Radioactive Substances Act 1993

Decision Document

Future regulation of disposals of radioactive waste on/from the Low-Level Waste Repository at Drigg, Cumbria operated by British Nuclear Group Sellafield Ltd.

February 2006

Executive Summary

The Environment Agency has responsibility for regulating radioactive waste disposals by means of authorisations issued under the Radioactive Substances Act 1993 (RSA93). We periodically review authorisations for the disposal of radioactive wastes from nuclear sites, to ensure that:

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

Whenever we review a nuclear site authorisation, the same basic steps are followed:

- A "Process and Considerations " document is issued which describes our approach to the review. ***The Process and Considerations document for the Low level Waste Repository (LLWR) Review was issued in November 2004***.
- We carry out the review and issue an Explanatory Document setting out any proposed changes, along with a draft authorisation certificate. ***The Explanatory Document for the LLWR Review was published in June 2005***
- We carry out a public consultation whereby we consult widely on the Explanatory Document and ask for comments from the public as well as interested organisations. ***The consultation period for the LLWR Review ran from 15 June to 7 September 2005***.
- Once all the consultation responses have been considered, we issue a Decision Document setting out our decisions. ***This document is the Decision Document for the LLWR Review***.
- The Decision Document is sent to the Secretary of State for Environment, Food and Rural Affairs and the Secretary of State for Health, for them to consider whether they wish to exercise their statutory powers in relation to our decisions. ***This document has been sent to the Secretaries of State***.
- Subject to intervention by the Secretaries of State, we will issue a new Certificate of Authorisation to BNGSL for the LLWR at Drigg, Cumbria.

We have reviewed all four of the current RSA93 authorisations for waste disposals at the LLWR at Drigg, Cumbria. Since 1 April 2005, the LLWR has been owned by the Nuclear Decommissioning Authority (NDA), and is currently operated by British Nuclear Group Sellafield Ltd (BNGSL) to whom the authorisations are issued. Our review has considered all the conditions and disposal limits in the authorisations and identified changes where appropriate. We also considered BNGSL current practices and future plans for the disposal of radioactive wastes to assess whether they represent the best practicable environmental option (BPEO) and whether BNGSL are using the best practicable means (BPM) to minimise disposals, and the radiological impacts from those disposals.

In our Explanatory Document, we proposed a number of changes to the authorisation and regulation of radioactive waste disposals on/from the LLWR. We sought views on our proposals during the public consultation. We considered all the responses to the consultation and have taken them into account when making decisions on our proposals. This Decision Document summarises the responses and explains our decisions.

We have decided to replace the four current authorisations with a single authorisation which we are satisfied will provide significant regulatory and potential environmental benefits, including a more transparent approach to the regulation of the LLWR. The new authorisation will also strengthen the Best Practicable Means conditions to both minimise the waste generated on the site, and ensure that the radiological impacts – both now and in the future – will be As Low As Reasonably Achievable (ALARA).

Disposal of solid radioactive waste is the primary authorised activity at the LLWR and, due to the potential impacts from coastal erosion, it is the single issue that generated the most comments from respondents to our consultation. In our Explanatory Document, we proposed retaining existing solid disposal limits until such time as BNGSL has provided additional information for us to determine the radiological capacity of the site. However, some respondents were critical of this approach and recommended that we either suspended disposals until further risk management had been undertaken or changed the status of the site from disposal to long-term storage. As a result of the comments received, we have now decided the following regulatory approach:

i) We will authorise continued disposal of LLW to the current Vault 8 area using existing annual solid waste disposal limits;

ii) We will not authorise LLW disposals to the proposed Vault 9, until it has received appropriate planning permission from Cumbria County Council and BNGSL has provided us with adequate information to allow the radiological capacity of the site to be determined. We will undertake a full review on the radiological capacity of the site and publish our findings;

iii) When Vault 8 reaches capacity (during 2008) and prior to Vault 9 being authorised, any LLW waste consigned to the LLWR shall be for the purpose of temporary storage and, by agreement with the HSE, shall be regulated under BNGSL's Nuclear Site Licence arrangements; and,

iv) We will not allow BNGSL to construct the final cap over the existing Vault 8 and trench disposals until BNGSL has provided us with the outcome of a wide-ranging risk management study that demonstrates that future impacts will be As Low As Reasonably Achievable (ALARA), required in 2 years.

By deferring our decision on the radiological capacity of the site and through our commitment to a future review of the authorisation, we will also be able to have regard to the outcome of the UK Government's and Devolved Administrations' review of LLW Management policy, the finalised NDA Strategy and the Committee on Radioactive Waste Management's (CoRWM's) recommendations to Government.

We consider that BNGSL's estimates of radiation doses and risks from historical disposals to members of the public in the future significantly exceed current regulatory targets, and that these impacts could be realised in a relatively short timescale (~500 years) if coastal erosion were to occur. While it would be unreasonable to expect historical practices to fully comply with present day guidance and modern standards, there may be ways of optimising the performance of the site by either minimising the impacts from certain scenarios and/or reducing the likelihood of those risks occurring. We will require BNGSL to investigate them.

The new integrated certificate of authorisation includes a number of requirements placed on BNGSL to make improvements and supply further information. In particular, we are requiring BNGSL to improve the evaluation of risk management options in the Post Closure Safety Case (PCSC) and to provide more information to support a view on the radiological capacity of the LLWR. This information should enable us to determine the remaining radiological capacity of the LLWR and, to assess whether the current LLW disposal limits will continue to be valid for the future regulation of operations on the site.

The certificate of authorisation accompanying this document will also, when implemented, place regulatory controls on BNGSL regarding:

- Discharges of gaseous radioactive waste to atmosphere;
- Discharges of aqueous radioactive waste via a pipeline to the Irish Sea;
- Transfers of certain low-level-wastes (LLW) for treatment at Sellafield, and subsequent return to the LLWR for disposal; and,
- Transfers of Plutonium Contaminated Material (PCM) to Sellafield for treatment and storage pending a final disposal route.

We consider our decisions will not:

- place a grossly disproportionate additional burden on BNGSL staff resources in meeting the improvement/information requirements in the new integrated authorisation; or
- require grossly disproportionate expenditure for additional monitoring and managerial control of disposals.

The volume of LLW that will be produced in the UK during nuclear power plant decommissioning is likely to far exceed the capacity of the LLWR. There is an urgent need, therefore, to identify the most appropriate national strategy for the future management of the UK's LLW, including the consideration of the possible need for one or more alternative disposal sites. We will continue to work with Government, the NDA, the waste producers, local authorities and other stakeholders to address this issue, and we are actively contributing to the current Government-initiated review of LLW management policy.

Contents

1. Introduction

Site History

1.1 The national low-level radioactive waste repository (LLWR) is located near the village of Drigg, West Cumbria in the North West of England, and is six miles south of the Sellafield site. Radioactive waste disposal began in 1959 when the LLWR was under the management of the United Kingdom Atomic Energy Authority (UKAEA). The UKAEA continued to manage waste disposal at the site until the Radioactive Substances Act 1960 (RSA60)[1] authorisation was transferred to BNFL, upon its formation, in 1971. British Nuclear Group Sellafield Ltd (BNGSL)[2] currently manages and operates the site. The LLWR occupies about 100 hectares, and waste disposal operations take place in the northern 40 hectares of the site subject to a planning consent granted in 1957.

1.2 During the early period of operations, waste was disposed of by tipping and burial in shallow, clay-lined trenches similar to the practice used by the landfill industry. In the period to 1995, approximately 800,000 m^3 of waste was disposed in seven trenches. These trenches are now covered by an interim earth cap, which incorporates a plastic membrane to minimise water ingress.

1.3 Between 1959 and 1964, Plutonium Contaminated Material (PCM) was transported to the LLWR for storage in ten former World War II munitions magazines on the site, to the west of the low-level waste disposal area. The waste arose from the UK's early weapons programme and, at the time, all the items were considered to contain plutonium in recoverable quantities. The storage was a temporary arrangement, pending the development of a process for the recovery of the plutonium. Since the early 1980's, BNFL has been retrieving and repackaging the PCM for transfer to Sellafield for treatment and long-term storage. The transfer is authorised by the Environment Agency under the Radioactive Substances Act 1993 (RSA93). In accordance with a condition linked to the planning permission for a PCM drum store at Sellafield, BNGSL aims to have all PCM removed from the LLWR by the end of 2006.

1.4 In response to recommendations made by the House of Commons Environment Committee in its 1986 report on radioactive waste,[3] BNFL initiated a major change to disposal operations that included containerisation of the waste followed by its emplacement in an engineered concrete vault. Waste disposals in the vault commenced in 1988. Most of the waste in the vault is packaged in freight containers that conform to International Standards Organisation (ISO) standards. The vault that is currently being filled (vault 8) has a capacity of approximately 200,000 m^3, and is projected to be full by mid-2008. BNGSL plans to build additional vaults to accept further waste subject to planning permission being received from Cumbria County Council.

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1 As superseded by the Radioactive Substances Act 1993 (RSA93).

2 On 1 April 2005, ownership of the LLWR was transferred from British Nuclear Fuels plc (BNFL) to the Nuclear Decommissioning Authority, under the provisions of the Energy Act 2004. Since 1 April 2005, management and operation of the site has been contracted out by the NDA to British Nuclear Group Sellafield Ltd (BNGSL), to whom all the regulatory permissions are currently issued. In this document we have attempted to use BNGSL wherever possible, although in some cases it is more appropriate to refer back to actions by BNFL.

3 *Radioactive Waste.* First Report from the (House of Commons) Environment Committee, Session 1985-86. House of Commons Paper HC191, London, 28 January 1986.

1.5 In 1988, BNFL intended that, where practicable, waste would be compacted, encapsulated in cement grout in mild steel containers and placed in an engineered concrete vault at the north end of the site. However, the waste compactor (based at Sellafield) did not become operational until 1995. In the intervening period, BNFL built up a 'backlog' of over one thousand consignments of waste requiring compaction. Since 1995, under the provisions of a generic Inter-Site Transfer Authorisation, BNFL has transferred this 'backlog' waste to Sellafield for compaction, prior to return back to the LLWR for grouting and final disposal in the engineered vault. The current BNGSL programme is for all backlog waste to be processed by the end of 2006.

1.6 The main activity on the LLWR is low-level, solid radioactive waste disposal. Contaminated leachate from the historical disposals is discharged via a marine pipeline to the Irish Sea, in accordance with conditions and limits associated with the extant solid waste disposal authorisation. The extant authorisation was issued by Her Majesty's Inspectorate of Pollution & the Ministry of Agriculture Fisheries and Food (HMIP & MAFF, the then Authorising Departments[4]) in 1988, based on an impact assessment undertaken by the National Radiological Protection Board (NRPB[5]) for BNFL.

1.7 In November 2001 the Government announced the formation of a new body having responsibility for the discharge of public sector civil nuclear liabilities, including those of BNGSL and of UKAEA. The body known as the Nuclear Decommissioning Authority (NDA), became operational on 1st April 2005 and took ownership of a number of sites including the LLWR. The NDA will provide the driving force and incentives for systematically and progressively reducing the hazard posed by legacy facilities and wastes. It has a specific remit to develop an overall UK strategy for decommissioning and clean-up. BNGSL currently operates the LLWR under contract to the NDA.

Site Regulation

1.8 The Environment Agency regulates the disposal of radioactive waste to water, air and land and the transfer of radioactive wastes from the LLWR, and other nuclear licensed sites in England and Wales, under RSA93. (Throughout this document for convenience the term 'discharge' is often used when referring to the disposal of waste to air or water.) We are the leading public organisation for protecting and enhancing the environment in England and Wales. We regulate industry and inspect industrial sites to protect the environment and people from pollution and environmental risks to health. We work to encourage effective environmental management by industry and other sectors.

1.9 The Health & Safety Executive (HSE), through the Nuclear Installations Inspectorate (NII), regulates nuclear safety, including the safe management, conditioning and storage of radioactive waste on nuclear licensed sites. The NII also has regulatory responsibility for the minimisation of the risk of accidents. The Office for Civil Nuclear Security (OCNS) deals with security issues on civil nuclear licensed sites.

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[4] The Environment Agency was created on 1st April 1996 by the Environment Act 1995, and brought together the regulatory roles of HMIP, the National Rivers Authority and the Waste Regulatory Authorities. MAFF (and subsequently the Food Standards Agency) became a statutory consultee in the regulatory process.

[5] Since April 2005, NRPB has become part of the Health Protection Agency.

1.10 In 1999, we commenced a review of the authorisations, but were unable to determine the potential impact of the site from existing and future (predicted) disposals, as BNFL had not yet updated the NRPB's impact assessment. Therefore, we varied the authorisation in January 2000 to require BNFL to provide information about the environmental safety of the LLWR during its operational lifetime [Operational Environmental Safety Case (OESC)] and after its final closure [Post Closure Safety Case (PCSC)]. These safety cases were submitted by BNFL in September 2002 (BNFL 2002a & 2002b). We have carried out a detailed assessment of the safety cases (Environment Agency 2005b) and this has informed our decision-making on the future regulation of the LLWR.

1.11 In November 2004, we published a Process and Considerations document (Environment Agency 2004) that described plans for review of the authorisations granted applicable to the LLWR under the Radioactive Substances Acts of 1960 and 1993. Included in those plans was the publication of an Explanatory Document to explain the issues that we have considered in the review and to describe proposals for the future regulation of the LLWR.

1.12 Our Explanatory Document (Environment Agency 2005a) gives details of our assessments and our proposals arising from the review of the authorisations. Significant changes to the existing authorisations were identified including a new single integrated certificate of authorisation for the LLWR. The document can be viewed on our website at www.environment-agency.gov.uk/yourenv/consultations.

1.13 We consulted widely on our proposals, with members of the public, national and local bodies and other interested groups and organisations (see Appendix 2). We also consulted the FSA and the HSE as statutory consultees under section 16 of RSA93. The public consultation period ran from 15 June 2005 to 7 September 2005. The consultation process was advertised in the local media and we issued a press release. We also held two 'open days' in the Drigg Village Hall and Whitehaven Civic Centre on 13 and 14 July 2005, which attracted over eighty people.

1.14 We received 30 written responses to the consultation from a variety of consultees. This Decision Document describes the responses and explains the decisions we have made after carefully considering the issues raised by the respondents together with other considerations. The new certificate of authorisation for the LLWR is included in Appendix 1.

2. Scope, Objectives and Background to the Review

Scope of the Review

2.1 Our review has considered:

- the four authorisations granted to BNGSL for the LLWR under the Radioactive Substances Act 1960 and 1993;
- other factors relevant to the site including authorisations, consents and licences issued under other relevant legislation;
- past operations, discharges, transfers and disposals of waste made from/on LLWR;
- BNGSL's future plans for operations, waste disposals/discharges to 2012 and beyond; and
- future plans to improve BNGSL's operations with respect to environmental performance.

In addition to the above considerations, the review has taken account of statutory requirements on the Environment Agency and Government policy (including draft policy), guidance and commitments.

Objectives of the Review

2.2 Our general approach to regulation is outcome focussed, risk-based, clearly communicated and delivered in a consistent manner with the overall objective of improving and protecting the environment. We aim to achieve this by applying five principles of modern regulation in our work, by being:

Transparent - by having rules and processes which are clear to those in business and local communities;
Accountable - by explaining ourselves and our performance;
Consistent - by applying the same approach within and between sectors and over time;
Proportionate - (or risk-based) by allocating resources according to the risks involved and the scale of outcomes which can be achieved;
Targeted - (or outcome-focused) by having environmental outcomes central to our planning and in assessing our performance.

2.3 Our specific objectives in carrying out this review were:

- to assess whether the Best Practicable Environmental Option (BPEO) is currently being used for the disposal of wastes that are created as a consequence of operations at the LLWR *(see Appendix 5 of the Explanatory Document for further details of BPEO requirements);*
- to strengthen the requirements of the authorisations, particularly with respect to the use of the Best Practicable Means (BPM) for minimising the activity and volume of radioactive waste generated on the site that will require disposal; *(see Appendix 5 of the Explanatory Document for further details of BPM requirements);*
- to review the existing limits to ensure that they remain appropriate, and to change the limits where appropriate;

- to ensure that any headroom between actual discharges and proposed limits (where limits are considered necessary) is the minimum required for operations to continue;
- to confirm that the current standard of operational environmental safety is acceptable and to enable an assessment of the post closure safety of the site to be carried out[6]; and
- to identify those areas of environmental safety, if any, where further work and/or research is needed in relation to the operational and post closure safety of the site.

Background to the Review

2.4 We currently regulate the disposal of radioactive wastes from the LLWR under four authorisations covering gaseous, aqueous and solid wastes. We have examined the following authorisations in the current review:

- On-site LLW disposal (effective 1 February 1988) issued by HMIP and MAFF;
  - varied by HMIP & MAFF effective date 1 January 1991; and
  - varied by the Environment Agency effective date 14 February 2000 (Ref BG7690)
  - varied by the Environment Agency effective date 1 January 2004 (Ref BV9390);

- Gaseous discharge to atmosphere (effective 1 April 1971), issued by the Department of the Environment, in so far as it applies to gaseous discharges from the LLWR;

- Disposal of relevant waste (PCM) to Sellafield (Certificate Ref HMIP/02/AA8435, effective 1 July 1995), issued by HMIP & MAFF; and

- Disposal of relevant waste (Backlog LLW) to Sellafield (effective 1 April 1971), issued by the Department of the Environment, in so far as it applies to transfers of LLW to Sellafield.

There have been previous reviews and variations to the RSA93 authorisations for BNGSL to support operational requirements; the list above includes extant authorisations and/or variation notices issued.

[6] By having required BNGSL to produce an Operational Environmental Safety Case (OESC) and a Post Closure Safety Case (PCSC) for the LLWR.

3. Consultation Responses and Our Comments

3.1 This section summarises the responses received to the public consultation and includes our comments in reply. We thank those individuals and organisations that responded to the consultation during the open days at Drigg Parish Hall and Whitehaven Civic Centre and via written response. Around 30 respondents commented via letter/email on the Explanatory Document and raised a number of substantial issues associated with the LLWR. In some instances we have quoted text directly from the responses but in other instances we have removed text for the purpose of brevity, whilst still retaining the key element of the issue(s).

Potential Impacts from Coastal Erosion and Climate Change

3.2 A number of respondents expressed views on the issues of climate change and coastal erosion, and their potential impact on the LLWR.

