on expertise from abroad in monitoring Sellafield [28].
- 3.9.6 *When considering the impact of Sellafield discharges, the Agency draws on all publicly available monitoring information including that from abroad. Monitoring information collected over many years has shown that the highest radiological impact occurs in the UK, in particular along the coast of NW England. Consequently, monitoring is most concentrated in this area. In general, expertise from abroad is drawn on through international conferences, seminars and workshops, through the international scientific literature and through international inter-laboratory comparison exercises.*
- 3.9.5 A respondent stated that more work should be done on the impact on flora and fauna of discharges to the environment, by a body completely independent of BNFL [34]. The respondent considered that whilst the Agency's proposals on reviewing and setting limits appear reasonable, on-going research into environmental pathways was needed for feasible assessments [34].
- 3.9.6 *The Environment Agency has an ongoing research programme into environmental pathways, and has commissioned an independent assessment of the impact of Sellafield's discharges to the environment on fauna and flora. In addition, information requirements in the current authorisations require BNFL to provide annual reports which include a detailed programme and findings of research on the behaviour in the environment of radionuclides*

discharged from Sellafield. This has the objective of improving the understanding of the effect on the sustainability of eco-systems and communities of non-human species. The independent reports and the BNFL reports will be considered as part of the current re-examination of the Sellafield authorisations.

3.9.7 The requirement for BNFL to measure liquid effluent waste streams at source was identified as important by one respondent who believed that the Agency should anticipate the possible BNFL response that this is too dangerous [28].

3.9.8 *The Agency has requested BNFL to assess the feasibility of monitoring individual liquid discharge streams at the source plants and to justify any arguments that are put forward against such monitoring. In assessing BNFL's response, the Agency will consider all relevant factors, including worker safety and cost effectiveness, and will introduce a requirement for statutory monitoring at source where appropriate.*

3.10 Health/Dose Assessment

3.10.1 One respondent commented that the Scope and Methodology of the review enables the interest of health to be taken fully into account [5]. Another respondent welcomed the reductions in radiation exposure to the workforce that have been achieved in recent years and expressed concerns about any measures which would result in a reversal of this positive trend [15]. This respondent noted that the re-examination should include a full and systematic review of the impact of any potential increase in radiation exposure to workers [15].

3.10.2 *Decisions that could impact on the radiation exposure of the workforce will only be taken after careful consideration by the Agency in consultation with the Nuclear Installations Inspectorate. For example, any environmental benefits of increased storage of wastes on site and the regulatory compliance benefits of increased sampling and hence improved waste characterisation would be balanced against any increase in dose to the workforce.*

3.10.3 One respondent noted that there was likely to be a threshold dose limit, below which cells can cope with ionisation effects and suggested that there was sufficient information available worldwide to evaluate risks from natural radiation and from the nuclear industry. The respondent then questioned the need for more severe restrictions on already low levels of discharges. The respondent linked these issues to costs/benefits.

3.10.4 *The UK's National Radiological Protection Board (NRPB) advises that the linear no-threshold dose-response relationship remains valid. It is assumed that the probability of cancer induction increases with increasing dose and that all radiation doses, no matter how small, are capable of causing cancer and hereditary defects. This represents a precautionary position which is accepted by all international radiological protection bodies. The Agency uses this guidance in setting discharge limits. In addition, the UK is a signatory to the 1998 OSPAR Sintra Statement which requires progressive and substantial reductions in radioactive discharges and that additional concentrations*

above historic levels of artificial radionuclides in the NE Atlantic and adjacent seas be reduced to 'close to zero' by 2020. Cost / benefit issues are dealt with at section 3.11 of this document.

- 3.10.5 One respondent believed that if different methods of dose assessment are to be employed in reaching a decision, the precise nature and assumptions used to devise them should be clearly spelt out for the public [29]. A further respondent felt that the Agency should consider a simplification of the dose assessment methodology to make effects of the nuclear industry's discharges more understandable to the general public [23].
- 3.10.6 *The Agency will include details of the dose assessment methodologies employed by the Agency, BNFL and the FSA in the consultation documents for the review. It will also explain any differences between them. The results of the dose assessments will be presented in such a manner as to make them understandable to the general public.*
- 3.10.7 One respondent noted, that where there is uncertainty, a precautionary approach should be adopted to limit setting and that, due to the longevity and cumulative effect of radioactivity, all discharges should be as near to zero as possible [24].
- 3.10.8 *The Agency will apply the UK policy on the regulation of radioactive discharges with the aim of minimising discharges as far as practicable and in line with the framework set out in the UK Strategy for Radioactive Discharges 2001–2020, as it is finalised. In addition the operator is required to use the best practicable means to minimise discharges at all times.*
- 3.10.9 One respondent suggested that the Agency should present high Linear Energy Transfer (LET)/ low LET contributions to collective doses and that a maximum time period of 500 years should be considered for assessing collective dose [22].
- 3.10.10 *The Agency will calculate and publish collective effective doses from Sellafield discharges. The collective dose will be that 'committed' to the populations of the UK and Europe over a period of 500 years, this is otherwise known as the 'collective dose truncated at 500 years'.*
- 3.10.11 *The collective effective dose will be broken down by radionuclide. However, the breakdown of the collective effective dose into high and low linear energy transfer components is far from straightforward. The effective dose coefficients used in the assessments are the sum of the weighted equivalent doses to organs/tissues, which are for many radionuclides, made up of both low and high LET components. For these radionuclides, particularly those which on decay produce other radionuclides that emit different radiation types, it is almost impossible to separate out the different LET components without commissioning special calculations.*
- 3.10.12 *The Agency considers that collective effective dose is a useful quantity when comparing the total impact of different radioactive waste management options. However, the primary quantity of interest for regulatory purposes is the effective dose to individuals for compliance checking against dose*

constraints and the dose limit. Allowance for the different effects of high and low LET radiation is implicit in the calculation of the effective dose. The breakdown of the collective effective dose or individual effective dose into high and low LET fractions is therefore only likely to be of interest in specialised health effect studies and not in assessments for regulatory purposes. However, the breakdown of doses by radionuclide will provide a broad indication of the relative contributions from emitters of high and low LET radiation.

3.11 Employment, Socio-Economic Impacts and Cost Benefit Issues

3.11.1 A number of respondents highlighted the importance of considering economic and social factors, including the health benefit of reduction in unemployment in the local population, in BPM and BPEO assessments [5] [15] [41] [16]. Two respondents stated that Agency should not simply make an open ended demand for lower discharge limits, as it is wrong to insist on huge costs to drive down discharges further when no soundly based scientific evidence is available to suggest that current levels of discharge can lead to unacceptable effects on human beings, the biosphere or the environment [9] [16].

3.11.2 *The Agency notes the above comments. It has a number of wide ranging powers and duties under EPA95 and will give appropriate weight to economic and social factors in its BPEO/BPM decisions.*

3.12 International Comparisons

3.12.1 One respondent questioned if the principles applied by France are taken into account to set discharge limits for the Sellafield site [16]. A further respondent identified that the publication of a comparison between the current radioactive discharges from the La Hague plant and Sellafield would be interesting [25].

3.12.2 *The Agency will consider, for example, the techniques currently used for reducing waste discharges at the COGEMA nuclear fuel reprocessing facility at La Hague. The Agency will continue its contact with the appropriate regulatory body in France, with the aim of obtaining information to enable relevant comparisons to be made between La Hague and Sellafield. Should this information be available, the Agency will include a comparative reference in the review consultation documents.*

3.13 Technetium-99 (Tc-99)

3.13.1 A number of submissions commented specifically on the discharge of Tc-99. Of these, three responses warmly welcomed the Agency's stated aim to reduce Tc-99 discharges to 10TBq per year [12] [10] [41]. However, concerns about potential delays in achieving this reduction were expressed, as was the dissatisfaction that a timescale had not been specified for this objective [12] [19] [38].

3.13.2 *The Agency is committed to requiring BNFL to reduce Tc-99 discharges to less than 10TBq per year as soon as possible. The timescale for this is being considered as part of the review.*

- 3.13.3 One respondent suggested restricting the use of the Enhanced Actinide Removal Plant (EARP) treatment plant and increasing the use of storage as a means of reducing discharges of Tc-99 [25].
- 3.13.4 *The continued storage of active liquid waste is one of the alternatives being considered by the Agency in the review of Tc-99 discharges. The Agency's proposals will be set out for consultation in the autumn.*
- 3.13.5 In contrast one respondent questioned the "drive down at any cost" philosophy which is currently being applied. The respondent did not believe that the fact that an exceedingly low level of Tc-99 can be detected means that the level is unacceptable. Furthermore this respondent considered that the Environment Agency should be able to adopt a more balanced, scientifically based view [16].
- 3.13.6 *In regulating discharges of Tc-99 from Sellafield, the Agency has to take into account matters such as radiological impact, costs and benefits and Government policy, including the UK's international commitments eg. OSPAR.*
- 3.13.7 One respondent asked whether the Agency would advise lobster eaters where to dispose of lobster shells [34].
- 3.13.8 *Extensive monitoring by the Food Standards Agency demonstrates that in terms of radioactive contamination, seafood, including lobster, is safe to eat. The lobster does accumulate Tc-99 in its tissue including the shell. However, levels are far too low to warrant special disposal arrangements and therefore the non-edible parts of the lobster can be disposed of with normal refuse.*
- 3.13.9 The same respondent noted that progress of the review depends on BNFL providing information. The respondent asked how the Agency could prevent BNFL from stalling long enough so that all the stored actinide liquors could be processed through EARP before the Tc-99 discharges were cut [34].
- 3.13.10 *The Agency is committed to carrying out an early review of Tc-99 discharges, as set out in the Scope and Methodology document. That requires the provision of the necessary information from BNFL and the Agency has a firm programme requiring the company to provide it.*

3.14 Limits and Conditions

- 3.14.1 The view of one respondent was that dispersal of radionuclides to the environment is wrong, and the Agency should be aiming at the standards of the International Atomic Energy Agency (IAEA) [34].
- 3.14.2 *The IAEA 'Principles for Radioactive Waste Management' state that "safe radioactive waste management includes keeping the releases from the various waste management steps to the minimum practicable". The preferred approach detailed in the IAEA document is concentration and containment of radioactive waste rather than dilution and dispersion in the environment.*

However, 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.