Consultees' Responses

Cumbria County Council
"Clearly the most important issue in your review of the LLW site at Drigg has been the issue of *climate change*. It appears obvious that you consider the site may be destroyed within 500 years and this calls into question its suitability as a disposal site. One difficulty is that this concern may well apply to licensing of other coastal nuclear facilities, including Sellafield. Despite the clear IPCC forecasts (though subject to wide bounds) there does not appear to be any agreed national basis for what level of sea level rise to assume, and of course coastal processes on which current forecasts are based will change as sea level changes. The national waste management policy reviews need to establish a consensus approach for the application of climate change forecasts on future licensing by the Agency."

English Nature
"We support the suggestion that BNGSL should review monitoring of the position of the coast and the rate of erosion – although we recognise that this may not lead to significant improvements to determine whether or when the site would be destroyed by coastal erosion. We suggest that this review should be carried out in liaison with work being undertaken on the Coastal Cell 11 Regional Monitoring Strategy aimed at better understanding coastal processes now and future"

Nuclear Decommissioning Authority
"We are concerned by British Nuclear Group Sellafield Ltd's post closure assessment, which predicts that destruction of the repository by coastal erosion is possible in 500 to 5000 years from now (although more recent analysis shows lower erosion rates) and the possibility that long lived low level waste in the facility might be creating undue burdens on the future generations. We welcome, therefore, the Agency's proposals to require the site operator to review the Post Closure Safety Case in light of the Agency's comments, international good practice and appropriate further research."

All Ireland Nuclear Free Local Authority Forum
"We are concerned about future impacts on the Irish Sea and we are very concerned by the prediction that erosion of the Cumbrian Coastline could reach Drigg within 500 years. As you know, since publication of your consultation paper there have been many new reports of increasing rates of thawing in Polar regions that, together with thermal expansion, will contribute to faster sea level rise and accelerating coastal erosion. Drigg could be breached in a much shorter timescale than 500 years."

British Nuclear Group Sellafield Ltd
"The Agency has placed emphasis on the earliest timeframe "in as little as 500 years". This was a lower estimate (within a range) based on the "1998 Shoreline Survey" presented in the 2002 PCSC submission …… and this has been updated by a further analysis referred to in the document "Position Paper on Coastal Erosion at Drigg" …… The latter, whilst recognising that there has been some erosion over the last 40 years, concludes that it is significantly less than the earlier work suggested."

Drigg & Carleton Parish Council
"….there remains a constant concern about the effects of coastal erosion on the stability of the Repository."

Greenpeace
"Clearly, from the EA's Assessment, the Drigg waste facility is untenable because of its location near to the sea. Drigg's days as a LLW disposal site are therefore numbered and it should be closed to further LLW disposals. BNGSL should not be granted an unlimited Authorisation. Any Authorisation should be time-limited, and should require BNGSL to establish plans for the orderly closure of the facility as a disposal site as soon as possible."

"EA's findings have implications beyond that of the Drigg site. Many of the UK nuclear facilities are situated on beaches or close to the sea. For example, most of the Sellafield site is less than 100m from the sea and is only a few metres above mean sea level. The possibility exists that the Sellafield site could be under the sea in less than 100 years, and the NDA and Government will need to plan for this possibility."

Health Protection Agency - Radiological Protection Division
"We agree with the concern of EA regarding the potential impact of coastal erosion at the site and support their approach of requiring BNGSL to undertake more studies in this area. Unfortunately the impact of erosion is not highlighted until Appendix 2, ie page 75 - *'BNGSL indicates that site destruction by coastal erosion is likely. We agree that destruction of the repository by coastal erosion is likely'*. The assessment of BNGSL that the repository could be destroyed by coastal erosion in 500 years time is a cause for concern. EA rightly say that engineering solutions are unlikely to be effective for this length of time and other options should be considered. The removal of wastes, longer site control, a thicker cap and the disposal of only short-lived waste are listed. It is not clear how the obvious problems associated with erosion of the site are to be considered in the wider context, i.e. that a major change has happened to the UK coastline and this will have other far reaching impacts."

Individuals
"More research is needed into the effects of climate change/global warming on the progressive erosion of the local coastline."

"It is unacceptable to allow radioactive wastes to erode into the sea. The Environment Agency would not accept a proposal to develop a new landfill for non-radioactive wastes where it would be likely to erode into the sea. In addition if waste is disposed in the new vaults proposed at Drigg it could have similar environmental impacts to a new landfill, because low-level radioactive wastes also contain non-radioactive contaminants, including heavy metals. The Environment Agency has stated that the proposed new vaults at Drigg are 'new developments' (page i of Environment Agency Position Paper 25, 2001). The Environment Agency should be consistent when considering proposals for new developments for the disposal of either radioactive or non-radioactive wastes. The Environment Agency should not, therefore, allow disposal of wastes to the new vaults at Drigg. Allowing the disposal of radioactive wastes at Drigg under a new Authorisation where they are likely to erode into the sea would be inconsistent with paragraph 6.8 of the IAEA safety requirement for near-surface disposal of radioactive waste. It would also be inconsistent with paragraph 22.5(c) of the Rio Declaration."

Jackson Consulting (UK) Ltd
"Probably the most important aspect of the review of Drigg has been the issue of climate change. Overall we are very pleased that the Environment Agency has taken a leadership position and critically examined the potential effects of climate change on Drigg, which might lead to destruction of the Drigg repository within 500 years. This has important implications for repository siting proposals by CoRWM and for existing coastal nuclear installations in the UK, as well as the question of where to site a new generation of nuclear power stations."

NHS Primary Care Trust
"One area of concern we do not consider to be fully explored with respect to long term risk is the effects of climate change. The evidence is that climate change is already affecting sea levels and weather patterns with respect to more turbulent less predictable weather and we would like to see analyses taking into account worst case scenarios. We believe that this is particularly important as the risk to human health will remain significant if containment is breached for the foreseeable future."

Nuclear Free Local Authority
"We note with concern the assessment that the Drigg site could be destroyed within 500 years (and possibly much sooner if climate change accelerates) and agree with CCC (*Cumbria County Council*) that "…this calls into question its suitability as a disposal site." We are also mindful of the very serious implications of your assessment for the long-term integrity of the 'neighbouring' Sellafield complex."

Our Comments

3.3 We note the strength of feeling expressed by respondents in relation to coastal erosion and climate change, and agree that it a key issue which drives the predicted future risks associated with the LLWR. We also recognise that the issue may be relevant to other coastal nuclear sites.

3.4 As we stated in the Explanatory Document, based on current knowledge, the integrity of the LLWR cannot be assured over the long-term (i.e. for more than 500 years) against the potential effect of coastal erosion assuming that at some point in the future institutional control will be removed. Therefore, we have proposed in the Explanatory Document that BNGSL should be required to carry out a thorough examination of a range of realistic risk management options that may improve the long-term safety of the LLWR.

3.5 With the Maritime Local Authorities, we are responsible for flood protection, and together we take an integrated and long-term view of managing our coastlines through Shoreline Management Plans. These plans, in line with Government policy, consider the implication of coastal processes and climate change. Policy options from these plans recommend whether we should keep the same line of defence or retreat the line. The more detailed coastal strategies are then developed, taking into account economic, social and environmental matters. Copeland Borough Council is the relevant Maritime Local Authority with responsibility for the coastline adjacent to the LLWR.

3.6 The safety of UK nuclear installations such as the LLWR is regulated by the Nuclear Installations Inspectorate (NII), which is part of the Health and Safety Executive (HSE). The safety of a nuclear plant is the responsibility of the licensee, who is required to submit to the NII a written demonstration of safety, the 'safety case'. NII requires that operators' safety cases address a range of internal and external hazards, including flooding. NII assesses the operators' safety cases to establish whether they are adequate.

3.7 Together with the NII, Copeland Borough Council, NDA (as site owner) and the site operator we will ensure that the Shoreline Management Plan does not compromise the potential long-term impacts from waste disposals on the LLWR site. This will be achieved through consultation on the development of the Plan.

3.8 In our review of the BNGSL PCSR (Environment Agency 2005b), we noted that there is significant ongoing work in the area of climate change impacts, both nationally and internationally. We recommended BNGSL should keep abreast of developments in this area and update the safety case accordingly, and expect this to be addressed in its response to relevant information requirements in Schedule 9 of the Certificate (see Appendix 1).

3.9 One respondent commented that we "*...would not accept a proposal to develop a new landfill for non-radioactive wastes where it would be likely to erode into the sea*". This is not our position. For both non-radioactive waste and radioactive waste we would require an applicant wishing to develop a new facility to demonstrate that, should coastal erosion occur, any impacts resulting from exposure of historic wastes are low/acceptable. This could be the case if waste being disposed of were inert, or if it had a low hazard at the time of erosion. We would also emphasise that whatever the impacts, BNGSL must demonstrate that they are As Low As Reasonably Achievable (ALARA), and this applies to all disposals on the site, both past, present and future.

Radiological Impact of the LLWR – short term

3.10 A number of respondents commented on the present day impact from the disposals.

Copeland Borough Council
"We are pleased the review has concluded that the repository site is being managed in compliance with their regulatory controls and the impact from all the disposals on the LLWR site are and will be very low during the future operational phase"

Nuclear Decommissioning Authority
"We welcome the Agency's conclusion that all the time the repository site is being managed by the operator in compliance with the regulatory controls, the environmental Impact of waste disposals at the LLW Repository will be very low."

Nuclear Safety Advisory Committee
"It is recognised that as long as the repository site continues to be managed in compliance with regulatory controls the impact [from] all the disposals will be very low."

NHS Primary Care Trust
"In section 7 of the ED we have reviewed the dosages to the critical group from the various sources and are convinced that the dosages calculated offer an acceptable risk to the community, which is very low in comparison with the average annual dose, (less than 1%). We would concur that unless these discharges can be shown to be above this level further analysis is not required, but we would like to see evidence of more detailed assessment and managed strategies to reduce them if these levels exceeded 1% of mean annual dose. We recognise that the public is very risk adverse in the area of radio-active discharges and the question of public perceptions is not always directly linked to scientific evidence so that closer the discharges are to zero, the less the potential psychological effects on the general public and community."

Health Protection Agency - Radiological Protection Division
"The EA has used its own generic and cautious methodology to assess the impacts from discharges. The estimated doses from gaseous and liquid discharges are below 20 μSv y^{-1} and therefore do not require a detailed assessment.

"It is not clear what the estimates of collective dose at 500 years refer to: are they gaseous and liquid discharges only? Both EA and BNGSL estimate collective doses below 1 man Sv. Hence, the individual doses and collective doses to 500 years satisfy the IAEA criteria for trivial impact."

This (*para. 7.18 of ED*) refers to HPA radiation risk factors, uses them to predict an additional 1% risk of fatal cancer from all natural and manmade radiation on top of a lifetime risk of 20-25% from all causes, and concludes that the risk from radiation is small compared with smoking. HPA agrees with this if the lifetime exposure to all sources of radiation is referring to the annual average dose as published in the HPA-RPD Population exposure review."

"The EA has reviewed the BNGSL assessment, which estimates that doses above 0.3 mSv y^{-1} are possible between 2050 to 2100 if a borehole for water abstraction were located between the site and the coast. EA note that the scenario is unlikely but cannot be discounted and require BNGSL to demonstrate BPM. However, it seems

very odd to consider the site under management and control until 2150 while no controls are considered to prevent the drilling of a borehole and subsequent abstraction of water from a point between the LLWR and the coast during this time."

Our Comments

3.11 We welcome the acknowledgement that present day impacts are very low and will remain low all the time the repository site is being managed by the operator in compliance with the regulatory controls. We believe that that our proposals and the new Authorisation will strengthen existing controls to minimise any impact during the operational phase of the repository.

3.12 In response to the query raised by the Health Protection Agency, we can confirm that estimates of collective dose at 500 years are based on gaseous and liquid discharges only.

3.13 The Health Protection Agency also queried our requirement for BNGSL to demonstrate the use of BPM to minimise dose impact in the unlikely event of a borehole for water abstraction being sunk close to the site between 2050 and 2100 especially as the site is assumed to be under management control until 2150. Our emphasis is to require BNGSL to ensure that they minimise the release of activity from the disposals, so that if such a borehole were constructed, an unacceptable dose would not arise.

Radiological Impact of the LLWR – long term

3.14 A number of respondents expressed fairly strong views on the environmental safety case for the LLWR and the actions they considered that we should carry out to regulate the site.

Consultees' Responses

Copeland Borough Council
"Copeland's view is that any increased risk to the community would not be acceptable as indicated in the review documentation where during the Post Closure Phase some risk was estimated at 1E-06 y^{-1}. It is agreed that radiological safety should not exceed a risk target of 1E-06 y^{-1} during the any phase of the site's life."

British Nuclear Group Sellafield Ltd
"The Agency has also focused on the risk (highest with the trenches) of 10^{-4} should this coastal erosion event arise (again as presented within the 2002 PCSC submission) but then appears not to have taken into consideration our later work "Summary of recent optimisation studies for the Drigg low level radioactive waste disposal site". This work points to a risk factor of 10^{-5} for the trenches and 10^{-6} for the vaults. In addition it is suggested that work to date indicates that future disposals in later vaults based on assessments of arisings from UK Nirex Inventory provide the lowest risk and are likely to achieve the Agency's target of 10^{-6}."

Greenpeace
"It is highly questionable whether the EA could authorize continued use of a site knowing that without remedial action (e.g. putting all the waste in stores) that people could be exposed radiation doses of 30 milliSieverts (mSv) in the future – when the

legal maximum now is 1mSv per year. This would certainly breach CoRWM's criteria of not undertaking practices on waste disposal which place a greater burden on future generations than that experienced by the current generation – the generation which has created the waste."

"The BNFL Safety Cases are extraordinarily lengthy, and their inordinate detail and complexity made their review difficult. It is notable that a team of EA reviewers took nearly 3 years to do this (NB but only three months was granted for NGOs and others to comment on them). Of course, detailed scientific examination of the safety of industrial operations is to be welcomed, but the BNFL Safety Cases are so excessively voluminous that, as the EA points out, essential elements of BNFL's thinking were lost in the maze of reports. In addition, despite (or because of) their inordinate lengths, important matters were insufficiently addressed by BNFL in its Safety Cases which required the EA to seek additional information from BNFL after the safety cases had been sent to the EA in 2002."

"It is difficult to avoid the impression that the massive lengths and multiple layers of ever-deepening detail of the Safety Cases represent attempts at obfuscation. At the very least, they indicate an institutional inability or unwillingness to structure and write reports succinctly. Greenpeace understands that during the drafting of the BNFL Safety Cases, a dozen independent consultants were requested to peer review various drafts of the Post Closure Safety Case (PCSC) and the peer reviewers made repeated requests and recommendations to BNFL to clarify and simplify the structure and content of PCSC reports. …… It is understood these requests were largely ignored by BNFL; with only a few of the reviewers' recommendations implemented."

"In view of the extreme length of the BNFL Safety Cases, the EA's review is welcomed for penetrating their labyrinthine verbiage and critically assessing them in a relatively clear way. However some of the EA's "Key Conclusions and Recommendations" (see paragraphs 149 to 161 of the Assessment) are questioned and require further discussion."

Griffiths Consultancy Services

"It is wholly justified that the EA require BNGSL to address the findings from their review of the 2002 environmental safety case prior to the EA undertaking any future review of solid waste disposal limits at the Drigg repository. The issue of coastal erosion and the fact that estimates of dose and risk from existing disposals to members of the public in the future could significantly exceed current regulatory targets are of specific concern. The public needs to have confidence that the regulators are requiring action now to mitigate such concerns. An appropriate level of both regulatory and stakeholder involvement in an options appraisal to achieve improvement on the safety case for the site is to be encouraged."

Health Protection Agency - Radiological Protection Division

"One of the important conclusions of the report is that on page 45 para 8.3 – "*We have concluded that the 2002 safety cases fail to make a robust argument for continued disposal of LLW"*. Given this statement, it seems odd that the EA are proposing to continue allowing disposals at Drigg under the terms of the current authorisation. The reasoning as presented is complicated and unclear but appears to be essentially a holding position, pending further information. EA could have been

more forthright in saying what was or was not satisfactory. Their reasoning seems to be (eg, para 6.48) that additional disposals will not increase the post-closure risks significantly as these are dominated by wastes that were disposed of some time ago and work to manage these sources of risk can be investigated and instituted as requirements under the proposed authorisation. In looking at options for the reduction of long term risks it is made very clear by EA that they think engineering system improvements are unlikely to result in significant long-term improvements in performance (para 6.50). This appears only to leave the potential option of removing some of the long-lived waste disposed of at an early stage in the facilities lifetime. An opportunity has been missed to make the position clear."

"An important point is that the risk target can be exceeded but the operator then needs to demonstrate that risks are ALARA. HPA fully support this view. However, HPA do recommend a risk constraint of 10^{-5} y^{-1} to be used as an upper value."

"The BNGSL assessment gives risks above the EA risk target of 10^{-6} y^{-1} for several scenarios and the NRPB (now HPA-RPD) risk constraint of 10^{-5} y^{-1}, (corresponding to 0.3 mSv y^{-1}). Hence, it is difficult to support the safety case for continued disposal as it stands."

"The BNGSL safety case is thought to be sufficiently robust for disposal of short lived LLW. Although this is mentioned by the EA as one of the options that BNGSL should consider in their improvement of the safety case, the EA has not endorsed it"

"The review of past disposals raises the question of how often their impact should be subject to a BPEO assessment. The result of such an assessment may require the retrieval of waste and a regular review during the operational time of the repository or once the site is closed but is still under active surveillance, ie, up to 2150 is reasonable. However, at a later stage it becomes a more difficult issue as it strikes at the heart of the debate between storage and disposal. Frequent reviews would appear to be unreasonable but periodic reviews, eg, every 20 years would seem acceptable. Note that EA principle 1 is that the safety of the site should be independent of controls and that EA would not consider active control beyond a few hundred years."

"Intrusion doses are treated differently, as recommended by ICRP 82 and 81: potential doses above 10 mSv may require intervention to be considered and therefore efforts should be made to ensure that the potential impact of inadvertent intrusion is reduced. The estimated intrusion doses increase with time due to ingrowth, and exceed 10 mSv after 10000y. Trench 2 doses seem higher and therefore it would make sense to consider options in particular for Trench 2.