- 3.14.3 Two respondents stated that the methodology for short-term emission limit discharges should include fixed, rather than advisory, limits and that appropriate non-compliance penalties should be specified [19] [38].
- 3.14.4 *As stated in section 4.7 of the Scope and Methodology document, the Agency might apply daily and weekly advisory levels for various radionuclides, or retain fixed limits. Any proposals will be subject to public consultation. Enforcement provisions, including criminal offences for breaches of authorisation conditions, are set out in the Radioactive Substances Act 1993. It would not be appropriate for the Agency to include non-compliance penalties in the authorisation itself*
- 3.14.5 One respondent noted with concern the Agency's intention to permit increases in discharges and discharge limits for specific waste storage and decommissioning projects "when requested by BNFL". The respondent's view was that any increase in discharges or discharge limits, for whatever purpose, would be directly contrary to the continuous improvement in the protection of the public and the environment from the effect of radioactive discharges from the Sellafield site, the Agency's stated principal aim of the re-examination, and the spirit of continuous downward pressure on discharges [20]. A second respondent requested clarification of the definition of "exceptional circumstances" for which the Agency may permit increase in discharges and/or discharge limit [35].
- 3.14.6 *The Agency's position on increases in discharges and/or discharge limits was set out in section 4.2 of the Scope and Methodology Document. This is consistent with current Government policy. Exceptional circumstances will be considered on a case by case basis and it is not possible to give any guidance in advance, beyond what was set out in section 4.2.*
- 3.14.7 A respondent considered that each major stack should be allocated an individual limit [20].
- 3.14.8 *As stated in the Scope and Methodology Document (section 4.2), the Agency aims to introduce individual discharge limits for all major stacks specified in the Sellafield aerial discharge authorisation.*
- 3.14.9 The same respondent considered that current limits are too lax and provide too much headroom for BNFL [20].
- 3.14.10 *In its assessment of discharge limits the Agency will restrict any headroom to no more than is absolutely necessary to allow BNFL to operate the facilities at Sellafield. The setting of discharge limits will be fully explained in the public consultation documents on the Agency's proposals from the re-examination.*

- 3.14.11 The same respondent believed that consideration should be given to introducing a requirement that BNFL should provide a written explanation on each occasion when a discharge return for a specific plant or operation is estimated [20].
- 3.14.12 *The Agency currently requires BNFL to provide a written explanation of any estimated discharges that have been reported on statutory discharge returns. The written explanation then accompanies the discharge return on the public register. The Agency will consider whether it would be appropriate to introduce a specific condition in the authorisation on the reporting of estimated discharges.*
- 3.14.13 One respondent suggested that the impact of radiologically contaminated land on the Sellafield site should be considered [32].
- 3.14.14 *Radioactively contaminated land on nuclear sites is principally a matter for the Nuclear Installations Inspectorate (NII). However, the Agency liaises with the NII regarding this issue, particularly concerning the potential for migration of contamination from nuclear sites. The potential radiological impact from radioactively contaminated land at the Sellafield site will be considered as part of the review. It should be noted that the Agency requires BNFL to undertake a large environmental monitoring programme as part of the authorisation arrangements for the disposal of radioactive waste. This programme includes monitoring of groundwater and the air, which are the major pathways by which migration of contamination from contaminated land is likely to occur. Hence any significant migration is likely to be detected.*
- 3.14.15 One respondent considered that the Agency needs to demonstrate the quantifiable objectives, in terms of public dose and environmental protection, that are linked to the proposals for placing discharge limits on individual production plants, the monitoring and sampling of individual waste streams and the introduction of daily or weekly advisory levels. The Agency should explain why these objectives cannot be achieved through existing conditions. As part of such an exercise, the Agency should consider, and clearly set out, the extent of increased costs arising from such additional conditions, the need for revised plant safety cases which they might imply and the level of exposure of plant workers [29].
- 3.14.16 *The Agency will set out in its consultation documents the rationale for any proposed changes to authorisation limits and conditions and in setting revised limits and conditions the Agency will consult with the NII regarding the impact such changes may have on the safety case for the particular plant.*
- 3.14.17 A respondent considered that introducing a more complex system of limit regulation by increasing the number of daily, weekly and annual discharge limits, could greatly increase operational tensions within BNFL's commercial business [35].
- 3.14.18 *Setting limits at source should result in more targeted control of the processes at Sellafield, with the aim of reducing the quantity of radioactive waste generated and requiring subsequent disposal. It is a matter for BNFL to manage any operational tensions within its commercial business.*

3.15 Delays and Timescales

3.15.1 A number of respondents expressed concern that the Agency may not have sufficient resources to complete this review within the timescales specified [27] [6].

3.15.2 *The Agency has made sufficient resource available to complete the review as specified within the given timescales. Should the specification for the review be changed then the Agency will review both resources and timescales.*

3.15.3 Two respondents stated that the delay in reviewing the Authorisation is unacceptable and steps should be taken to ensure this does not recur [23] [33].

3.15.4 *The Agency's aim is to review the Sellafield Authorisations every four years. In addition, the Agency reviews operations on site continually as part of its regulatory activities, and will continue to do so.*

3.15.5 A respondent commented that the Agency should include a time allowance in the project for contemplation of the regulatory implications of the proposed Secretary of State's guidance on determination of discharge authorisations and the national discharge strategy for compliance with the OSPAR Sintra agreement, once they are agreed and published [29].

3.15.6 *The review programme includes provision to consider the implications of both the Secretary of State's guidance and the UK Strategy for Radioactive Discharges, 2001 – 2020, as those documents develop.*

3.16 Other Issues

3.16.1 One respondent believed that the Agency should comment on the significance of the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 [32].

3.16.2 *The Regulations prescribe procedures for environmental assessment of any project to dismantle or decommission a nuclear power station or nuclear reactor. They require the consent of the Health and Safety Executive to undertake any such project. The Agency would be a consultee in any such environmental assessment.*

3.16.3 *The Agency does not consider that these Regulations are of relevance to this re-examination of the Sellafield authorisations to dispose of radioactive waste.*

3.16.4 One respondent suggested that the term "waste" should only be applied to material which is not clearly capable of commercial recycling [25].

3.16.5 *The Agency applies the definition of "waste" in the Radioactive Substances Act 1993:*

- 3.16.6 *"Waste includes any substance which constitutes scrap material or an effluent or other unwanted surplus substance arising from the application of any process, and also includes any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoilt"*.
- 3.16.7 One respondent pointed out that there seems to be no mention of cutting Krypton-85 (Kr-85) discharges and asked why not - is this because there is no technical method of cutting the discharge [34]?
- 3.16.8 *The aerial discharge authorisation which came into effect on 1 January 1994 required BNFL to investigate potential technology for the removal of Kr-85 gas from aerial discharges and to provide to the Agency an annual report on research and development in this area. All such BNFL reports up to the current year have been placed on the public register. There is currently no practicable technology available to abate Kr-85 discharges.*
- 3.16.9 One respondent wanted assurance that liquid discharges do not include solvents or liquid immiscible with sea water [34].
- 3.16.10 *The Sellafield liquid discharge authorisation specifies a limit on the concentration of tributyl phosphate, the solvent extractant used in the chemical separation processes in THORP and Magnox reprocessing. This limit is based on the solubility of the solvent in water. In addition, the authorisation requires BNFL to ensure that the amount of any organic solvent, other than tributyl phosphate, in liquid waste discharged from the sea pipelines, and the rate at which it is discharged, are as low as reasonably practicable. In addition, the authorisation issued to BNFL under the Environment Protection Act 1990 (EPA90) limits the amount of tributyl phosphate that may be discharged from the sea pipeline and from other parts of the plant.*
- 3.16.11 One respondent pointed out that under the Conservation (Natural Habitats & c.) Regulations 1994 any new or revised authorisation would need to be considered in relation to the possible impacts on Natura 2000 sites that might be affected, and the Agency will need to consider specifically whether a significant effect is likely on the Drigg Coast candidate Special Area of Conservation (cSAC), Morecambe Bay cSAC and Special Protection Area (SPA), Solway Firth cSAC and Upper Solway Flats and Marshes SPA, and other Natura 2000 sites in the vicinity [18].
- 3.16.12 *The Agency recognises its responsibilities under these Regulations. In accordance with the Conservation (Natural Habitats & c.) Regulations 1994, the Agency will assess the likelihood of any significant effect on European sites and where any such impact is likely, will carry out appropriate assessment in accordance with the Regulations.*
- 3.16.13 One respondent recommended that the Agency should be vigilant about the transfer of radioactivity off the Sellafield site, for example via wildlife [22].
- 3.16.14 *The Agency has recently commissioned work, to take a fresh look at the potential for unconventional pathways for the transfer of contamination from*

nuclear sites to the environment. Additionally, the Agency has recently co-sponsored an aerial gamma survey to map environmental levels of radioactivity around Sellafield. The results of both these studies will be considered as part of the re-examination of the Sellafield authorisations. It should be noted that the control of radioactive materials on nuclear sites is regulated by the Nuclear Installations Inspectorate of the Health and Safety Executive, whilst the Agency's responsibilities relate to the disposal of radioactive waste.