Individuals

"I think the EA really must call a halt to disposals of the radioactive waste at the Drigg LLWR until such time as BNFL has satisfied the concerns over the long-term safety of the repository. Given that the safety case does not make a sufficient argument for continued disposals, the EA should explain why it is proposing to let disposals to continue. If disposal are to be allowed to continue at all, the Agency should prohibit the disposal of long-lived wastes."

"One of the major problems that I had when reading the documentation was the amount of time Principle number 2 (Effects in the Future) don't [*seem*] to be taken seriously."

Our comments

3.15 We share the concern raised by many respondents that the radiological impacts from coastal erosion are both uncertain and potentially high. However, at this stage we have not made a decision as to whether the risks are unacceptable. Regardless of the level of risk, the important issue is for BNGSL to demonstrate that the impacts are As Low As Reasonably Achievable (ALARA) and, to date, this has not been demonstrated.

3.16 A number of respondents commented on the present-day public dose limit, and site-related and source-related dose constraints. The respondents noted that many future (post-closure) scenarios would lead to exceedence of the present-day limits and constraints. We wish to clarify that, for the period after withdrawal of control over the facility, conformity with a radiation protection standard cannot be demonstrated or enforced as it can be during the previous period. The standard is therefore expressed as a target in recognition of the more limited level of assurance of conformity that can be achieved. The release of radioactivity and its impact are determined by the contents of the facility, its engineering design and the characteristics of the site and its surroundings. The safety case for this period depends entirely on current assessments of the future performance of the disposal system, including its radiological impact. Because of the uncertainties inherent in such assessments, the protection standard is more appropriately expressed in terms of radiological risk rather than dose.

3.17 While we concluded that the 2002 environmental safety cases do not make a robust argument for continued disposals, we do not consider the LLWR to be unacceptable for current or future disposals. We consider that there is the potential for BNGSL to work with the information they have gathered and to implement a forward programme to produce an acceptable safety case and risk management strategy. Furthermore, we note an environmental safety case is a 'living' document which shall be reviewed and revised on a continuous basis to consider new or updated information particularly as the site moves from one phase to the next (for example from an operational phase to closure).

3.18 We note the comments and suggestions regarding potential options to reduce the future impacts, such as prohibiting disposal of long-lived waste or only allowing disposal of short-lived waste. We acknowledge these options may have benefits, and in our Explanatory Document we suggest other options that we consider should be evaluated. We believe it is important that BNGSL undertake a thorough evaluation of a wide range of realistic risk management options, and that it should ensure an appropriate level of regulatory and stakeholder involvement in its options appraisal. The Health Protection Agency also considers that we should have been clearer with our views on the disadvantages of engineering system improvements as a means of mitigating future risks. We disagree - at this stage it would be inappropriate for us to express an opinion on any single option, or to constrain BNGSL's optimisation studies.

3.19 We note the comment raised by the Health Protection Agency regarding the use of a 'risk constraint' of 10^{-5} yr^{-1}, and the comment by Copeland Borough Council that the 10^{-6} yr^{-1} target should be a limit that should not be exceeded. However, we consider that it would

be inappropriate to apply a risk limit or constraint to a waste disposal facility after closure and that only a risk target or benchmark is appropriate. We believe our position, as set out in our regulatory guidance (Environment Agency *et al* 1997) is in line with current Government policy in this area, which states:

> "The Government therefore confirms the preliminary conclusion of the review that it is inappropriate to rely on a specified risk limit or risk constraint as the criterion for determining the acceptability of a disposal facility, but that a risk target should be used as an objective in the design process and that this should by a risk of 10^{-6} yr^{-1} of developing a fatal cancer and serious hereditary defect." [Para. 78 of Cm 2919 (DETR 1995)]

3.20 We note the Health Protection Agency's comment regarding consideration of impacts arising from human intrusion (as recommended by ICRP). We agree that the highest calculated doses arising as a consequence of occupation of the site following large intrusions into the trenches fall within the range 10 to 100 mSv y^{-1}, where the ICRP indicates that intervention should be considered. As noted previously, we expect BNGSL to consider intervention in its risk management optioneering.

3.21 We can confirm that we have reviewed the additional information on optimisation provided by BNGSL (and referred to in its response above). However, BNGSL has not provided a sufficiently convincing argument that annual individual risks are likely to be lower than those calculated in the 2002 PCSC. Furthermore, BNGSL's limited consideration of alternative risk management options is inadequate to demonstrate that radiological impacts from the repository will be as low as reasonably achievable (ALARA), and neither did it ensure an appropriate level of regulatory and stakeholder involvement in its options appraisal.

3.22 We note the comments by respondents on the complexity of the BNGSL safety cases and welcome the support for our proposals to require BNGSL to improve the LLWR environmental safety cases before we review LLW disposal limits.

3.23 We note the comment that we did not allow consultees very long to comment on the BNFL Safety Cases. Our consultation was based on proposals as set out in our Explanatory Document, and we published our review of the BNFL Environmental Safety Cases to provide further, supporting information for interested parties. We also note that we placed the BNFL Environmental Safety Cases on our Public Registers in 2002, and at the time we wrote to a number of key stakeholders (including a number of NGOs) informing them of the documents and our review.

Radiological Capacity and Solid Waste Disposal Limits

3.24 The current uncertainty in the Explanatory Document regarding the radiological capacity of the LLWR was highlighted by a number of respondents. Some people supported our proposal to retain the existing solid disposal limits whereas others thought that disposals should be temporarily suspended until the radiological capacity has been properly determined. Others suggested that fast track review should be carried out to determine the radiological capacity of the LLWR:

Copeland Borough Council

"It is evident from reading the review and the concerns expressed by the EA, that BNGSL has not provided a confident determination of remaining radiological and volumetric capacity at the LLWR site. As a result of its strategic interest we support the proposal to continue authorisation of solid waste disposal at the existing limits and capacity. However, we ask the EA to require BNGSL to perform an urgent review of its future capacity methodology to mitigate the risk of over-subscription and inappropriate disposal planning."

Cumbria County Council

"The second most significant issue in your review relates to *radiological capacity*. The proposed authorisation (even after 10 years of work on the review) still leaves open the need for significant further work to accurately determine the radiological content of the closed vaults. Despite the consultation undertaken, it is illustrative of the current difficulties that the EA proposes to leave the existing limits on disposals as set at the time of the 1988 review. We note with concern that you are proposing a condition requiring the submission of an options study for reducing peak risks from disposed wastes (by 2009) and an updated environmental safety case by 2011. It is clear that you do not yet have comprehensive evidence of the nature and radiological significance of the historic inventory, but need such information to determine the amount of radioactive waste which can be safely disposed of without breaching radiation dose limits or risk targets. This very much calls into question the acceptability of a situation in which, despite 10 years work and substantial expenditure, you are proposing a new authorisation with no significant environmental improvement and the need for substantive further investigative work embedded in the proposed authorisation. Such assessment might well result in the need to develop a programme of selective remediation of the Drigg trenches, to remove inappropriate materials, before the inventory can be defined and thus the licenseability of the site determined. The Council recognises that the trenches tumble tipped in the 1970's and 80's significantly increase the risk profile of the LLW site at Drigg, and that remediation of "hot spots" may be needed if new disposals in the future vaults 9-15 are to be authorised or granted planning consent. We recognise that legally the EA cannot require new management programmes for previously properly authorised disposals. (The Dounreay shaft problem is a prime example of major remediation of a previously authorised disposal route.) It is the NDA that has the primary role in ensuring inadequate past practice is addressed, but the EA can, and in our view should, work with the NDA to drive forward to a fast track review timed to allow all the issues of the future role of the LLW site at Drigg to come together in a major Inquiry in 2008/9."

"The Agency needs to review its proposal to make a new disposal Authorisation now, given the remaining uncertainties. It can also be questioned whether allowing further "disposals" would breach the Agency's statutory duties to protect the environment, given the lack of key information about the site."

"We oppose authorisation of solid waste disposals using the existing limits (except within the consented area of vault 8 up to the originally planned height), until BNGSL has addressed the Environment Agency's concerns from the safety case

review. We support [but subject to our primary observation] further review of solid waste disposal limits, following receipt of key additional information from BNGSL related to risk management and minimising the future impact from the LLW disposals."

British Nuclear Group Sellafield Ltd
"BNGSL supports the pragmatic view taken by Environment Agency in respect of the retention of the existing annual Solid Waste Disposal Limits at this time, rather than move towards a site based radiological capacity limit until further work has been completed by BNGSL."

Committee on Medical Aspects of Radiation in the Environment (COMARE)
"It is a matter of some concern that the principal UK LLW disposal site has an uncertain remaining capacity. This is a strategic issue which may have wider national implications eg. prioritisation of future usage of the site."

Griffiths Consultancy Services
"Maintenance of the currently authorised limits for wastes deposited in a conditioned form in the repository is reasonable, despite the fact that there may be a greater demand for its utilisation as nuclear decommissioning progresses. Given the uncertainties arising from coastal erosion in the area and the potential for waste deposited on site during the early phase of site operation to be washed to the sea, it would be unreasonable at this time to consider any increase in limits for waste to be deposited at the site."

"It should be noted that small users would wish to see available capacity for wastes that may necessitate placement at Drigg preserved for the foreseeable future. This is especially relevant now that commercial sector partners are financing the construction of medical cyclotrons on hospital premises across the UK. These facilities are scheduled to operate for twenty years and then decommission. As part of contractual arrangements being drafted for such partnerships, the financial protection for decommissioning is being written into contracts and relies upon access to Drigg or its successor. Small users will increasingly rely on access to the Drigg repository or any future replacement facility, so it is important that neither regulatory pressures on the site, nor its transfer of ownership to the NDA, prevent future access

Health Protection Agency - Radiological Protection Division
"BNGSL have used their safety case calculations, together with estimates of the site capacity, to estimate disposal limits. These are the same as the current limits. The EA has a number of concerns over these capacity calculations. They also have concerns over the safety case, mainly in relation to the long-term impact. However, since they have no basis on which to change the limits, EA proposes to keep the same limits until BNGSL has addressed the concerns of the EA. At first sight, this appears to be an odd decision; however the accompanying text explains the reasoning behind it in some detail. HPA is concerned that there is no sense of urgency about the resolution of the important issues. A review of the disposal limits on receipt of additional information is sensible."

"The EA state that Drigg will not have the capacity to take all LLW from decommissioning and therefore a new site is needed. They are contributing to

government review of LLW policy. This is welcomed. HPA is also contributing, as a stakeholder."

"We agree with the EA consideration of the 5 principles in the Statutory Guidance on radioactive waste discharges in setting discharge limits for solid waste disposals as far as possible. This whole section (*A5*) discusses the options for limit setting but does not state what EA would actually use. They have not set any for solid waste disposals. The methodology for setting discharges is that used for Sellafield discharges and is the EA standard procedure. A5.19 discusses options for performance requirements: should the trench and vault be considered together or separately when determining capacity? The HPA view is that they should be considered together if the same people form the critical group."

Jackson Consulting (UK) Ltd

"The as-yet unknown radiological capacity of the Drigg site is particularly worrying and raises an important question over whether LLW disposals should be temporarily suspended until the radiological capacity has been properly determined. Indeed there is some risk that in continuing to allow disposals the Agency might be considered to be in breach of its statutory duties to protect the environment, particularly for future generations whose radiation doses might exceed the current dose limits. More generally we are worried that the Agency's regulatory approach appears to be overly focussed on mathematical modelling rather than on the practical environmental interventions necessary to reduce risks from the repository. The focus so far has been on the technical merits of the operator's safety case rather than on the practical regulatory decisions necessary to ensure the continued operation of the repository as a national asset. Modelling calculations can help to inform regulatory judgements but a more pragmatic regulatory analysis may be needed to deliver progress quickly, perhaps via an accelerated regulatory review. We recommend as a matter of urgency that the Agency completes a fast track review of past and future Drigg disposals to identify the radiological capacity of the site, decide what environmental interventions are needed as conditions of the new authorisation and set appropriate disposal limits on that basis."

Nuclear Free Local Authority

"We note with concern the assessment that the Drigg site could be destroyed within 500 years (and possibly much sooner if climate change accelerates) and agree with CCC that "…this calls into question its suitability as a disposal site." We agree with Jackson Consulting's recommendation (letter dated 20 July 2005) that "... Drigg is operated and regulated as a storage facility rather than a permanent disposal site." We have seen Jackson Consulting's correspondence (dated 22 July) with the NDA recommending that Drigg be redesignated a storage facility and note the NDA's reply (dated 9 August) saying, "…the NDA agrees with much of what you say." We are also mindful of the very serious implications of your assessment for the long-term integrity of the 'neighbouring' Sellafield complex. "We share the deep concern of both CCC and Jackson Consulting that the radiological capacity of Drigg has not yet been determined. We support CCC in its view that "…the EA can, and in our view should, work with the NDA to drive forward to a fast track review timed to allow all the issues of the future role of the LLW site at Drigg to come together in a major Inquiry in 2008/9." Such an Inquiry must be open and fully transparent."

"We agree with CCC and Jackson Consulting that it is questionable whether permitting further disposals (as opposed to storage) at Drigg would breach the Agency's statutory duties to protect the environment, given the lack of key information about the site."

Our Comments

3.25 We note the comments by respondents on a number of important issues related to the radiological capacity of the LLWR.

3.26 We note the comments of a number of respondents who considered that we should not continue to allow waste disposal at the LLWR. In particular, we highlight one response that quoted text from the Explanatory Document in which we said that the 2002 safety cases fail to make a robust argument for continued disposals of LLW. The LLWR as the UK national repository for LLW provides a disposal route for radioactive waste not only from the nuclear industry but also from other industries, academia and healthcare. To immediately revoke the authorisation for the LLWR and prohibit the disposal of LLW on the basis of inadequacies in the post closure safety case, would therefore have far reaching consequences. We would reiterate that the impacts from disposals on the LLWR site all the time it is actively managed are very low, and that the long-term safety of the site is dominated by past disposal to the trenches. The potential future impacts will be increased only marginally by allowing disposals to continue in the vaults over the next few years, and the new authorisation will require BNGSL to ensure that the impacts are ALARA. We therefore consider it would be inappropriate to prohibit continued disposals whilst BNGSL undertakes further work to address our concerns. However, we acknowledge that if BNGSL's additional studies and risk management activities do not address our concerns, then prohibition of disposals will be an option in the future.

3.27 Several respondents expressed the view that LLW disposals should be suspended until the radiological capacity of the LLWR has been properly determined. We note that the current disposal area at the LLWR (Vault 8) is nearing capacity, and we propose allowing disposals to Vault 8 to continue until it is full (expected mid-2008). The next disposal area (Vault 9) will be subject to permissioning by the local planning authority (Cumbria County Council). We have also decided not to permit disposals to Vault 9 until BNGSL has provided us with adequate information to allow the radiological capacity of the site to be determined, and we will undertake a full review of the radiological capacity of the site and publish our findings.

3.28 Therefore, due to delays in the availability of the next disposal areas on the LLWR (Vault 9), there will be a suspension of **disposals** on the site when vault 8 is full. BNGSL intends to ensure uninterrupted receipt of LLW on the site, and following discussions with ourselves, HSE, and both local and planning authorities, BNGSL has proposed a number of 'contingency arrangements' on the site which will involve the temporary **storage** of LLW.

3.29 Some respondents questioned whether we would breach our statutory duties to protect the environment by allowing waste disposals to continue given the lack of key information about the LLWR. We reiterate that all the time the LLWR is actively managed, the impacts are very low, and we consider that our statutory duties are not compromised by allowing further waste disposals at the LLWR.

3.30 We note the comments from the Health Protection Agency concerning solid waste disposal limit setting methodology and determination of radiological capacity of the LLWR. As the Health Protection Agency notes, we have said in the Explanatory Document how limits **could** be set, and it is correct in saying that we have not stated how the limits **would** be set. We deliberately took this action, as we need to decide on an endpoint to define the capacity, and until BNGSL has completed its risk management studies we are unable to agree what that endpoint should be. Our Explanatory Document also indicated that any methodology would need to consider policy and stakeholder issues. With regard to determining the radiological capacity of the LLWR, we agree with the respondent that the trenches and the vault should be used together in this determination.

3.31 Jackson Consulting (UK) Ltd expressed concern that our regulatory approach appeared to be overly focussed on mathematical modelling rather than on the practical environmental interventions necessary to reduce risks from the repository. We disagree with this comment and note that our approach is to require BNGSL to examine a number of practical management options for improving the long-term safety of the LLWR.[7] Furthermore, we expect an Operator to use the output of its radiological safety assessment to identify key risk drivers and inform any risk management option study.

3.32 Several respondents suggested that we should work with the NDA for a fast track review of past and future waste disposals at the LLWR to identify the radiological capacity of the site. They recommended that the review should be timed to allow all the issues of the future role of the LLWR at Drigg to come together in a major inquiry in 2008/9. Since publishing our Explanatory Document, we note the NDA has also consulted on its Draft Strategy (NDA 2005), in which it proposes to:

"- encourage the Government as part of its LLW policy review to look at the provision of new, more flexible LLW disposal capacity.
- compete the management and operation of the Drigg facility and the proposed LLW facility at Dounreay together in April 2006.
- consider whether there are better, more cost effective solutions for LLW other than the disposal facility at Drigg."

Following approval by the Secretary of State for Trade and Industry and Scottish Ministers, NDA will publish the Strategy in 2006.

3.33 Another respondent wanted assurance that capacity at the LLWR would be preserved for wastes from small users e.g. hospitals etc into the foreseeable future. Whilst we sympathise with the respondent, indeed we are actively managing a disposal programme for small users disused sources, this issue is really for Government and is an issue on which the Government will be consulting when it consults on its review of LLW

[7] We would also refer the respondent to our regulatory guidance which states:

"The Agency will need to be satisfied that **good engineering practice** has been used in developing proposals for design, construction and operation of a facility and that **good science** has been applied in investigating the suitability of the site, in supporting research and development work, in the interpretation of the resulting data and in the development of safety assessment methodologies." (Environment Agency *et al* 1997, para 9.1, emphasis added)

Management Policy in the near future.[8] It is also important that the NDA, as owner of the LLWR, is mindful of Small Users needs when finalising its future Strategy.

Retrieval of Historical Waste Disposals

3.34 A number of respondents thought that waste should be retrieved from the trenches whereas others remarked that waste retrieval should be implemented only after consideration of all factors involved.