- 3.16.15 One respondent stated that all parties, especially BNFL and subsidiaries, should declare all gifts and consultancies to holders of public office and private individuals [24].
- 3.16.16 *The Agency requires its employees and members of the Board to declare any personal interests which might impinge or be reasonably thought by others to impinge on their impartiality, and business gifts are not accepted. The Agency is cognisant of the need to consider any "conflicting interest" of third parties (such as consultants) that may be engaged to carry out work in connection with the re-examination. The Agency does not consider that any further measures are necessary for the re-examination.*
- 3.16.17 Another respondent stated that the Agency should ensure the general public are aware of the purposes of the Sellafield plant and why radioactivity is discharged into the environment. This should include a description of the nature of discharges and an explanation of why statutory controls are necessary [34].
- 3.16.18 *All these issues will be addressed in the consultation documents, which the Agency will issue with its proposals from the review.*
- 3.16.19 The same respondent asked that any modifications to THORP and existing Magnox reactors be called in by the appropriate Government Minister for a public inquiry [34].
- 3.16.20 *This is a matter for the Secretary of State for the Environment, Transport and Regions or the Secretary of State for Health, who each have powers under section 24 of the Radioactive Substances Act 1993 to call-in applications and hold a public inquiry. Therefore, all requests for a public inquiry received by the Agency during public consultations will be referred to the Secretaries of State.*
- 3.16.21 One respondent criticised the Agency's proposal to ask BNFL to assess the practicability of modifying THORP to reprocess Magnox fuel, and the use of uranium oxide fuel in Magnox reactors when neither had been subject to prior discussion or public enquiry.
- 3.16.22 *The Agency's aim in seeking information from BNFL regarding the potential use of THORP for reprocessing Magnox fuel and the possibility of using uranium oxide fuel in Magnox reactors, is to investigate the alternatives to the continued operation of the Magnox Reprocessing Plant, B205. This*

information will be made available when the Agency publishes its consultation documents setting out its proposals from the review.

3.16.23 One respondent requested clarification on the end date for Magnox Reprocessing [1].

3.16.24 *BNFL has recently issued a press release which states that "the Magnox reprocessing plant (B205) at Sellafield will close once all Magnox fuel has been reprocessed. It is expected that this will be around 2012 although this could be later depending on throughput schedules".*

3.16.25 A respondent commented that any option to store spent fuel should take into account the visual impact of such a store, and the potential for cataclysmic events impacting on western civilisation [7].

3.16.26 *Consideration of the visual impact of any new facility is a matter for the Local Planning Authority. Consideration of the Nuclear Safety aspect of any store, should it be built, is a matter for the NII.*

3.16.27 A respondent commented that the scope of the review could also anticipate a need to establish a system whereby workers at the Sellafield plants, who know about malpractices, are able to report these to the Agency. This would require the Agency to fine BNFL to pay for their relocation and pension/loss of income [28].

3.16.28 *The Public Interest Disclosure Act 1998 inserted provisions into the Employment Rights Act 1996 to provide protection for workers who may wish to disclose information about breaches of the law or dangers to health, safety or the environment. Within the terms of the Act and the Public Interest Disclosure (Prescribed Persons) Order 1999, disclosures can be made to the Agency.*

4.0 ACTIONS IDENTIFIED IN THIS REPORT (INCLUDING ISSUES ARISING FROM THE COMMENT SEEKING PROCESS)

- 4.1 It was originally envisaged that the Scope and Methodology document might be republished to accommodate issues raised by consultees. However, these have generally been matters of clarification, and the Agency has decided not to reprint the original Scope and Methodology document. This report should therefore be read together with the original document to provide the overall Scope and Methodology. Labels have been added to the covers of the all the copies of the Scope and Methodology document held on Public Registers. Additional clarification is in the Foreword to this report.
- 4.2 Copies of this report will be distributed using the same circulation list as used for the Scope and Methodology document, additions to the circulation identified during the comment seeking process have been included. Copies will also be sent to others who submitted comments.
- 4.3 Actions identified in this report are listed below. These largely reflect existing commitments in the original Scope and Methodology document, legal responsibilities of the Agency and the Agency's existing practice on RSA93 reviews. The Agency re-examination will be assessed against the overall Scope and Methodology as part of the independent quality assurance audit commissioned as part of the re-examination. The findings of the audit will be reported when the Agency publishes its consultation documents

Page	Section	Action	Existing Scope and Methodology Commitment (section)
2	3.1.5	Independent Peer Review – to include an evaluation of the Scope and Methodology in terms of readability and clarity.	5.0
3	3.2.2	Include the trade unions on the Sellafield site on the circulation list for consultation documents.	
4	3.2.7	Application of the principles of the Selected Licence Procedure.	5.0
4	3.2.9	Continue to review circulation lists for consultation documents.	
4	3.3.3	Continue to review the way in which the Agency interacts with the public.	
4	3.3.3	Consider the use of flyers for future consultations.	
8	3.6.2	Requiring BNFL to undertake BPEO assessments for all major waste streams.	3.2
9	3.6.4	The Agency will consider the best available technology and overseas practice. In particular the COGEMA plant at La Hague	3.2
9	3.6.4	Review will include an appraisal of what is considered to be BPM for minimising radioactive waste disposal from the Sellafield site.	3.2