Consultees' Responses

Allerdale Borough Council
"The Council supports the Environment Agency's proposals but would comment that all radioactive waste should be retrievable"

Cumbria County Council
"Such assessment might well result in the need to develop a programme of selective remediation of the Drigg trenches, to remove inappropriate materials, before the inventory can be defined and thus the licenseability of the site determined."

Individual
"The EA should make the removal of the 'high-risk' wastes in the trenches a requirement, and should establish a firm deadline for the completion of this essential work to protect the Irish Sea. The EA should not allow this deadline to slip in the way that the date for the removal of PCM from the LLWR site did."

Health Protection Agency - Radiological Protection Division
"EA position on the disposals states that it would be unreasonable to insist that historic disposals meet current standards but that BNGSL should investigate ways of optimising the performance of the site. This seems reasonable. The Dounreay shaft is another example of historic practices and here the waste is being retrieved, as it does not meet current standards. The EA may have difficulty with their position on Drigg. The important thing is optimisation of the overall impact, by considering all factors. Thus, removal of waste should not be ruled out but should not be implemented if it is not the optimum option"

Jackson Consulting (UK) Ltd
"Perhaps the most obvious solution for increasing the capacity of Drigg is to selectively retrieve and repackage some known historic disposals of uranium, radium and thorium wastes that were tumble-tipped into the Drigg trenches in the 1970s and 1980s. At present these specific disposals significantly increase the overall risk profile of the Drigg site by about a factor of 10. Selective remediation of some hot spots could be the best strategy to reduce risks and allow an increase in disposal capacity. We recognise the legal difficulty for the Environment Agency is that once wastes have been disposed no further regulatory control is possible under the Radioactive Substances Act 1993 (RSA93). Nevertheless although the Agency has no formal statutory powers to retrospectively apply new authorisation conditions on

[8] See http://www.peoplescienceandpolicy.com/llw/forum.html

past disposals to the trenches, the Agency should consider how far the NDA may be prepared to accept some retroactive conditions on past disposals (perhaps via the joint MoU) in order to secure an increased authorisation for extra disposal capacity at Drigg."

All Ireland Nuclear Free Local Authority Forum
"Any future emplacements at Drigg should be temporary and undertaken in such a manner as to enable waste removal and relocation to a new low level waste facility further in land and on ground that is not at risk of erosion."

Our Comments

3.35 We note the comments of the respondents and re-affirm our intention, as stated in the Explanatory Document, to require BNGSL to assess the option, along with others, of selective removal of long-lived wastes in the trenches that are assessed as contributing significantly to the long-term risk associated with the LLWR. Any option is likely to have both advantages and disadvantages, and we note that retrieval of waste could result in an increased worker dose. As we have stated previously, it is for BNGSL to undertake the assessment of options, and to present us with what it considers is the 'best' option, having had regard to a number of criteria, including: impacts on health and safety; impacts on the environment; socio-economic impacts; and, cost. We are allowing BNGSL two years to complete this assessment which should ensure that it is carried out thoroughly, and involve an appropriate level of stakeholder input. We will monitor BNGSL's progress throughout the work and, if we consider the work could be completed earlier, we will encourage BNGSL to do so.

3.36 We note the comment from Jackson Consulting (UK) Ltd that once waste is disposed we have no further control. We disagree with this statement and note that, whilst the options for managing past disposals may be limited, we do not consider the disposal is complete until the disposal system is complete (i.e. all post-closure engineering (capping, etc.) has been completed). This is clearly stated in our regulatory guidance, which states:

> "disposals will not be regarded as complete until all the requirements of the safety case have been met, including sealing and closure of the facility" (Environment Agency et al, 1997, para 7.15)

The LLWR as a Storage Facility

3.37 A number of respondents suggested that the LLWR should change from a disposal facility to a LLW storage facility.

Consultees' Responses

Cumbria County Council
"Future waste consignments to the LLW site at Drigg (other than those envisaged to complete vault 8 to its presently authorised physical capacity) should be regarded as being placed in temporary storage. (It is recognised that this would raise issues of locus for the EA in licensing such emplacements, so this needs to be considered in the national policy reviews.)"

All Ireland Nuclear Free Local Authority Forum
"We are aware that you have received proposals in response to the consultation that the status of Drigg be changed from a repository to a storage facility. We would strongly support these proposals."

Greenpeace
"An important condition is that BNGSL should not be granted a further Authorisation for its Drigg operations under present operations and changes must be made to move it to being a storage site. All operations must meet – at the very least - the EA's criteria and targets as set out in its Guidance on Requirements for Authorisation (GRA). In particular, estimated doses and risks to critical groups from current operations and post closure must meet the EA's required limits: at present they do not."

"Drigg's days as a LLW site are clearly numbered, and it is merely a matter of time before Drigg is closed to further LLW disposals. Because of this it is recommended that:

- any future authorisation for use of the site to manage low-level waste must be changed to storage only. The Agency should instruct BNGSL to establish and implement plans for this change of use;
- the waste stored there should be packaged using the most up to date methods and facilities built on the site to contain the waste; and
- an essential condition of future use of the site is that BNGSL (or any successor operator) must demonstrate it will meet the EA's criteria and targets as set out in its Guidance on Requirements for Authorisation (GRA) on radiation exposures and risk targets."

Health Protection Agency - Radiological Protection Division
"The safety case shows two major problems: the impact from the past trench disposals (not the vaults) will exceed the current regulatory targets; the prediction that the repository could be destroyed by coastal erosion at any time from 500-5000 years from now. Obviously further information is required and HPA supports the EA requirement for BNGSL to continue to look at options and demonstrate ALARA. However, EA do not seem to have considered the fact that continued long term storage of waste in the vaults is perfectly acceptable. Currently, disposal in vault 8 is reversible as the ISO containers are not concreted in: this will happen when the vault is closed, essentially changing it from a storage to a disposal facility. The EA could vary the authorisation to require a review before the vault is closed."

Jackson Consulting (UK) Ltd
"The problem of how to reduce future radiation doses from Drigg whilst at the same time increasing its disposal capacity might be partially resolved by reclassifying Drigg as a long term interim storage facility rather than a permanent disposal site. The solution is possible because the Drigg repository can be regarded as two sites in one. Old Drigg consists of a series of 7 disposal trenches operated between 1959 and 1995. Radioactive wastes were simply tumble-tipped into the trenches and permanently covered-over with no intention to retrieve the buried wastes. New Drigg is rather different and has many of the characteristics of a waste storage facility rather than a disposal site. The NDA's current strategy is to cap and then permanently withdraw control (i.e. effectively to abandon) the repository by 2150. We doubt

whether these plans are credible and recommend that Drigg is operated and regulated as a storage facility rather than a permanent disposal site. The storage capacity could be safely increased allowing Drigg to act as a centralised LLW store for the NDA's national clean-up programme. We recommend that Defra's LLW Policy Review considers the need for extending the Environment Agency's powers to cover waste storage as well as disposal. Meanwhile for the avoidance of doubt we recommend that the Environment Agency should seek an advisory Counsel Opinion from the Treasury Solicitor on the lawfulness of the Agency's proposed RSA93 disposal authorisation for Drigg, in the light of Drigg's current apparent mode of operation as a long term storage facility."

Nuclear Free Local Authority

"We agree with Jackson Consulting's recommendation (letter dated 20 July 2005) that "Drigg is operated and regulated as a storage facility rather than a permanent disposal site." We have seen Jackson Consulting's correspondence (dated 22 July) with the NDA recommending that Drigg be redesignated a storage facility and note the NDA's reply (dated 9 August) saying, "….the NDA agrees with much of what you say." "

Our Comments

3.38 We note respondents' comments that the LLWR should be operated in future as a storage facility. The definition of 'disposal' as set out in section 47(1) of RSA 93 is very broad. In relation to (radioactive) waste it includes its removal, deposit, destruction, discharge (whether into water, air or into a sewer or drain or otherwise) or burial (whether underground or otherwise). Our considered opinion is that containerised waste in a vault falls within the definition as a deposit and, therefore, legally should be regulated as a disposal. Furthermore, as there is no current intention for the containerised waste ever to be removed from the vault (the plan is to cap it), we do not consider that it is being stored rather than disposed of when 'storage' itself implies a finite period.

3.39 As noted earlier, the current disposal area at the LLWR (Vault 8) is nearing capacity (expected to be full during 2008), and the next disposal area (Vault 9) will not be available until 2008/9 at the earliest (subject to permissioning by the local planning authority (Cumbria County Council). As a result, any waste consigned to the LLWR during this intervening period shall be for the purpose of temporary storage and, by agreement with the HSE, shall be regulated under BNGSL's Nuclear Site Licence arrangements.

3.40 Since issuing our Explanatory Document in June 2005, we also note that BNGSL has changed its future operating strategy for the site. Previously, it had planned to construct an interim cap over the vaults, and then to construct the final cap over the disposal area around 2100. However, BNGSL now intends to progressively construct the final cap over the whole disposal area as future vaults are filled, and this would commence around 2014. We note that earlier capping may foreclose potential risk management options (e.g. any form of waste retrieval) and, as recommended by the Health Protection Agency, we shall require BNGSL to review this decision prior to final capping being implemented.

New Integrated Authorisation

3.41 All respondents supported the proposal to replace the four extant authorisations for the LLWR with a single integrated authorisation regulating the disposal of solid, gaseous and aqueous radioactive wastes.

Consultees' Responses

Copeland Borough Council
"We support the EA with the concept of replacing the existing four Authorisations with a single 'Integrated Authorisation' which regulates waste disposals to all pathways i.e. air, water and land. Including the introduction that requires BNGSL to have a management system, organisational structure and resources sufficient to achieve compliance with the limitations and conditions of the authorisation."

Cumbria County Council
"We welcome a single integrated authorisation, which regulates waste disposals to air, water and land but would not require provision of an Integrated Waste Strategy through the authorisation."

"This very much calls into question the acceptability of a situation in which, despite 10 years work and substantial expenditure, you are proposing a new authorisation with no significant environmental improvement and the need for substantive further investigative work embedded in the proposed authorisation."

Griffiths Consultancy Services
"A single integrated authorisation is to be welcomed as a step in the right direction to achieve holistic consideration of the regulation of the site as a whole, rather than the potentially fragmented approach of continuing to issue a number of separate authorisations."

Health Protection Agency - Radiological Protection Division
"The proposal for the EA to issue one authorisation to cover both discharges, (to air and water) and solid waste disposals (to land) from the Drigg LLWR is welcomed as is the intention to ensure that any non-radiological properties of the waste are addressed in a way that complies with Landfill Regulations. In addition, we agree with the conclusion of the EA that the radiological impact of the site will be very low whilst the site is being managed. However, this aspect is not reflected in the relative levels of attention devoted to the very low impact of discharges from the site during operation as opposed to longer-term radiological impact issues. Thus, while generally supportive of the EA proposal to have a single authorisation for the site it is hoped that this will not result in a disproportionate allocation of effort to the operational phase."

NHS Primary Care Trust
"We support an integrated approach to authorisation, it is consistent with the approach taken in other environmental legislation."

Our Comments

3.42 We note that all respondents were in favour of a single integrated certificate of authorisation for the LLWR. One respondent remarked that we should devote an appropriate level of attention to the long-term impact of the site but this should not be at expense of maintaining a focus on the impact of operational discharges. We wish to assure all consultees that our regulatory duties are focussed on the routine operation of the LLWR and BNGSL's compliance with its authorisation, whilst acknowledging that actions taken today can impact on the long term impacts from the site. We review the authorisations periodically to ensure that the conditions and requirements remain relevant, and to have regard to up-to-date information.

3.43 We note the Health Protection Agency's concern that a multi-media certificate may result in disproportionate allocation of effort during the operational phase. The Schedule 1 requirements are common to all operators and it is for the Operator to ensure that their arrangements are appropriate. It is our opinion that the balance of Information Requirements in Schedule 9 of the certificate is proportionate, and we note that present-day operations can influence future impacts. As noted in our Explanatory Document (Environment Agency 2005a) we periodically review authorisations, and we shall ensure the balance of regulation remains appropriate for the LLWR site, as it moves forward through the various phases of operation, closure, post-closure monitoring, etc.

3.44 We disagree with the comment that the new authorisation has "*no significant environmental improvement*". We consider that the new multi-media authorisation is consistent with our aims of modern regulation and, more importantly, will require BNGSL to specifically address a number of our concerns on legally binding timescales.

Authorisation Conditions

3.45 A number of respondents commented on the new Schedule 1 conditions proposed in the integrated authorisation.

Consultees' Responses

Copeland Borough Council
"We welcome the introduction of the proposed condition that require BNGSL to undertake a comprehensive assessment of BEPO for all environmental pathways i.e. liquid, gaseous and solid wastes as this should provide a more detailed appraisal of the benefits and detriments of alternative waste disposal options. …… Additionally, we support the requirement for BNGSL to use BPM to minimise the activity of radioactive waste for disposal under the authorisation. In order to minimise the activity of gaseous and aqueous waste disposals to the environment and to minimise the volume of wastes disposed of by transfer to other premises. BPM should also be used to dispose of radioactive waste at periods, in a waste-form and in a manner so as to minimise the radiological effects of the local environment and members of the local community."

Cumbria County Council
"We welcome a new condition that requires the site contractor to have a management system, organisational structure and resources sufficient to achieve compliance with

the limitations and conditions of the authorisation. We welcome revised conditions that require BPM to be used to minimise the activity of radioactive waste produced requiring disposal under the authorisation, to minimise the activity of gaseous and aqueous waste disposals to the environment and to minimise the volume of wastes disposed of by transfer to other premises."

Griffiths Consultancy Services
"The new authorisation condition requiring BNGSL to have a management system, organisational structure and resources sufficient to achieve compliance with the limitations and conditions of the authorisation is to be welcomed."

Health Protection Agency - Radiological Protection Division
"The EA proposal to require BNGSL to have a management system and the resources required to achieve compliance with the conditions of the authorisation is sensible."

"EA propose to ask BNGSL to do a more detailed BPEO study of the waste streams generated at Drigg LLWR. We agree with this requirement and especially that BNGSL should consider options for leachate management more fully. It is important that the optimum option (the BPEO) is chosen from a wide range of options."

"We agree with the EA proposal to introduce BPM requirements to minimise waste arisings and activity in the wastes, since these are standard conditions for RSA93 authorisations on nuclear sites and we agree with the central principle that waste arisings should be minimised. However, it should be made clear in the main text that the proposed BPM requirements for minimising the radiological effects on humans and the environment are ALARA and will therefore not incur disproportionate costs. This point is made in Appendix 5. EA propose that there should be a minimisation of the wastes disposed of by transfer to other premises. Currently, secondary LLW is sent from Drigg LLWR to Sellafield for compaction before being returned to the Drigg LLWR. In addition some LLW is removed from Drigg LLWR to Sellafield for disposal. It should be made clear that both of these transfers are being allowed to continue (see also 6.26)."

Our Comments

3.46 We welcome the support for introduction of new conditions regarding the application of BPM and the requirement for a management system, organisational structure and resources that are sufficient to achieve compliance with the authorisation. We acknowledge the comment that, in the context of the use of BPM, it would have been helpful to refer in the main text of the Explanatory Document that radiation doses to the public should be As Low As Reasonably Achievable (ALARA). With regard to the transfer of LLW arising from current operations at the LLWR ('new LLW' and 'backlog LLW' stored on the site), we would confirm that our proposal in the Explanatory Document permits both types of LLW to be transferred to Sellafield.

3.47 We also welcome the support from the Health Protection Agency for our proposal to require BNGSL to review the Best Practicable Environmental Option (BPEO) for the waste streams generated on the LLWR, particularly that BNGSL should consider options for leachate management more fully.

Gaseous and Aqueous Discharges

3.48 There were mixed responses to our proposals to remove aqueous discharge limits and not to introduce gaseous discharge limits for the LLWR.

Consultees' Responses

Copeland Borough Council
"Although we support the concept of one single 'Integrated Authorisation' and the strengthened BPM condition in order to further minimise discharges, we are concerned that the removal of the limits associated with aqueous discharge may have a negative impact on the potential clean-up of the historic waste within the trenches."

Cumbria County Council
"We support the proposal not to introduce gaseous discharge limits for the LLWR, and to utilise the strengthened BPM condition in the proposed integrated authorisation to require BNGSL to minimise discharges. We support the proposal to remove the limits associated with aqueous discharges from the site, and to utilise the strengthened BPM condition in the proposed integrated authorisation to require BNGSL to minimise discharges."

Committee on Medical Aspects of Radiation in the Environment (COMARE)
"The Proposed removal of limits on aqueous discharges (Schedule 4) may therefore be premature, since the existence of a limit would ensure both downward pressure on discharges and accurate monitoring of the marine pipeline activity."

Cumbrians Opposed to a Radioactive Environment (CORE)
"Whilst we understand the difficulties in measuring (liquid and gaseous) discharges from disposed LLW, we believe the proposal not to set limits for the DGF and PCM operation facilities is not wholly satisfactory. Irrespective of the level of discharge from these facilities, the lack of any limit effectively leaves discharge control in the hands of the operator and not the regulator. This could set a dangerous precedent in any future regulation.

Health Protection Agency - Radiological Protection Division
"The continued reporting of gaseous discharges is a proportionate response which we endorse. We also agree that it is not necessary to introduce gaseous discharge limits. EA propose to remove the aqueous discharge limits and to rely on the BPM requirement to minimise discharges. We agree with this since discharges are low and BNGSL have little control over them (leachate from past disposals). However, discharges may rise in future when leachate control measures fail and it is not clear how this will be controlled."

Individual
"The EA says that the LLWR should be operated with the Best Practicable Means. The vaults should be covered with roofs during their operation in the same way as in other countries (eg Japan). This would help the EA STOP liquid discharge of liquid radioactive wastes from the LLWR. Radioactivity is currently leaking into groundwater from the LLWR."

Jackson Consulting (UK) Ltd

"The Environment Agency has proposed to deregulate some low risk aspects of the Drigg environmental licence which we broadly support; (a) the removal of limits on gaseous discharges released from solid wastes at Drigg in licence Schedule 3, ……. We have mixed views on the proposal to deregulate gaseous discharges which mainly arise from emanation of radon and thoron gases from past disposals of uranium, radium and thorium in the old Drigg trenches. On the one hand it would be difficult for the Drigg site operator to accurately monitor the radon discharges from the trenches, which are simply grassed over fields emanating radon gas directly to the local atmosphere rather than through a managed ventilation system. There is also the legal difficulty that the radon discharges arise from wastes that have already been disposed and hence are no longer subject to regulatory control under RSA93. On the other hand continuous emissions monitoring systems for landfill gases such as methane are already in common use at domestic landfill sites in the UK and it might be reasonably practicable to adapt these systems to monitor radon discharges from the old Drigg trenches. For example the Environment Agency has recently published guidance on monitoring landfill gas surface emissions including the use of flux boxes for measuring diffuse emissions such as radon. But probably the most important reason for continuing to place limits on gaseous radon discharges is that these discharges are likely to be the major source of radiation exposure of members of the public in the future - the Agency has estimated that these doses could range from 30 mSv per year to as high as 95 mSv per year in the far future after the repository has closed. For comparison the radiation dose limit today is 1mSv per year. The setting of discharge limits is a basic regulatory control measure and it is ethically difficult to justify deregulating them when the exposures of future generations of society from Drigg might breach present day radiation protection standards. Radon monitoring is not straightforward but on balance we feel that the gaseous discharge limits should be retained and a compliance monitoring system put in place."

Our Comments

3.49 We would emphasise that we are not 'deregulating' gaseous and aqueous discharges. Other conditions in the Authorisation will require BNGSL to continue to both minimise and monitor discharges. As stated in our Explanatory Document, we will also continue to require BNGSL to send us reports of its discharges on a periodic basis, and those reports will be placed on our public register and the annual discharges included in our Pollution Inventory[9].

3.50 Regarding the comment about monitoring of radon that is released from the trenches, we note that BNGSL already undertake gas sampling on the trench cap. We also note that the BPM requirement extends to all arrangements, including monitoring, and we expect BNGSL to have regard to gas sampling techniques adopted on conventional landfills where it may be helpful to inform and improve their own arrangements.

[9] The Pollution Inventory (PI) is an annual record of pollution in England and Wales from selected activities we regulate. The PI now includes six years of data from major industrial sites. The PI may be accessed via our website: http://www.environment-agency.gov.uk/pi

3.51 Another respondent suggested that the vaults should be covered with roofs during their operation. We acknowledge that other facilities in France and Spain are covered during the operational phase. As noted previously, it is for BNGSL to demonstrate that the design and operation of its disposal system is optimised, such that impacts are ALARA. We note that a roof would prevent rainwater contacting the disposal containers, but acknowledge that there may be other disadvantages such as visibility of the structure to local stakeholders, which we acknowledge could be of concern.

Discharge to the Drigg Stream

3.52 There was strong support for the proposal to revoke the current authorised discharge route to the Drigg Stream.

Consultees' Responses

Cumbria County Council
"We strongly support the proposal to remove the option that allows discharge of contaminated water via the Drigg Stream."

British Nuclear Group Sellafield Ltd
"The Agency is also proposing to remove the option to discharge contaminated water to the Drigg stream, currently allowed in emergency scenarios. Whilst the company supports the principle and the route hasn't been used for many years, we believe further discussions are needed to clarify all of the implications for the operation of the Low Level Waste Repository. We also note that the only route identified for aqueous discharge is via the marine pipeline (Schedule 4) and therefore seek clarification of the status of any discharges from the Drigg stream due to residual activity being present (currently an authorised disposal)."

Cumbrians Opposed to a Radioactive Environment (CORE)
"We also note the Agency's view that the radioactivity currently measurable in the Drigg Stream is residual activity arising from the historical discharges that ceased in 1991 - or should that be 1997, or perhaps even later? For clarification, the Agency should show how it has arrived at its conclusions on the residual activity and provide further information on the introduction of the non-tidal regime introduced in 1997. It would be helpful if the Agency were to show how in physical terms, the discharge route to the Drigg Stream can effectively be made 'no longer available'. If this cannot be done, then the retention of a limit would appear to be appropriate."

Health Protection Agency - Radiological Protection Division
"We agree with the EA proposal to remove the authorisation for disposals to Drigg stream, which has not been used since 1997."

"Doses from discharges of leachate to the Drigg stream (prior to 1997) are also below 20 μSv y^{-1} (BNGSL estimate). However, the water framework directive is currently being implemented in the UK and EA and SEPA have proposed screening levels for compliance with this directive that the Drigg stream is at risk of exceeding. Hence, EA propose to prohibit future discharges to Drigg stream. We agree with this proposal."

Jackson Consulting (UK) Ltd

"The Environment Agency has proposed to deregulate some low risk aspects of the Drigg environmental licence which we broadly support; ……. (b) the removal of the Drigg stream as an authorised disposal route for liquid discharges in licence Schedule 4. The proposal to deregulate the Drigg stream is sensible because past use of the stream has been highly controversial."

Our Comments

3.53 We welcome the support for our proposal to prohibit future discharges of leachate from the trench disposal area via the Drigg Stream.

3.54 One respondent requested clarification of when the latest discharge was made. We can confirm that the latest discharge to the Drigg Stream was made in 1997. However, due to unusually heavy rainfall on 11th October 2005, the discharge pumps at the marine holding tanks were unable to handle the volume of water and, as a consequence, the flow was automatically directed into the Drigg Stream for about 20 minutes. In these situations, we can confirm that only surface run-off water from the vault disposal area is diverted, and that leachate from the trench area continues to be discharged via the pipeline. As the surface run-off water should be free of any radioactive contamination[10], we will continue to authorise surface water from vault 8 being discharged to the Drigg Stream in extreme rainfall conditions, and subject to the Marine Holding Tanks and the discharge pumps being at capacity.

3.55 In its response, CORE asked how we arrived at our conclusion on the residual activity in the Drigg Stream. We can confirm that BNGSL samples the Drigg Stream on a daily basis as part of the current authorisation requirements, and they have done so since 1991. The measured activity has always been low, and trending of the data illustrates that there has been a gradual reduction in activity since discharges via the pipeline commenced. Furthermore, we undertake periodic sampling of the Drigg Stream to independently validate BNGSL's results.

3.56 CORE also requested further information on the introduction of the non-tidal discharge regime introduced in 1997. Discharges via the marine pipeline were originally made in accordance with certain 'tidal windows'. However, in 1997, BNGSL and the Environment Agency undertook a number of dispersion trials that demonstrated there was no benefit from the tidal discharge regime, hence the requirement was removed.

3.57 We can confirm that monitoring for radioactivity in the Drigg Stream will continue as part of the Statutory Environmental Monitoring Programme, both now and after any new BNGSL arrangements are implemented.

Environmental Monitoring

3.58 Many respondents supported our proposals for BNGSL to undertake a comprehensive review of monitoring requirements on and off the LLWR and to implement any changes.

[10] The vault area is not designated a Controlled (Contamination) Area, under the Ionising Radiations Regulations 1999. That is to say the ISO's that are disposed in the Vault are sealed and certified free from external contamination prior to emplacement.

Additionally, two specific concerns were raised related to the environmental monitoring programme.

Consultees' Responses

Cumbria County Council
"We **welcome** a requirement on the site contractor to undertake a comprehensive review of monitoring requirements on (and off) the site, and to implement any changes in an appropriate timescale."

English Nature
"We agree that appropriate monitoring and comprehensive assessment of the impact of its radioactive discharges and disposals on ecosystems and wildlife species, including Natura 2000 sites and Sites of Special Scientific Interest in West Cumbria, should include the impacts via the groundwater pathway. We understand that this has not been considered by the Sellafield assessments. We agree that environmental monitoring and an assessment of the contaminated groundwater leaking from the historical trench disposals and migrating under the Drigg Coast SAC should be undertaken."

Nuclear Decommissioning Authority
"We also welcome the Agency's proposals to improve the environmental monitoring undertaken by the site to confirm its integrity, to determine the extent of groundwater contamination and to asses the potential impact of the site on SSSI's in West Cumbria."

United Utilities
"…… I would draw your attention to one specific issue, which is the apparent absence of any reference to consideration of the possible impact of leachate migration upon utility infrastructure (particularly water mains and sewers). This exposure route is not referred to by BNFL in identifying 'Potentially Exposed Groups'. There are water mains and public and private sewerage facilities on the northern and eastern boundaries of the site. There is no evidence from UUNW's ongoing water quality sampling regime (including radiological monitoring), that any significant risk to water quality exists. However, the attached comments make two recommendations to further reduce uncertainty on this issue. It is recommended the risk of leachate entering the public or private sewerage systems in the vicinity of the site, and the exposure this might present to utility workers, be investigated. It is recommended that the risk arising from the possible existence of leachate leakage paths in the vicinity of the water mains network in the vicinity of the site be investigated. In neither case is there any evidence that such risks are significant. However, such investigations would further reduce uncertainty around the LLWR site's geosphere."

Drigg & Carleton Parish Council
"With regard to the Repository, and its environmental impact on the village, the concerns of the Parish Council [include] radiological contamination of the local water courses and beach. …….whether real or perceived attracts a considerable stigma to the Village and any efforts by yourselves to offset these concerns would be appreciated. Of particular value would be clear statements about the safety of the local water courses and the beach areas. If these reassurances cannot be made, in a

manner clearly understood by the general public, initiatives are required to improve or remove latent radioactivity in our local environs. The Village simply does not hear enough about the safety of our open spaces and beach."

Health Protection Agency - Radiological Protection Division
"EA criticise the monitoring approach of BNGSL and propose that they should review it and take action to improve it. HPA supports this position."

Individual
"The Society for Radiological Protection website currently reports a recent investigation of external gamma dose rates along the Cumbrian coast by McDonald et al. (2005) (Journal Radiological Protection, Volume 25, Issue 1, pp. 67-82) led to unexpected observations at Drigg Barn Scar, where cobalt-60 contained in sessile biota significantly contributed to the external gamma dose rate. The EA should take samples to determine if the radioactivity is moving into the Drigg Coast SSSI, and to see if radionuclides are building up in the soils near the coast, or in plants or animals."

Our Comments

3.59 We welcome the support by respondents to require BNGSL to review it's monitoring programme, both on and off the LLWR site.

3.60 We note the comments by United Utilities relating to the risk of leachate entering the public or private sewerage systems in the vicinity of the LLWR and the possible existence of leachate leakage paths in the vicinity of the watermains network in the vicinity of the site. We have proposed a requirement in the integrated authorisation (Appendix 1 – Schedule 9, Requirement 8) that BNGSL should establish and implement a monitoring programme to determine the extent of groundwater contamination on and off the LLWR site. We will ensure, via Requirement 8, that BNGSL investigates thoroughly the specific issues of leachate migration raised above.

3.61 We will also ensure that the issue of Co-60 detected in sessile biota off the Drigg Barn Scar is addressed, either through LLWR monitoring programme, or through the programme related to the discharge authorisation for the Sellafield site.

Information/Improvement Requirements

3.62 We received a number of useful comments from respondents on the proposed information/improvement requirements in the integrated authorisation.

Consultees' Responses

Cumbria County Council
"We support if required [subject to our primary observations … about fast tracking and temporary storage pending clarity on radiological capacity] the EA's introduction of a number of specific improvement conditions that ensure the site contractor will address the findings from your review of the 2002 environmental safety cases……"

"We **welcome** a requirement on the site contractor to undertake a comprehensive assessment of BPEO for liquid, gaseous and solid wastes that provides more detailed appraisal of the benefits and detriments of alternative waste disposal options.
We **welcome** a requirement on the site contractor to undertake a comprehensive review of national and international developments in best practice for minimising all waste disposals and the radiological impact from those disposals, together with a strategy for achieving reductions in impacts.
We **welcome** a requirement on the site contractor to undertake a comprehensive review of the means used to assess the activity of radionuclides in disposals and the environment and to determine compliance with this Authorisation, including consideration of national and international developments in best practice.
We **welcome** a requirement on the site contractor to establish and carry out a programme of research and development in support of the above requirements.
We **welcome** a requirement on the site contractor to ensure that all environmental systems and equipment that are required to be maintained/tested in compliance with the Authorisation are categorised, clearly labelled and are clearly identifiable within a written maintenance schedule.
We **welcome** a requirement on the site contractor to undertake a comprehensive assessment of the impact of its radioactive discharges and disposals on ecosystems and wildlife species.
We **welcome** a requirement on the site contractor to undertake a review that considers the nature, quantities and sources of foreseeable emissions of substances from the installation into each environmental medium, and a description of any foreseeable significant effects on the environment."

Health & Safety Executive – Nuclear Safety Directorate
"We welcome the schedule 9 requirements on Drigg improvement and in particular we would encourage the Agency to ensure that any review of options for reducing future risks from the Drigg site is unconstrained e.g. includes mitigation options and interventions to reduce risk from coastal erosion."

Griffiths Consultancy Services
"Consistency of approach is to be supported, as is the requirement for BNGSL to undertake a comprehensive BPEO assessment for its liquid, solid and gaseous waste streams."

"It is noted that the regulators are routinely requiring nuclear licensed sites to individually undertake comprehensive reviews of national and international developments in best practice for minimising all waste disposals and their radiological impact, and to undertake an extensive R&D programme. Given that the NDA has taken ownership of all twenty sites from April 2005, rather than impose conditions via an authorisation on each site, it would seem both sensible and cost effective for a single centre of excellence to be set up to undertake such reviews and take the lead in R&D across all nuclear industry requirements, hence achieving the greater level of consistency that the regulators themselves continue to aim to achieve. These are two of the proposed new authorisation conditions that personally I would oppose in favour of the alternative approach that has been suggested. It is my firm belief that the alternative approach will be both cost effective and will produce more productive outcomes in a shorter time period. The alternative approach may also

serve to encourage new enthusiastic recruits into the field, hence overcoming some of the current problems of recruitment and retention and further development of skills."

Health Protection Agency - Radiological Protection Division
"It is also surprising that there is no sense of urgency about the resolution of the important issues raised in the main text of the document. For example, no timescales for undertaking additional work are discussed in the main text. In Appendix 1 (Draft Certificate of Authorisation), timescales are given for the undertaking of various studies/production of reports, etc, but this should have been brought out in the main text."

"EA have asked BNGSL to provide information on management plans and discharges up to 2012 to provide a long term perspective. This is only 6 years from the date requested and can not therefore represent a long-term perspective. As EA will review the authorisation regularly, eg, every 5 years, it would be more natural to have a 10 year projection of the management plans and discharges from the site."

"We agree with the EA proposal to ask BNGSL to do a better BPM study on secondary wastes (to minimise radioactivity and volume). The radiological impact is, nevertheless, very small."

"EA propose to ask BNGSL to do a BPM study to ensure that the impact from past disposals is ALARA. The long-term implications of this are not made clear: is this to be a recurring requirement or only for as long as the site is operational? The BPM study involves assessing options to reduce the impact and should state that this is to ensure that the impact is ALARA and not just to reduce the impact whatever the cost."

"EA propose to ask BNGSL to address the findings of their review of the safety case. This is sensible."

"EA propose to ask BNGSL to do a more detailed BPEO study of the waste streams generated at Drigg LLWR. We agree with this requirement and especially that BNGSL should consider options for leachate management more fully. It is important that the optimum option (the BPEO) is chosen from a wide range of options."

Individuals
"The timescales for BNFL to respond to the information requirements proposed in Schedule 9 of the EA's report are far too long given the level of concern over the LLWR and the periods for items 2, 5 and 6 should be cut in half at least."

" I agree that BNFL's proposals to retain records for up to 37 years is insufficient and needs to be improved in line with the life of the LLWR."

Our Comments

3.63 With regard to the timescales for information requirements 2, 5 and 6, we set these on the basis of: what we considered to be reasonably achievable by BNGSL; to ensure that the reports contain an appropriate level of information; and, where appropriate, involve an adequate level of wider stakeholder input. However, following discussion with BNGSL

and recognising the importance of the risk management strategy, we have decided to shorten the timescale for information requirement 2 from three to two years. Furthermore, if BNGSL are able to deliver the requirements to a suitable standard and in a shorter timescale, we would obviously encourage them to do so. We acknowledge for future reviews of the authorisation we should discuss any proposed timescales for Schedule 9 requirements, in more detail. We consider that the timescale of 2012 in the Process and Considerations document for which BNFL were requested to provide projected discharge estimates etc., was appropriate and any information covering a longer timescale would inevitably be subject to more uncertainty and therefore of less use in the review.

3.64 One respondent made a general comment related to requirements 2 and 4 in Schedule 9 that refer to a review of national and international developments in best practice to minimise the impact of waste disposals on the LLWR and to carry out associated research. The respondent opposed these generic requirements which are common to all RSA 93 nuclear site authorisations and suggested that, as the NDA owns the majority of nuclear sites, a centre of excellence should be set up to undertake such reviews and take the lead in R&D across the nuclear industry. Whilst NDA will undoubtedly sponsor R&D in certain areas, we would note it is the responsibility of the Operator to demonstrate compliance with its authorisations. However, we have no objection to, and support, industry working together to develop and share best practice.

3.65 We welcome the support for our proposal to require a BPEO for the disposal of liquid, gaseous and solid waste arisings at the LLWR.

Inter-site Waste Transfers

3.66 All respondents who commented on the transfers of LLW and PCM from the LLWR to Sellafield agreed with our proposals to continue to authorise such transfer.

Consultees' Responses

Copeland Borough Council
"We fully support the decision to authorise the transfer of the remaining PCM waste currently stored at the LLWR back to Sellafield without any specific limits. In addition, we support the provision of a 'time-limit' on the schedule of the end of 2006, as this will help speed up the current transfer programme and reduce the potential risk of discharge to the environment."

Cumbria County Council
"We support the continued authorisation of LLW transfer back to Sellafield without specific limits. We support early transfer of remaining PCM waste back to Sellafield without specific limits, but to time-limit the schedule to the end of 2006. We welcome variation of the generic BNFL inter-site transfer authorisation to prevent its use for the transfer of radioactive wastes from the Repository, and instead, to authorise transfers to Sellafield through the proposed site specific authorisation."

British Nuclear Group Sellafield Ltd
"We question the benefit in the Agency imposing a time bound limit for the PCM transfers of 31st December 2006 (Schedule 7) recognising that we are working to achieve the target set by Copeland Borough Council in their planning consent. In our

view, it would appear to be more appropriate to not time bound the transfer but subject it to review in early 2007, at which point if all PCM has been removed then the Authorisation can be varied to close out this transfer option."

Griffiths Consultancy Services
"Given the current uncertainties surrounding the planning permissions for the Drigg repository beyond 2006, it would appear sensible to time limit the transfer of PCM waste back to Sellafield without specific limits in order to encourage accelerated retrieval and transfer within this timescale."