9	3.6.8	In assessing BPM the Agency will consider whether it would be appropriate to seek independent advice.	
9	3.7.3	Agency staff will continue to contribute to the OSPAR working groups on defining "close to zero".	
10	3.7.3 3.7.10	Agency will take account of developing government policy during the course of the review.	1.0
10	3.7.5	Agency's environmental monitoring information will be used in the assessment of dose to the public.	4.11
11	3.8.2	Agency will verify key data submitted by BNFL by accessing primary data.	4.2
11	3.8.4	Examine BNFL managerial arrangements relating to the disposal of radioactive waste.	
11	3.8.4	Consider introduction of specific management systems within the authorisation.	
12	3.9.4	Pass on details of the radiological monitoring of beaches and suggestion regarding the blue flag scheme to the Tidy Britain group.	
12	3.9.6	Draw on all publicly available monitoring information when considering the impact of the Sellafield discharges.	
12	3.9.6	Consider BNFL's and independent studies on the impact on flora and fauna.	4.10.4
13	3.9.8	Consider all relevant factors concerning monitoring at source (including worker safety).	4.2
13	3.10.2	Consideration of impacts on health exposure of workforce – in consultation with NII.	4.12
14	3.10.6	Include details of the dose assessment methodologies in the consultation documents on the Agency's proposals from the re-examination.	4.10.2
14	3.10.6	Explain any differences between the various dose assessment methodologies (in a manner understandable to the general public).	4.10.2
14	3.10.8	Apply the UK policy on the regulation of radioactive discharges with the aim of minimising discharges.	1.0
14	3.10.10	Will calculate and publish collective effective doses from Sellafield discharges.	4.10.3
14	3.10.11	Collective effective dose will be broken down by radionuclide.	
15	3.12.2	Consider the techniques used for reducing discharges at the COGEMA plant at La Hague, France.	3.2
15	3.12.2	Continue contact with the appropriate regulatory body in France.	3.2
15	3.12.2	Include a comparative reference in the consultation documents (La Hague & Sellafield).	3.2
17	3.14.10	Restrict any headroom to no more than is absolutely necessary.	4.4 /4.5
17	3.14.10	Explain the setting of discharge limits in the consultation documents.	
17	3.14.12	Consider whether it would be appropriate to introduce	

		a specific condition in the authorisation regarding the reporting of estimated discharges.	
18	3.14.14	As far as relevant the potential radiological impact from radiological contaminated land at the Sellafield site will be considered as part of the review.	
18	3.14.16	Explain any proposed change to the authorisation limits and conditions in the consultation documents.	
18	3.14.16	Consult with the NII regarding the impact of any changes (limits and conditions) on safety.	4.12
18	3.15.2	Review both resources and timescales (should the specification for the re-examination change).	
20	3.16.12	Assess the likelihood of any significant effect on European sites, and where any such impact is likely, carry out the appropriate assessment.	
20	3.16.14	Consider the results of the recent "unconventional pathways study" and the aerial gamma survey as part of the re-examination of the authorisations.	
21	3.16.17	Provide explanation of the purpose of the Sellafield plant, why radioactivity is discharged and why statutory controls are necessary (within the consultation documents).	
21	3.16.20	Refer any call-in requests to the Secretaries of State.	
21	3.16.22	Publish findings of BNFL studies regarding alternatives to the continued use of B205.	3.6
23	4.1	Add labels to all copies of the Scope and Methodology held on Public Registers.	
23	4.2	Distribute this report using the Scope and Methodology circulation list (plus additions).	
23	4.2	Send copies of this report to respondents	
23	4.3	Quality Assurance Audit to assess compliance against overall Scope and Methodology document.	5.0

GLOSSARY

Abatement techniques: Technological means used to reduce radioactive discharges.

Absorbed dose: Quantity of energy imparted by ionising radiation to unit mass of matter such as tissue. Unit gray, symbol Gy. 1 Gy = 1 joule per kilogram.

AGR: Advanced Gas-Cooled Reactor – The second generation of nuclear reactors built in the UK. They use slightly enriched uranium dioxide clad in stainless steel as fuel, and operate at a much higher temperature than the Magnox reactors from which the reactor design was developed.

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 under RSA93 to dispose of radioactive waste; normally subject to conditions which must be met.

Basic Safety Standards Directive: European Community Directive 80/836/Euratom, Basic Safety Standards for the Health Protection of the General Public and Workers against the Dangers of Ionising Radiation. These standards were adopted as European Law in 1980 and revised standards were adopted in May 1996. A revised Directive 96/29/Euratom was adopted in May 1996, for implementation in Member States by May 2000.