Health Protection Agency - Radiological Protection Division
"We agree that no limits should be introduced for LLW transfers to Sellafield for compaction but the authorisation should stipulate that the compacted waste is returned to the Drigg LLWR for disposal within a maximum time period. We agree with the proposed schedule for returning plutonium contaminated waste to Sellafield."

Jackson Consulting (UK) Ltd
"We broadly support the removal of limits on waste transfers between Drigg and Sellafield in licence Schedule 7. Similarly the proposal to deregulate LLW transfers between Drigg and Sellafield is pragmatic because the transfers are simply intended to achieve better waste treatment and compaction at Sellafield before the waste is returned to Drigg for final disposal."

Our Comments

3.67 We welcome the support by many respondents for our proposals regarding the transfer of LLW and PCM from the LLWR to Sellafield.

3.68 We have considered the Health Protection Agency's recommendation to specify a limit on the time LLW should be held for compaction at Sellafield before being returned to the LLWR. In accordance with Government Policy, both the HSE and ourselves encourage all Operators to dispose of radioactive waste promptly, where a disposal route exists. However, we do not consider there would be any environmental benefit in setting a specific time limit and suggest it would be an unnecessary burden on operators, as they would have to have arrangements to ensure compliance with any time limit.

3.69 We note BNGSL's suggestion not to time bound the transfer of PCM to Sellafield. However, we note the considerable support for our proposal from other respondents, and consider the December 2006 timescale is both a realistic and achievable challenge for BNGSL.

Integrated Waste Strategy

3.70 One respondent supported our proposal not to require BNGSL to provide an Integrated Waste Strategy (IWS) for the LLWR.

Consultees' Responses

Health Protection Agency - Radiological Protection Division
"It is agreed that there is no need to ask for an Integrated Waste Strategy (IWS) for Drigg LLWR as part of the authorisation as this is being addressed by the Nuclear Decommissioning Authority (NDA) and, in any event, Drigg LLWR produces very little 'new' waste."

Our Comments

3.71 We welcome the support from the Health Protection Agency regarding this proposal. We are working with industry and the NDA to provide guidance on IWS, and anticipate the LLWR will benefit from the waste generators IWS in the form of improved forecasts of LLW destined for disposal at the LLWR.

Use of the Waste Hierarchy and Minimisation

3.72 One respondent considered that more should be done to reduce waste arisings through improved monitoring and recycling of the waste disposed of at the LLWR.

Consultees' Responses

Individual
"More effort should be made to monitor the contents of all isofreight containers with a view to reducing the overall quantity of waste dumped at Drigg. Greater thought should be given to cleaning up and re-using/recycling waste instead of stuffing it into containers & sending it to Drigg."

Our Comments

3.73 We note the respondent's comments and agree that there is still opportunity to reduce the quantity of waste being disposed of at the LLWR. Along with HSE and the NDA, we will continue to encourage all waste generators to minimise their arisings and have regard to the waste management hierarchy of avoiding creation of wastes, minimising arisings and looking for opportunities to recycling and reuse (subject to appropriate control) prior to disposal.

3.74 With regard to waste monitoring, the responsibility for determining the contents of containers sent for disposal at the LLWR lies with the waste generator. That is to say, they need to have appropriate arrangements to ensure compliance with their own authorisations to transfer waste to the LLWR. However, to ensure compliance with its own authorisation for the LLWR, BNGSL also undertakes check monitoring of waste. The requirement for check monitoring will be formalised through an Environment Agency Specification, linked to the new authorisation when it is issued. Furthermore, we periodically seize waste for independent check monitoring at our Waste Quality Checking Laboratory on the Winfrith Nuclear Licensed Site in Dorset.

Waste Incineration

3.75 One respondent raised the issue of waste segregation, and incineration on the sites where the waste was produced or in commercial incinerators. The respondent was particularly

concerned about the future availability of commercial incinerators for dealing with waste from Small Users.

Consultees' Responses

Griffiths Consultancy Services

"I am aware that there are currently potentially combustible beta/gamma waste streams produced on nuclear sites at the lower end of the activity spectrum of LLW (typically made up of absorbent wipes, disposable coveralls and gloves) being deposited at Drigg that are utilising valuable capacity. There is no driver to segregate such wastes as the Drigg repository is convenient when faced with the potential for public opposition to use of alternative disposal options. For these waste streams, a BPEO assessment would realistically justify such wastes being disposed of by incineration, either at on-site plants or utilising more locally available capacity at commercial sector incinerators, with subsequent disposal of the secondary residues as VLLW to landfill. Small Users are concerned at the rate at which commercial sector clinical waste incinerators are choosing to seek revocation of their RSA93 authorisations because that aspect of their business is not profitable, leaving disposers to find a new route, often involving greater costs and transport over greater distances. I am aware of three clinical waste incinerators that have sought revocation of their authorisations in the past two years and at least two currently considering such action. Any re-authorisation of the Drigg site needs to consider those quantities of waste that are being deposited at the site that realistically should be disposed of by commercial incineration within authorisations already in existence, hence securing the viability of these RSA authorised commercial sector incinerators for the longer term protection of the routes currently available to small users."

Our Comments

3.76 We note this respondent's comments relating to the use of incineration for certain waste types as an alternative to disposal at the LLWR. We consider that it is important that producers of radioactive waste segregate and minimise the creation of waste and ensure compliance with their RSA 93 authorisations that require the use of BPM to minimise the activity of waste disposed of. We agree that it is important that when radioactive waste creation is unavoidable, appropriate disposal routes need to be available for small users, and note this is an issue being considered in the current LLW Management Policy review being undertaken by Defra.

Worker Dose

3.77 We received comments from one respondent in relation to the potential for increased radiation dose to the LLWR workforce as a consequence of our proposals.

Consultees' Responses

Nuclear Safety Advisory Committee

"Whilst the document recognises the need for a "trade-off" between environmental protection and worker dose, it, for example, implies support for the concept of recycling leachate into grout mix. Although this is worthy of detailed consideration it will, inevitably, increase worker dose and is therefore of interest to NuSAC. There

needs to be an acknowledgement that the implementation of some of EA's requirements for further consideration by BNGSL could result in wastes of higher specific activity (albeit of smaller volume) than current Drigg limits. This could also increase the risk of higher worker dose. The comments above suggest that EA considerations have been confined to the operation of the Drigg site only. There should be a recognition that changes to current practices at Drigg could affect overall radiological and environmental impacts when other sites (especially Sellafield) are taken into consideration."

Our Comments

3.78 We note the comments by the respondents relating to increased worker dose that may result from using recycled trench leachate in the waste cement grouting process on the site. We have proposed that BNGSL should be required to undertake a comprehensive assessment of BPEO for liquid, gaseous and solid wastes. We expect BNGSL to assess the potential option of recycling trench leachate. We would also expect the assessment of this particular option to consider a number of factors including worker dose and potential for exceeding LLW radioactivity limits. In the event that worker dose were shown to be significant then we would have to reconsider carefully with HSE whether this option should be pursued further. We note the point made by the respondent concerning the potential radiological and environmental impact on other sites of changes in the operation of the LLWR. We would assure the respondent that such impacts would be taken into account if significant changes to the operation of the LLWR were to be proposed in the future by the site operator.

Visual Impact, Noise and Light Pollution from the LLWR Site

3.79 A number of respondents were concerned about the visual impact of operations on the site, in particular the stacking of containers of waste in Vault 8. They also expressed concern about the effect of noise and lighting from the site impacting on the local community.

Consultees' Responses

Drigg & Carleton Parish Council
"With regard to the Repository, and its environmental impact on the village, the concerns of the Parish Council fall into …. distinct areas:

i) noise and pollution stemming from the site traffic, predominately HGVs, passing through the Village.
ii) Light pollution caused by on-site lighting.

Each item affects different parts of the village to different degrees but in total the combination have a high real, or perceived, impact on what is profoundly a rural community and setting and hence are highly unwelcomed.

We, therefore, require the regulatory authorities to insist on the highest standards of operation which, seeing as the Repository is regarded as a national asset, should be required to operate at world class standards. Regrettably, we do not feel that this is the case at present.

We have raised issues i) and ii) with the NDA and BNG from an operational perspective but would welcome your intervention from an environmental aspect."

Individuals

"The present operators have applied for planning permission to stack isofreight containers up to six high in vault 8. Vault 9, originally scheduled for 2008, will not be ready until 2011 & they are running out of space. I object to the extra stacking level on both visual & safety grounds. ……There should be better screening of Drigg Dump, the original conifers have mostly seen cut down & replaced by deciduous trees which (a) are not nearly as tall (b) have been decimated by last winters storms and (c) offer no screening at all in winter when the leaves fall off."

"No stress seems to have been put by the Environment Agency in the visual impact of the site: ugly buildings & light levels in particular. When I moved to Drigg several years ago, all that could be seen of the site was pine trees and this was a most satisfactory state of affairs. However many of these tress were subsequently removed in what seemed like a laudable effort to replace them with native species. But this meant that when the big storm came in January 2005 the remaining trees has lost their protective barrier & many more were lost as a result rendering the site ugly & exposed. If these trees had not been removed, the 'higher stacking' issue might never even have been an issue. Now I think we must resist higher staking at all cost as the containers would look dreadful. Furthermore, I think a screen of fast growing large conifers such as leylandii should be planted ASAP with native species to the outside of them. Native species all lose their leaves in winter and so the buildings could still be seen. Also all buildings should have to be painted camouflage green, or something tasteful so they do not stand out for miles around from the fells."

Our Comments

3.80 We note the concerns of local residents over the impact of the LLWR operations, which were also reiterated by a number of people during the consultation surgery in the Drigg Parish Hall on 13 July 2005. Whilst we empathise with these concerns, we have no regulatory powers in these matters, which are primarily a matter for the relevant Planning Authority. We will raise these concerns with both BNGSL and the Planning Authority at the West Cumbria Sites Stakeholder Group, LLWR Sub-Committee and would encourage the respondents to do the same. We will also encourage BNGSL to do all it can to minimise the impact of its operations on the local community.

Other Comments (including Matters for Government)

3.81 This section brings together a series of general comments by respondents that we found to be informative in making our decisions.

Consultees' Responses

Copeland Borough Council

"We are pleased that the review has considered the regulatory control of all discharges and disposals made at the LLWR and believe the conclusions and proposed changes are appropriate."

"It is important to understand the great importance and benefits that improved stakeholder involvement and transparency would bring to the issue of the future of radioactive waste management, storage and disposal. During the recent past community involvement has been viewed as a burden and impediment to progress, thus in many cases overlooked. ……We would urge the EA to urgently review its own stakeholder engagement policy and encourage BNGSL to commit to reviewing its own strategy/policy. A clear system of regular engagement is necessary, which involves the local community at each level of the process in order to reach a solution on a mutual basis rather than at the end of a process as a down-stream consultee."

"…it is important to recognise that the LLWR at Drigg is a 'national resource' which grew due to demand over a long period of time without being subject to any process of local or national public acceptance. …… The Council has formally taken the view that no further increase in capacity at Drigg should be allowed until the industry reaches agreement with the Borough Council on a package of "offset" measures to compensate for the presence of a radioactive waste repository in its area. Such arrangements are common-place in various parts of the world and are used to deal with the issues of equality between communities that are affected by the siting of radioactive waste stores and repositories. …… Copeland will need to build a new economy following the decommissioning of the nuclear industry. The presence of a national radioactive waste repository will undermine our efforts unless agreed offset measures are in place. It is an unacceptable anomaly that radioactive waste sites do not even trigger landfill credits as do ordinary household wastes facilities. Socio economic issues of this kind should be given equal weight by the Environment Agency in assessing impacts and mitigation against them as other environmental and safety issues. Therefore in order to safeguard Copeland's future social and economic prosperity we will be seeking such a package consistent with those in Europe and the rest of the world."

Cumbria County Council

"The County Council welcomes the EA's review as the culmination of a careful and thorough process, in which you have worked with BNFL and then BNG Sellafield Ltd over an extended period. You rightly point out the changed context in which this consultation is taking place. However, the Council is concerned that no decisions are taken on the Authorisations until the national LLW Review has concluded and its implications have worked through. The Council considers it is preferable to work within the current authorisation rather than anticipate the LLW Policy Review, CoRWM's output and the NDA Strategy conclusions, which could each radically change the role and status of the Drigg site, not least because of some of the implications of your review."

Food Standards Agency

"The Food Standards Agency has no objection to the Environment Agency granting the Authorisation to BNGSL for the Drigg site proposed in the Explanatory Document. The FSA supports the requirements for BNGSL to produce reports on their reviews of whether the current operations represent the best practicable environmental option and best practice for minimising the impact of waste disposed of in the site. The FSA would wish to be informed with the progress in the production of these reports."

English Nature
"We support the Environment Agency's proposals for the future regulation of radioactive waste disposal at the LLWR at Drigg as set out in the Explanatory Document. We consider that the proposals are necessary to protect the interest (present and future) of people and the environment local to the site."

Health & Safety Executive – Nuclear Safety Directorate
"Overall, the HSE believe that the proposed authorisation is a significant step forward in ensuring that Drigg is managed in a sustainable manner as a UK asset which provides essential support to nuclear licensed sites and to many other parts of the UK as a whole."

Nuclear Decommissioning Authority
"We also share the Agency's view that the activities of the site should be optimised in light of the Operation Safety Case and international best practice. For this reason we are supportive of the proposed integrated authorisation and in particular the improvement conditions the Agency intends to include in it to achieve this optimisation."

Cumbrians Opposed to a Radioactive Environment (CORE)
"CORE is in general agreement with and therefore supports the Environment Agency's proposals for the future regulation of the Low Level Radioactive Waste Repository (LLWR) at Drigg. In particular, we note and support the Agency's concern about dose/risk estimates to the public from existing disposals exceeding current regulatory targets in the future and the predicted effects of coastal erosion on the site in 500 plus years."

Department of Local Government and the Environment, Isle of Man Government
"The Department would wish to endorse these proposals in full."

Greenpeace
"Greenpeace recommends that the site be closed to disposal and that wastes currently on-site be moved into secure storage facilities at the location. As this could have implications for LLW disposal in the UK and, indeed, management of higher level radioactive wastes. Greenpeace asks that this matter be referred to the Secretary of State for the Environment under powers contained in the Radioactive Substances Act (Section 24) for his determination."

Health Protection Agency - Radiological Protection Division
"This section in the ED [Appendix 4] is based on the recommendations of ICRP60 since they are the basis of UK regulations, however it mentions the CERRIE report and COMARE response with no references. It is surprising that it does not mention the fact that ICRP are in the process of producing revised recommendations and that draft recommendations and foundation documents are out for consultation. Also, no reference is made to ICRP81 that gives recommendations relevant to waste disposal. HPA fully supports the COMARE position and hence supports the EA position that there is no requirement to change their approach since there is no recommendation to change the central values of radiation risk factors. A reference to the forthcoming revision of its recommendations by ICRP might be expected here.

Individuals
"Disposal of radioactive wastes at Drigg under a new Authorisation where they are likely to erode into the sea could result in the radioactive contamination of waters of neighbouring countries. A statement is, therefore, required under Article 37 of the Euratom Treaty, which states "Each Member State shall provide the Commission with such general data relating to any plan for the disposal of radioactive waste in whatever form as will make it possible to determine whether the implementation of such plans is liable to result in the radioactive contamination of the water, soil or airspace of another Member state." The Environment Agency should ensure that such a statement is prepared. The Environment Agency should solicit the views on the Drigg Authorisation of relevant foreign Governments, including Ireland, as well as Iceland and the Scandinavian Countries. The Environment Agency should demonstrate that the views of foreign Governments have been taken fully into account in the Drigg Authorisation Review."

"Your proposals are very informative and I completely support them…."

NHS Primary Care Trust
"We would also like to comment, though not in the scope of this consultation that given the capacity of Drigg more effort should be employed identifying a future suitable site for low level waste disposal."

Nuclear Free Local Authority
"We support the CCC view that that no decisions are taken on the Authorisations until the national LLW Review has concluded and its implications have been worked through. We support CCC's view that "…it is preferable to work within the current authorisation rather than anticipate the LLW Policy Review, CoRWM's output and the NDA Strategy conclusions, which could radically change the role and status of the Drigg site, not least because of some of the implications of your review."

UKAEA
"UKAEA supports EA's proposals for the regulation of the LLWR at Drigg in the short term. UKAEA does however have concerns that the additional work required and the resulting conclusions could have significant impact on the management of LLW in the UK in the medium to longer term. UKAEA urges the EA and BNGSL to ensure that the NDA and other stakeholders are fully engaged in discussions before any significant changes are implemented."

UK Nirex Ltd
"We support the Environment Agency's findings, including the need for a full and thorough review of the options for Drigg"

Our Comments

3.82 We welcome the many comments from respondents supporting our proposals in full, particularly the need for a thorough review of risk management options for the LLWR.

3.83 We acknowledge that ICRP are in the process of producing revised recommendations and that draft recommendations and foundation documents are out for consultation. We note that current UK radiation protection legislation is based on ICRP 60. We also note the

comments by the Health Protection Agency with regard to the more recent recommendations of ICRP on waste disposal (ICRP 1998). We asked BNGSL to consider the recommendations set out in ICRP81 in developing the environmental safety cases, and will continue to ensure that the recommendations are addressed in its risk management optioneering.

3.84 We note that a number of respondents were concerned about the impact that our decisions in the review of the authorisations might have on the management of LLW in the UK. They requested that any decisions should await the outcome of Defra's LLW Policy Review and should involve discussions with all relevant stakeholders. However, we consider there are immediate benefits to be had from issuing a new, modern authorisation for the LLWR before the Government issues its revised Policy. These benefits include putting legally binding requirements on BNGSL to address our concerns on risk management in a timely manner.

3.85 We note the recommendation by Greenpeace that the decision be referred to the Secretary of State for the Environment under powers contained in the RSA 93 (Section 24) for his determination. We have forwarded this recommendation to Defra. It will be for Ministers to decide whether to "call-in" the decision after receiving and reviewing this Decision Document.

3.86 We also note the recommendation by one respondent that the LLWR should be subject to Article 37 of the Treaty establishing the European Atomic Energy Community. Article 37 of the Treaty, requires that each Member State is to provide the European Commission (EC) with such general data relating to any plan for the disposal of radioactive waste in whatever form as will make it possible to determine whether the implementation of such plan is liable to result in the radioactive contamination of the water, soil or airspace of another Member State. The Commission then delivers its opinion within six months, after consulting the group of experts referred to in Article 31 of the Treaty. Submissions are made by the UK Government (i.e. not the Environment Agency or the Operator).

3.87 We note that the LLWR commenced operation before the UK joined the European Community, and has not been subject to a Submission, or Opinion, from the Commission. Commission Recommendation 1999/829/Euratom of 6 December 1999 on the application of Article 37 of the Euratom Treaty states that if a Member State envisages modifying a plan for the disposal of radioactive waste on which no Opinion has already been given, then the submission of general data is necessary unless:

- the modification of the plan for the disposal of radioactive waste envisages unchanged or more restrictive authorised limits and associated requirements than in the existing plan; or

- the potential consequences of the reference accident(s) are unchanged or decreased.

3.88 Our proposals for strengthening the regulation of the LLWR would leave the current authorised limits unchanged and will improve the regulatory controls over the operation of the site. In its operational phase, while the site is under active management, the radiological risks and the consequences of an accident are very low, both for the local UK population and those further afield in other EU member states. Introducing the new authorisation will allow us to require the operator to address how the impact of past,

present and future disposals can best be minimised. For these reasons, we do not consider there is a need to delay the introduction of the new authorisation while a Submission of general data is made, but will raise the respondents' concern with Defra, to allow the Government to make a decision.

4. Our Decision

4.1 The Environment Agency exercises regulatory control over disposals of radioactive waste through the limits and conditions of the authorisations we issue under the Radioactive Substances Act 1993. One of our main tasks during the review of the authorisations for the LLWR has been to decide whether the conditions and limitations of current authorisations should still apply or whether they should be changed in order to improve public and environmental protection.

4.2 The majority of our decisions, as described in the following sections, are confirmations that we intend to implement our proposals as set out in the Explanatory Document (Environment Agency 2005a). However, we have carefully considered the responses made to our consultation, and as a result we have decided to modify our original proposals for regulatory control over solid waste disposal at the LLWR and discharges to the Drigg Stream. The changes are detailed below.

Risks from Radiation Exposure

4.3 We have carefully considered the points raised by respondents on risks from radiation exposure. We consider that our decisions on the future regulation of radioactive waste disposal from the LLWR will continue to ensure that the risks and radiological impact of operations on the site remain very low whilst the site is actively managed in compliance with the RSA 93 authorisation. Furthermore, our decision will require BNGSL to demonstrate that these present-day impacts are As Low As Reasonably Achievable (ALARA).

4.4 We note that BNGSL's estimates of doses and risks from historical disposals to members of the public in the future significantly exceed current regulatory targets, and that these impacts could be realised in a relatively short timescale (~500 years) if coastal erosion were to occur. While it would be unreasonable to expect historical practices to fully comply with present day guidance and modern standards, there may be ways of optimising the performance of the site. As noted in the Explanatory Document, BNGSL must demonstrate that the future impacts from disposals on the site will be also be ALARA – currently this has not been done. Our decision will require BNGSL to investigate a wide range of possible options and propose which option (or combination of options) should be implemented, so that ultimately it can demonstrate that future impacts will also be ALARA.

4.5 Although we anticipate no substantial changes in future to the advice we currently receive from the Health Protection Agency on risks from exposure to low level radiation, we will remain alert to developments in this area and, if appropriate, will review relevant authorisations under RSA93 accordingly.

Low Level Solid Waste Disposal

4.6 Disposal of solid radioactive waste is the primary authorised activity at the LLWR and, due to the potential impacts from coastal erosion, it is the single issue that generated the most comments from respondents to our consultation. In our Explanatory Document, we proposed retaining existing solid disposal limits until such time as BNGSL had provided additional information for us to determine the radiological capacity of the site. However,

some respondents were critical of this approach and recommended that we either suspended disposals until further risk management had been undertaken or changed the status of the site from disposal to long-term storage. As a result of the comments received, we have now decided the following regulatory approach:

i) We will authorise continued disposals of LLW to the current Vault 8 disposal area, using existing limits in the new integrated authorisation as set out in Table 1 below:

Table 1: Proposed Solid Waste Disposal Limits

Radionuclide or Group of Radionuclides	Annual Limit, TBq
Uranium	0.3
Radium (Ra)-226 plus Thorium (Th)-232	0.03
Other alpha emitters [1]	0.3
Carbon (C)-14	0.05
Iodine (I)-129	0.05
Tritium (H)-3	10
Cobalt (Co)-60 [3]	2
Other radionuclides [2]	15

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 (excluding C-14, I-129 and H-3) of which the Co-60 content may not exceed 2 TBq; and other radionuclides specified in writing by the Environment Agency.
   b. any other radionuclides specified in writing by the Environment Agency.
3. The Co-60 figure is included in "Others" as well as shown separately.

ii) we will not authorise LLW disposals to the proposed Vault 9, until it has received appropriate planning permission from Cumbria County Council and BNGSL has provided us with adequate information to allow the radiological capacity of the site to be determined (required in 2008, a year sooner than originally proposed in our consultation), and we will undertake a full review on the radiological capacity of the site and publish our findings;

iii) when Vault 8 reaches capacity (during 2008), and prior to Vault 9 being authorised, any LLW waste consigned to the LLWR shall be for the purpose of temporary storage and, by agreement with the HSE, shall be regulated under BNGSL's Nuclear Site License arrangements; and,

iv) we will not allow BNGSL to construct the final cap over the existing Vault 8 and trench disposals until BNGSL has provided us with the outcome of a wide-ranging risk management study (required in 2 years) that demonstrates that future impacts will be As Low As Reasonably Achievable (ALARA).

4.7 While adopting this strategy we will continue to:

- ensure that disposals of solid radioactive waste are properly managed and their radionuclide content is fully accounted for;
- provide transparency of the solid radioactive waste disposals which are occurring (by requiring reporting against the limits); and
- ensure compatibility with authorisations for waste disposal at the consigning sites.

4.8 Furthermore, current regulatory controls have ensured that the present-day impacts from the LLWR are very low, and can be kept low while the LLWR is managed in compliance with these limits and conditions in the solid waste disposal authorisation.

4.9 The HSE has confirmed that it will regulate temporary storage under the Nuclear Site License and work with ourselves under the terms of our Memorandum of Understanding to ensure the safety of the public, the workforce and the environment.

4.10 By delaying our decision on the radiological capacity of the site, we will also be able to have regard to the outcome of the UK Government's and Devolved Administrations' review of LLW Management policy, the finalised NDA Strategy and the Committee on Radioactive Waste Management's (CoRWM's) recommendations to Government. [11]

4.11 In the Explanatory Document we indicated that BNGSL should focus further work to improve the safety cases on a thorough evaluation of a range of realistic risk management options including, but not limited to, the following:

- constructing a thicker, more robust, cap over the disposals;
- future disposal of only certain categories of waste (e.g., short-lived LLW);
- the selective removal of those long-lived wastes in the trenches that are assessed as contributing most significantly to risk;
- extending the active management period of the site beyond 150 years; and
- combinations of the above.

4.12 To ensure our concerns are addressed, we will specify in the new integrated authorisation a number of improvement requirements on BNGSL (see Appendix 1), including:

- preparation of a document that details how (and when) BNGSL proposes to address the findings from our review of the 2002 environmental safety cases;
- provision of results from consideration of a wider range of realistic risk management options than were considered in the 2002 safety cases (see suggested options above);
- proposal, consultation on, and implementation of a strategy for retention of a comprehensive set of records containing appropriately detailed information on all aspects of the safety cases, until the withdrawal of institutional control from the site; and,
- review of the conditions for acceptance for waste disposal on the site to ensure they are consistent with the assumptions made in the environmental safety cases.

[11] CoRWM is an independent committee, set up by the Government and the devolved administrations, responsible for recommending to Government, under its "Managing Radioactive Waste Safely" programme, how best to manage the UK's higher activity radioactive waste in the long term. Information about CoRWM may be found on its website www.corwm.org.uk.

New Integrated Regulation

4.13 There was general support from respondents for the proposed new integrated authorisation for the LLWR. Therefore, we have decided that a single integrated authorisation, which regulates waste disposals to air, water and land, will be introduced at the LLWR. Two of the extant authorisations issued to BNGSL will be revoked and the generic inter-site transfer authorisation and generic gaseous discharge authorisation both issued to BNFL under RSA60 will be varied to prevent their future use for disposal of wastes from the LLWR.

Management System Condition

4.14 There was general support from respondents for the new condition relating to management systems. Therefore, we have decided that the new authorisation will require BNGSL to have a management system, organisational structure and resources that are sufficient to achieve compliance with the limitations and conditions of the authorisation. This management system should include written arrangements specifying how compliance with each limitation and condition will be achieved, written environmental operating rules and operating instructions, and a maintenance schedule and instructions. The management system should also describe the arrangements for consultation with suitable Radiation Protection Advisers (RPAs) or other qualified experts as approved by us and include the arrangements for internal audit and review of the management system.

Use of BPEO and BPM

4.15 There was general support from respondents for the proposed new BPM conditions. Therefore we have decided that the new authorisation will require BPM to be used to minimise the activity of waste produced on the LLWR site that will require disposal, to minimise the activity of gaseous and aqueous waste disposals, and to minimise the volume of wastes disposed of by transfer to other premises. The authorisation also requires BPM to be used to dispose of radioactive waste at times, in a form and in a manner which will minimise the radiological impact on the environment and members of the public.

4.16 Also, there was general support from respondents for our proposals to require BNGSL to:

- undertake a comprehensive assessment of BPEO for liquid, gaseous and solid wastes generated on the site that provides a more detailed appraisal of the benefits and detriments of alternative waste disposal options;
- undertake a comprehensive review of national and international developments in best practice for minimising all waste disposals and the radiological impact from those disposals, together with a strategy for achieving reductions in impacts;
- undertake a comprehensive review of the means used to assess the activity of radionuclides in disposals and the environment and to determine compliance with this Authorisation, including consideration of national and international developments in best practice; and
- establish and carry out a programme of research and development in support of the above requirements.

4.17 We have decided therefore that BNGSL will be required to carry out the work specified above (see Appendix 1, Schedule 9).

Gaseous and Liquid Discharges

Gaseous Limits

4.18 We proposed in the Explanatory Document that it would be inappropriate to introduce gaseous discharge limits for the LLWR for the following reasons:

- current discharges from the Grouting Facility (GF) and Plutonium Contaminated Material (PCM) facilities are very small;
- the radiological impact from the GF and PCM facilities discharges is <1 μSv y^{-1};
- future discharges are not expected to increase above the current level; and
- the PCM retrieval facilities are the main sources of discharges and operations in these facilities should be finished by 2006/07.

4.19 We stated that we would continue to require BNGSL to send us reports of its discharges on a periodic basis, and those reports will be placed on our public register and the annual discharges included in our Pollution Inventory.

4.20 Some respondents supported our proposal not to introduce gaseous discharge limits for the LLWR whereas others were opposed to it. However, we have decided that no gaseous discharge limits will be introduced for the LLWR and we will utilise the strengthened BPM condition in the proposed integrated authorisation to require BNGSL to minimise discharges from the DGF and PCM retrieval operations. If at any time in the future we consider that it would be appropriate to introduce limits for gaseous discharges, we will do so.

Aqueous Limits

4.21 Some respondents supported our proposal to remove aqueous discharge limits for the LLWR whilst others considered that limits should be retained.

4.22 BNGSL's assessment indicates that future routine aqueous discharges from the LLWR will be within the limits in the current authorisations. Our assessment has confirmed that any future discharges can be expected to be within the existing radioactivity limits and in most cases well below them. We note that the radiological impact from aqueous discharges is very low (~1 μSv y^{-1}). We also note that BNGSL has little direct control over the discharges as the main component of radioactivity arises from waste in the trenches although, as noted above, we expect BNGSL to review the BPEO for contaminated leachate.

4.23 We have decided to remove the limits associated with aqueous discharges from the site, and to utilise the strengthened BPM condition in the proposed integrated authorisation to require BNGSL to minimise discharges. We will continue to require BNGSL to send us reports of its discharges on a periodic basis, and those reports will be placed on our public register and the annual discharges included in our Pollution Inventory. If at any time in the future we consider that it would be appropriate to re-introduce aqueous discharge limits we will do so.

The Drigg Stream

4.24 Prior to the sea pipeline coming into operation in 1991, contaminated leachate from the trenches was discharged to the Drigg Stream. Since the sea pipeline was commissioned, discharges have been authorised via this route directly to the Irish Sea. The current RSA93 authorisation places activity concentration limits on the Drigg stream.

4.25 Respondents supported our proposal to remove the Drigg Stream as an authorised aqueous discharge route based on the fact that the stream had not been used for this purpose for almost 10 years. However, due to unusually heavy rainfall on 11th October 2005, the discharge pumps at the Marine Holding Tanks were unable to handle the volume of water and, as a consequence, the flow was temporarily directed into the Drigg Stream for about 20 minutes. In these situations, we can confirm that only surface run-off water from the vault disposal area is diverted, and that leachate from the trench area continues to be discharged via the pipeline. As the surface run-off water should be free of radioactive contamination[12], the Drigg Stream is now included as an authorised discharge outlet in Schedule 4 of the new certificate (see Appendix 1), subject to certain conditions being met (e.g. extreme weather, pumps working at capacity, etc.)

4.26 We will ensure that BNGSL continues to monitor the Drigg Stream as part of the Statutory Environmental Monitoring Programme.

Low-Level Solid Waste Transfers

4.27 There was general support from respondents for the proposal to continue to authorise the transfer of LLW back to Sellafield without specific volume and radionuclide limits. We have decided therefore to continue to authorise LLW transfer back to Sellafield without specific limits. We consider that there would be no significant environmental benefit in imposing transfer limits and furthermore they might restrict the movement of waste requiring further treatment at Sellafield and subsequent return to the LLWR for final disposal. Minimisation of new arisings will continue to be required by the strengthened BPM condition. We will also continue to require BNGSL to report the transfers to the Environment Agency on a periodic basis, and those reports will be placed on our public register.

Plutonium Contaminated Material Transfers

4.28 There was general support from respondents for our proposal to permit the transfer of PCM to Sellafield without specific radioactivity limits and for it to be time-limited to the end of 2006. We have decided therefore to authorise the transfer of remaining PCM waste back to Sellafield without specific limits, but to time limit the schedule to the end of 2006.

4.29 We consider the December 2006 timescale is both a realistic and achievable challenge for BNGSL, and our decision will help to ensure that the PCM remaining on the LLWR site is transferred back to Sellafield as soon as reasonably practicable. We have specified a timescale that is consistent with a planning condition issued by Cumbria County Council for transfer of all PCM on the LLWR site to Sellafield. We will continue to require

[12] The vault area is not designated a Controlled (Contamination) Area, under the Ionising Radiations Regulations 1999. That is to say the ISO's that are disposed in the Vault are sealed and certified free from external contamination prior to emplacement.

BNGSL to report the transfers to us on a periodic basis, and those reports will be placed on our public register.

Improvement and Additional Information Requirements

4.30 We proposed in the Explanatory Document that the draft LLWR authorisation should include a number of improvement/additional information conditions that BNGSL would be required to respond to in accordance with specific timescales. Overall, respondents supported the proposals in the draft authorisation. We have decided therefore to include all the proposed improvement/additional information requirements in the new integrated authorisation (see Appendix 1).

4.31 We will continue dialogue with BNGSL to ensure that its responses to the requirements are comprehensive and address all relevant issues. Where necessary we will specify our requirements in more detail, or set interim milestones, in accordance with Schedule 1, condition 19 of the authorisation (see Appendix 1).

Changes in the Regulation of Waste Disposals from BNGSL

4.32 BNGSL currently utilise a generic Inter-Site Transfer Authorisation (ISTA) to transfer compactable LLW back to Sellafield for compaction before being returned to the LLWR for final disposal. This authorisation permits radioactive waste of any description, without limitations, to be transferred to other premises occupied by BNGSL.

4.33 Our proposal to vary the ISTA thus preventing it being used by BNGSL to transfer LLW from the LLWR to Sellafield was supported by all the respondents who commented on the proposal. We have decided therefore to vary the generic ISTA and prevent its use for transferring radioactive wastes from the LLWR, and instead, to authorise transfers to Sellafield by means of the new integrated authorisation. We have already introduced a similar change to the authorising of LLW transfer from Sellafield. The current decision will ensure improved regulatory control of the transfer of radioactive waste between sites.

4.34 BNGSL also currently utilises a generic gaseous discharge authorisation to discharge gaseous wastes from the LLWR. As these discharges will now be authorised through the new integrated authorisation, we have decided therefore to vary the generic gaseous authorisation and prevent its use for discharging gaseous radioactive wastes from the LLWR.

Matters for Government

4.35 Respondents to the public consultation raised two issues that we consider are outside our regulatory remit, and which are properly matters for the Government. These relate to:

- the recommendation that our decision be referred to the Secretary of State for the Environment under powers contained in the Radioactive Substances Act (Section 24) for his determination; and,

- the recommendation that the LLWR should be subject to Article 37 of the Treaty establishing the European Atomic Energy Community.

4.36 Both these issues are discussed in more detail at the end of Section 3, and this Decision Document will be provided to the Secretaries of State for their consideration of both issues. In the interests of strengthening the regulatory controls over disposals of radioactive waste at the site we will be pointing out to Government the importance of introducing the new authorisation as soon as possible.

5. Limits, Doses and Impacts from the New Authorisation

Assessed Impacts from Authorised Discharges

5.1 We consider that gaseous and aqueous discharges from the LLWR are unlikely to change significantly in the future on the basis of there being no information available at present to indicate otherwise. We have therefore used actual discharge data in a prospective assessment of the radiological impacts from present day discharges. For the aqueous source term, we have used the average releases via the marine pipeline to the Irish Sea for the period 1999-2003, based on data reported by BNGSL in their response to our Process & Considerations document. For the gaseous source term, we have used the maximum annual discharges from either the grouting facility or the PCM retrieval facilities, for the period 1994-2003.

5.2 Our assessment of radiological impacts gives a worse case annual dose to a fisherman of 1.1 μSv (for release via the pipeline) and 0.018 μSv to local inhabitants via gaseous releases. When summed, the dose is less than the 20 μSv y^{-1} threshold at which we determine no further assessment is necessary. Our assessment is broadly consistent with BNGSL's assessment (see Appendix 2 in Explanatory Document).