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

- Megabecquerel (MBq) equals 1 million transformations per second
- Gigabecquerel (GBq) equals 1 billion transformations per second
- Terabecquerel (TBq) equals 1000 billion transformations per second.

Best Practicable Environmental Option (BPEO): A concept developed by the Royal Commission on Environmental Pollution, it implies that decisions on waste management have been based on an assessment of alternative options evaluated on the basis of factors such as the occupational and environmental 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.

Blue Flag: Is an exclusive eco-label standard awarded annually to beaches and marinas in Europe which symbolises high environmental standards as well as sanitary and safety facilities. Foundation for Environmental Education in Europe (FEEE) owns and operates the Blue Flag campaign. The FEEE Secretariat is the Tidy Britain Group in the UK.

Calder Hall: A Magnox nuclear power station on the Sellafield site providing process steam and electrical power.

Cm2919: “*Review of Radioactive Waste Management Policy, Final Conclusions*”. A Government White Paper published in 1995.

Community Food Intervention Levels (CFILs): Laid down in Euratom Council Regulation 3954/87 as being maximum permitted levels of radioactive contamination of foodstuffs and feeding stuffs following a nuclear accident or any other case of radiological emergency.

COGEMA: Compagnie Generale des Matiere Nucleaires (French nuclear fuel reprocessing company).

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.

Collective dose: The product of radiation dose to an individual multiplied by the number of individuals exposed.

Collective Effective Dose: The quantity obtained by multiplying the average effective dose by the number of people exposed to a given radiation source. Often abbreviated to collective dose. Unit man sievert, symbol man Sv.

DETR: Department of the Environment, Transport and the Regions.

Discharge: The release of gaseous or liquid wastes to the environment.

Disposal: Defined in RSA93 as, in relation to waste, "including its removal, deposit, destruction, discharge (whether into water or into the air or into a sewer drain or otherwise or burial whether underground or otherwise)".

In the context of solid waste, "disposal" would cover 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** rather than disposal. The definition of disposal covers the release of aerial (gases, mists and dusts) or liquid wastes to the environment (i.e. emissions and discharges).

Dose: A measure of the radiation received. Various forms of dose are commonly referred to, including equivalent dose, effective dose and absorbed dose (measured in Sieverts and Grays).

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 compares with an average radiation dose to members of the UK population of 2.2 mSv/y from background radiation and an average of 0.3 mSv/y from medical applications.

EARP: Enhanced Actinide Removal Plant.

EPA 90: Environmental Protection Act 1990.

Equivalent dose: The quantity obtained by multiplying the absorbed dose by a factor to allow for the different effectiveness of different types of ionising radiation in causing harm to tissue. Unit sievert, symbol Sv.

Euratom: 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.

Dounreay: A United Kingdom Atomic Energy Authority site on the north coast of Scotland which once operated 3 fast reactors which are in the process of decommissioning.

Fauna: The animals of a particular region, habitat or geological period.

Flora: The plants of a particular region, habitat or geological period.

Food Standards Agency (FSA): An Agency set up in April 2000 whose aim is to protect public health in relation to food and to protect the wider food-related interests of consumers. The FSA is accountable to the Secretary of State for Health. The FSA takes over the work of the Joint Food Safety and Standards Group of the Department of Health and the Ministry of Agriculture, Fisheries and Food.

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.

HSE: Health and Safety Executive.

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.

International Atomic Energy Agency (IAEA): The United Nations Agency whose principle 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.

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

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 to offset the radiation detriment it causes.

Krypton-85 (Kr-85): A radioactive form of krypton (half-life of 11 years) that is produced during the irradiation of fuel in a nuclear reactor.

Linear Energy Transfers (LET): The quantity of energy imparted to matter by ionising radiation per unit distance travelled by that radiation. High LET radiation types include alpha radiation and low LET radiation types include beta and gamma radiation.

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

MAFF: Ministry of Agriculture, Fisheries and Food.

Magnox: A magnesium/aluminium alloy that is used in the manufacture of the canister for uranium metal fuel that is used in a certain type of nuclear reactor.

Magnox fuel: Uranium metal fuel contained in a Magnox canister.

Magnox reactor: A nuclear reactor that uses Magnox fuel.

Magnox reprocessing: The processing of spent uranium fuel from the Magnox nuclear power stations to provide uranium which can be used to manufacture new fuel for nuclear power stations.

National Discharge Strategy: "UK Strategy for Radioactive Discharges 2001 - 2020". A Government consultation document on a draft strategy on how the Government and the devolved administrations will implement the OSPAR strategy for radioactive substances.

NRPB: National Radiological Protection Board.

NI: Nuclear Installations Inspectorate (part of the Health & Safety Executive).

OSPAR Convention: The 1992 Convention for the Protection of the Marine Environment of the North East Atlantic, by which 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.

PWR: Pressurised Water Reactor - The most recent type of reactor to be constructed in the UK is at Sizewell B. It is a water-cooled and moderated reactor which uses, as fuel, slightly enriched uranium dioxide clad in Zircaloy

Quarterly notification level (QNL): Quarterly discharge or disposal levels that the Environment Agency specifies in an operator's authorisation. The operator must inform the Environment Agency if these are exceeded.

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

Radionuclide: General term for an unstable element that emits ionising radiation.

RSA 60: Radioactive Substances Act 1960.

RSA 93: Radioactive Substances Act 1993.

Safety Case: A safety case is a set of documents providing a comprehensive written demonstration that risks have been reduced to a level which is as low as reasonably practicable

SETP: Segregated Effluent Treatment Plant.

Selected Licence Procedure: The Agency has developed preliminary proposals for extended consultations on selected licence applications that raise matters of significant public concern.

SEPA: The Scottish Environment Protection Agency.

Sintra Agreement: An agreement made at a Ministerial meeting of the OSPAR Commission in Sintra, Portugal, on 22-23 July 1998.

SIXEP: Site Ion Exchange Plant.

Statutory Guidance: "*Statutory Guidance on the Regulation of Radioactive Discharges into the Environment from Nuclear Licensed sites*". A Government consultation document (in preparation) which sets out the objectives Ministers consider appropriate for the Agency to pursue in the context of granting authorisations for the discharge of radioactivity under RSA93.

Technetium-99 (Tc-99): A radioactive element (half-life of 2.1×10^5 years) that is produced during the irradiation of fuel in a nuclear reactor.

Terabecquerel (TBq): See Becquerel

Thermal Oxide Reprocessing Plant (THORP): A plant where oxide fuel from AGRs and PWRs is reprocessed. It has been operated since 1995 by BNFL at Sellafield in Cumbria.

Tidy Britain Group: Is an independent national charity which aims to improve the quality of local environments. It runs campaigns and programmes aimed at ridding towns, countryside and beaches of litter.

WRA 91: Water Resources Act 1991.

Appendix - List of Consultees

Statutory Consultees

Food Standards Agency (FSA, formerly MAFF)
Health and Safety Executive (HSE)
Cumbria County Council
Copeland Borough Council
Allerdale Borough Council
Barrow-in-Furness Borough Council
Carlisle City Council
Eden District Council
South Lakeland District Council
Lancashire County Council
Northern & Yorkshire NHS Executive
United Utilities (NWW)
English Nature

Other Interested Organisations Invited to Comment

Drigg and Carleton Parish Council
Gosforth Parish Council
Ponsonby Parish Council
Seascale Parish Council
St Bridgets Beckermets Parish Council
St Johns Beckermets Parish Council
North Cumbria Health Authority
Morecambe Bay Health Authority
West Cumbria Community Health Council
Whitehaven and District Trades Council
Cumbrians Opposed to a Radioactive Environment (CORE)
Friends of the Earth (FoE)
Greenpeace
Association of Nuclear Free Local Authorities
National Farmers Union (HQ) (NFU)
NFU North West Region
Country Landowners Association
Food and Drink Federation
Lake District National Park
British Ports Association
Associated Port Health Authorities
Association of Sea Fisheries Committees of England and Wales
Cumbria Sea Fisheries Committee
National Federation of Fishermen's Organisations
North Western and North Wales Sea Fisheries Committees
Sea Fish Industry Authority
Shellfish Association of Great Britain
UK Major Ports Group
Government of the Isle of Man
Government of the Irish Republic
Scottish Executive
Northern Ireland Government
National Assembly of Wales (NAW)
CEC
Scottish Environment Protection Agency (SEPA)
Department of Trade and Industry (DTi)
Department of the Environment, Transport and the Regions,
Radioactive Materials Transport Division (DETR, RMT)
Committee on Medical Aspects of Radiation in the Environment (COMARE)
Radioactive Waste Management Advisory Committee (RWMAC)
National Radiological Protection Board (NRPB)
Regional Environment Protection Advisory Committee (REPAC)

Area Environment Group (AEG)

Sellafield Shop Stewards Committee have now been added to this list

Other Local Authorities provided with the Scope & Methodology Document

1. England

Lancaster City Council
Wyre District Council
Blackpool District Council
Fylde District Council
Preston District Council
South Ribble District Council
West Lancashire District Council
Sefton District Council
Liverpool City Council
Wirral District Council
Cheshire County Council
Halton District Council
Vale Royal District Council
Ellesmere Port and Neston District Council

2. Wales

Camathenshire County Council
Ceredigion County Council
Pembrokeshire County Council
Flintshire County Council
Denbighshire County Council
Conwy County Borough Council
Isle of Anglesey County Council
Gwynedd County Council

3. Scotland

Dumfries and Galloway Council

4. Northern Ireland

Ards Borough Council
Belfast City Council
Carrickfergus Borough Council
Coleraine Borough Council
Down District Council
Larne District Council
Limavady District Council
Moyle District Council
Derry City Council
Newry and Mourne District Council
North Down Borough Council
Newton Abbey District Council