Potential Impacts during the Operational Period from Releases to Groundwater

5.3 We have not undertaken an independent assessment of potential impacts during the operational period due to releases to groundwater. However, we have undertaken a detailed regulatory review of BNGSL's Operational Environmental Safety Case (OESC), and this is detailed in a separate report (Environment Agency 2005b). We summarised BNGSL's results in Appendix 2 in the Explanatory Document.

5.4 In the 2002 OESC, BNGSL indicates that doses during the period from approximately 2050 to approximately 2100 could exceed the 0.3 mSv y^{-1} dose constraint. The high doses presented in the 2002 OESC arise because BNGSL assumes that a person drinks water from a borehole located between the site and the coast that intercepts water contaminated with technetium-99 and chlorine-36. Although such a scenario may be unlikely, we consider that it cannot be discounted.

5.5 After submission of the 2002 OESC, BNGSL provided a review and re-assessment of the potential doses that could be received by drinking groundwater abstracted between the repository and the coast. This information includes lower calculated doses, however, we consider that BNGSL has not undertaken a sufficient assessment of the uncertainties associated with the potential dose estimates.

5.6 We conclude that BNGSL has not provided sufficient evidence that potential doses are likely to reduce with time or remain below the dose constraint (Agency 2005). In any event, BNGSL must demonstrate that Best Practicable Means have been used to ensure that doses to members of the public are as low as reasonably achievable. In our view, this has not been demonstrated. If monitoring were to indicate increasing groundwater contamination, we would require BNGSL to review options for mitigating the releases and to take action as necessary.

5.7 We accept that present day impacts are very low, and can be kept low while the site is actively managed.

Potential Future Impacts

5.8 We have not undertaken an independent post-closure radiological safety assessment (PCRSA). However, we have undertaken some assessment calculations and have conducted a detailed regulatory review of BNFL's environmental safety cases (see Environment Agency 2005b). Our review was conducted in accordance with a clearly defined plan (Environment Agency 2003), and involved a team of experts comprising Environment Agency staff and consultants from industry and academia.

5.9 BNGSL has conducted a significant programme of work and has provided an extensive set of documents that comprise the 2002 PCSC. The work has improved understanding of the performance of the LLWR. However, we have technical reservations concerning BNGSL's assessment, for example relating to their treatment of uncertainty. Overall, we consider that their results provide a broad indication of the impacts from the waste repository. We summarised BNGSL's results in Appendix 2 in the Explanatory Document.

Impact of Coastal Erosion

5.10 BNGSL indicates that the LLW repository at Drigg might be destroyed by coastal erosion in 500 to 5,000 years. Coastal erosion is assumed to lead to blocks of waste falling onto the beach and, as a result beach users would receive a radiation dose from the waste. BNGSL suggests that the repository might be eroded even if present-day sea level remains constant, but that repository destruction would be even more likely if sea level rises.

5.11 Although estimates of coastal erosion rates and sea-level changes along the Drigg coastline are uncertain, BNGSL indicates that site destruction by coastal erosion is likely. We agree that destruction of the repository by coastal erosion is likely at some time in the future.

Future Human Actions

5.12 A range of future human actions can be envisaged having the potential to bring people into direct contact with the waste. These actions may be deliberate, i.e. taken with knowledge of the location and hazardous nature of the facility, or inadvertent because the location or purpose is unknown. Our guidance allows arguments to be made to justify a very low probability of inadvertent actions affecting the disposal system for a period following closure. However, in the longer term, institutional controls cannot be relied upon and assessments must consider the likelihood and consequences of possible future human actions that might result in the exposure of individuals to the waste.

Other exposure pathways and possible scenarios

5.13 BNGSL consider glaciation as an alternative site destruction scenario. BNGSL assess the impacts from both Regional Glaciation (60,000 – 100,000 years) when the Wasdale glacier and Scottish ice are projected to advance on the site, and Valley Glaciation (20,000 – 40,000 years) involving just the Wasdale glacier. BNGSL model the risks resulting

from drinking surface water that has flowed across glacial deposits strewn with waste materials, and land occupiers inhaling radon-222 from the uranium waste in the exposed trenches.

5.14 BNGSL model various impacts from potential releases of radioactivity from the waste via the groundwater and gas pathways in the future. BNGSL's assessment predicts that impacts from the groundwater pathway will peak after 50,000 years, and will be due to potentially exposed groups consuming cattle offal and freshwater fish contaminated with lead-210 and polonium-210 derived from the uranium-234 in the trench disposals. For the gaseous pathway, BNGSL predict peak impacts in 250 years arising from people occupying the site and inhaling radon-222 derived from the disposed radium-226.

5.15 In summary, the 2002 PCRSA indicates that risks exceed the risk target of 10^{-6} per year for several scenarios and potential exposure pathways. If the repository is destroyed by coastal erosion, the assessed conditional risks are approximately 10^{-4} per year. If groups reoccupy areas contaminated by excavated trench wastes, the peak conditional risks are assessed as approximately 10^{-3} per year.

6. Conclusions

6.1 Our review has considered:

- the four authorisations granted to BNGSL in relation to the LLWR at Drigg under the Radioactive Substances Acts of 1993 and 1960;
- other factors relevant to the site including authorisations, consents and licences issued under other relevant legislation;
- past operations, discharges, transfers and disposals of waste made from/on the site;
- BNGSL's future plans for operations, discharges and disposals to 2012 and beyond;
- future plans to improve BNGSL operations with respect to environmental performance; and
- the statutory requirements on the Environment Agency and Government policy (including draft policy), guidance and commitments.

6.2 We have concluded that all the time the repository site is being managed in compliance with our regulatory controls, the impact from all the disposals on the LLWR will be very low.

6.3 We propose to issue a new authorisation which, in the interim period while remaining capacity in vault 8 is filled, keeps current limits while strengthening regulation and specifically requiring BNGSL to address our concerns with regard to risk management on the site. After BNGSL has reported in two years time on the measures and improvements we have specified, we will review the authorisation again in the light of this information, and will have regard to any new Government LLW Management Policy, NDA Strategy and CoRWM's recommendations to Government.

6.4 We believe that our decisions for the future regulation of waste disposal on/from the LLWR will:

- provide a more transparent approach to the regulation of the LLWR;
- strengthen the BPM conditions and maintain pressure on BNGSL to minimise the environmental and radiological impact from its activities on the site; and
- require BNGSL to improve its risk management strategy on the site, to protect the interests (both present and future) of people and the environment local to the site.

6.5 We consider that our decisions will <u>not</u>:

- place a grossly disproportionate additional burden on BNGSL staff resources in meeting the requirements for information in the draft authorisation; or
  involve grossly disproportionate expenditure for additional sampling or monitoring and managerial control of discharges and disposals.

6.6 We note that the volume of LLW that will be produced in the UK during nuclear power plant decommissioning is likely to far exceed the capacity of the LLWR (RWMAC 2003). We also note that the results of BNGSL studies may reduce the capacity further. There is an urgent need, therefore, to identify the most appropriate national strategy for the future management of the UK's LLW, including the consideration of the possible need for one or more alternative disposal sites. We will continue to work with Government, the NDA,

the waste producers, and other stakeholders to address this issue, and we are actively contributing to the current Government-initiated review of LLW management policy.

6.7 Table 1 presents a summary of our decisions from the review of authorisations for the LLWR. The table also gives a signpost to the relevant condition(s) of the certificate of authorisation that will instigate each decision.

Table 1: Our Decisions for future regulation of the LLWR and how they will be implemented in the certificate of authorisation at Appendix 1.

Our Decisions	
Description	**Schedule and condition**
We will introduce a single integrated certificate of authorisation for regulating waste disposals to air, water and land from the LLWR.	All
We will introduce a new condition in the integrated certificate of authorisation that requires BNGSL to have a management system, organisational structure and resources sufficient to achieve compliance with the limitations and conditions of the authorisation.	Schedule 1, condition 6.
We will require BNGSL to undertake a comprehensive assessment of BPEO for liquid, gaseous and solid wastes produced on the site that provides a more detailed appraisal of the benefits and detriments of alternative waste disposal options.	Schedule 9, Requirement 1.
We will introduce revised conditions that require BPM to be used to minimise the activity of radioactive waste produced on the site that will require disposal under the authorisation, to minimise the activity of gaseous and aqueous waste disposals to the environment and to minimise the volume of wastes disposed of by transfer to other premises. The proposed conditions also require BPM to be used to 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.	Schedule 1, condition 2.
We will require BNGSL to undertake a comprehensive review of national and international developments in best practice for minimising all waste disposals and the radiological impact from those disposals, together with a strategy for achieving reductions in impacts.	Schedule 9, Requirement 2.
We will require BNGSL to undertake a comprehensive review of the means used to assess the activity of radionuclides in disposals and the environment and to determine compliance with this Authorisation including consideration of national and international developments in best practice.	Schedule 9, Requirement 3.
We will require BNGSL to establish and carry out a programme of research and development in support of the above requirements.	Schedule 9, Requirement 4.

Our Decisions	
Description	**Schedule and condition**
We will not introduce gaseous discharge limits for the LLWR but will utilise the strengthened BPM condition in the proposed integrated authorisation to require BNGSL to minimise discharges.	Schedule 3.
We will remove the limits associated with aqueous discharges from the site, and to utilise the strengthened BPM condition in the proposed integrated authorisation to require BNGSL to minimise discharges.	Schedule 4.
We will continue to allow discharge of surface water run-off from the disposal vaults via the Drigg Stream, subject to certain conditions being met (e.g. extreme weather conditions, and marine pipeline pumps working at capacity).	Schedule 4, condition 3.
We will continue to authorise LLW transfer back to Sellafield without specific limits.	Schedule 6.
We will authorise the transfer of remaining PCM waste back to Sellafield without specific limits, but to time-limit the schedule to the end of 2006.	Schedule 7.
We will continue to authorise solid waste disposals to Vault 8 using existing limits.	Schedule 8, condition 1 (b).
We will not authorise disposals to the planned Vault 9, until BNGSL has provided us with adequate information to allow the radiological capacity of the site to be determined.	Schedule 1, condition 5
We will not approve BNGSL's construction of the final cap over the existing Vault 8 and trench disposals until it has provided us with the outcome of a wide-ranging risk management study that demonstrates that future impacts will be As Low As Reasonably Achievable (ALARA).	Schedule 1, condition 5
We will introduce a number of specific improvement conditions that ensure BNGSL address the findings from our review of the 2002 environmental safety cases.	Schedule 8, condition 5. Schedule 9, Requirements 1, 2, 4 – 9.
We will require BNGSL to develop and implement a strategy for the long-term maintenance and active management of records associated with the deposit of low-level waste on the site.	Schedule 9, Requirement 10.
Following receipt of key additional information from BNGSL related to risk management and minimising the future impact from the LLW disposals, we shall undertake a further review of solid waste disposal limits.	N/a

Our Decisions	
Description	**Schedule and condition**
We will require BNGSL to ensure that all environmental systems and equipment that are required to be maintained/tested in compliance with the Authorisation are categorised, clearly labelled and are clearly identifiable within a written maintenance schedule.	Schedule 9, Requirement 12.
We will require BNGSL to undertake a comprehensive review of monitoring requirements on (and off) the site, and to implement any changes in an appropriate timescale.	Schedule 9, Requirements 7, 8 & 11.
We will require BNGSL to undertake a comprehensive assessment of the impact of its radioactive discharges and disposals on ecosystems and wildlife species.	Schedule 9, Requirement 11
We will require BNGSL to undertake a review that considers the nature, quantities and sources of foreseeable emissions of substances from the installation into each environmental medium, and a description of any foreseeable significant effects on the environment.	Schedule 9, Requirement 13.
We will vary the generic BNFL inter-site transfer authorisation to prevent its use for the transfer of radioactive wastes from the LLW Repository, and instead, to authorise transfers to Sellafield by means of the new integrated authorisation.	N/a
We will vary the generic BNFL gaseous discharge authorisation to prevent its use for the discharge of gaseous radioactive wastes from the LLW Repository, and instead, authorise discharges to atmosphere by means of the new integrated authorisation.	N/a

7. Next Steps

7.1 Before implementing our decisions we 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 Ministers to determine whether they wish to exercise their statutory powers.

7.2 Subject to consideration by the Secretaries of State, we would implement our decisions by revoking the existing authorisations issued under RSA60 and RSA93. We would at the same time issue BNGSL with a new integrated authorisation under RSA93 as set out in Appendix 1.

7.3 We will complete the document 'Compilation of Environment Agency Requirements' (CEARs) specifying the detailed compliance requirements e.g. environmental monitoring programme, environmental performance indicators etc., that will be issued with the new integrated authorisation.

8. References

BNFL 2002a — Drigg Operational Environmental Safety Case.

BNFL 2002b — Drigg Post-Closure Safety Case: Overview Report.

DETR 2000 — Department of the Environment, Transport and the Regions. The Radioactive Substances (Basic Safety Standards) (England and Wales) Direction 2000, DETR, 9 May 2000, London.

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Environment Agency 2005a — Explanatory Document to assist Public Consultation on proposals for the future regulation of disposals of radioactive waste at the Low-Level Radioactive Waste Repository at Drigg, Cumbria.

Environment Agency 2005b — The Environment Agency's Assessment of BNFL's 2002 Environmental Safety Cases for the Low-Level Waste Repository at Drigg, February 2005.

EC 1999 — Commission Recommendation 1999/829/Euratom of 6 December 1999 on the application of Article 37 of the Euratom Treaty.

GB Parliament 1999 — Ionising Radiations Regulations, 1999, SI 1999: 3232 Stationary Office.

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RWMAC 2003 The Radioactive Waste Management Advisory Committee's: Advice to Ministers on Management of Low Activity Solid Radioactive Wastes within the United Kingdom, March 2003, ISBN 0-85521-019-2.

UN 1992 Rio Declaration on Environment and Development, UNCED, A/Conf.151/5, dated 14 June 1992, Chapter 22, Agenda 21.

9. Glossary of Terms and Abbreviations

Note: Not all of the terms below are used in this document.

Activity: The rate of radioactive decay. Measured in the standard international unit, "Becquerel" (Bq) – see below.

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. More information about the Agency may be found on its website www.environment-agency.gov.uk

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 complied with.

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 standards in May 1996 (The 'BSS Directive', see EC 1996). The revised standards are due to be implemented in all member states by 13 May 2000. In the UK Implementation of the 1996 BSS Directive in the UK is being carried out through legislative changes made under the Health and Safety at Work etc. Act 1974 (e.g. see GB Parliament 1999) and under the Radioactive Substances Act 1993 (e.g. see DETR 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.

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.

Community Food Intervention Levels (CFILs): Levels 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.

Committee on Radioactive Waste Management (CoRWM): CoRWM is an independent committee, set up by the Government and the devolved administrations, responsible for recommending to Government, under its "Managing Radioactive Waste Safely" programme, how best to manage the UK's higher activity radioactive waste in the long term. Information about CoRWM may be found on its website www.corwm.org.uk.

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 power station 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 buildings surrounding the reactor shield are dismantled; and finally the reactor itself is dismantled.

Department of Health (DoH): DoH is responsible for health policy in England. 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 RSA93 for nuclear sites in England. Information about DoH may be found on its website www.doh.gov.uk

Department for Environment, Food and Rural Affairs (Defra): Defra is responsible for (among other matters) environmental policy in England, including policy for the management and disposal of radioactive waste. It is the sponsoring Department for the Environment Agency. 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 RSA93 for nuclear sites in England. Information about Defra may be found on its website www.defra.gov.uk.

Department of the Environment in Northern Ireland (DoENI): The Government Department with regulatory responsibility for RSA93 matters in Northern Ireland.

Department of Trade and 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. 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

Direct radiation: Radiation received directly from a source such as a nuclear power station, 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 1 mSv y^{-1} 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.

Environmental media: Land, sea, rivers, groundwater and air.

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.

Food Standards Agency (FSA): 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 RSA93 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.foodstandards.gov.uk

Habitats Directive: The European Directive on the conservation of Natural habitats and of Wild Flora and Fauna.

Half-life: The time required for the activity of a radionuclide to decrease to half of its initial value.

Headroom: The margin between the actual level of discharge and the authorised limit.

Health Protection Agency (HPA): The HPA was created in April 2003 to provide better protection against infectious diseases and other dangers to health, including chemical hazards, poisons and radiation. In April 2005, it merged with the NRPB (see below) to form a comprehensive health protection service.

Health and 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). 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 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 RSA93 to dispose of radioactive waste in England and Wales. Information about HSE may be found on its website www.hse.gov.uk

Her Majesty's Inspectorate of Pollution (HMIP): The regulatory body within the Department of the Environment responsible, jointly with the Ministry of Agriculture, Fisheries and Food (MAFF), for authorising disposal of radioactive wastes (including emissions and discharges to the environment) prior to April 1996. Responsibility for authorising disposal of radioactive wastes transferred to the Environment Agency on its creation on 1 April 1996.

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'. Information about the IAEA may be found on its website www.iaea.org

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. Information about ICRP may be found on its website www.icrp.org

Integrated Waste Strategy (IWS): An integrated waste strategy is an outline overall plan, taking into account environmental principles, that can be applied consistently to all actual and potential sources of waste, both radioactive and non-radioactive, within the scope of the strategy. The scope may extend to the whole of a complex nuclear site or even to multiple sites. A BPEO study may be needed to identify an optimised strategy.

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.

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

Ionising radiation: Radiation that produces ionisation in matter. Examples are alpha particles, beta particles, gamma rays, X-rays and neutrons. When these radiations pass through the tissue of the body, they have sufficient energy to cause cell damage, in particular damage DNA.

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.

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.

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 (man Sv): A measure of collective dose.

Ministry of Agriculture, Fisheries and Food (MAFF): Ministry within Government having statutory responsibilities for food safety issues in the UK that, jointly with HMIP, authorised disposals of radioactive wastes (including emissions and discharges to the environment) from nuclear sites prior to April 1996. Statutory responsibilities for food safety passed to the Food Standards Agency (FSA) in April 2000.

National Assembly for Wales (NAW): 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 RSA93 for nuclear sites in Wales. Information about the National Assembly for Wales may be found on its website www.assembly.wales.gov.uk

National Radiological Protection Board (NRPB): NRPB was created under the Radiological Protection Act 1970. Its statutory functions under RSA93 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. The NRPB merged with the Health Protection Agency (HPA) in April 2005, and further information may be found on the HPA website at http://www.hpa.org.uk/radiation/.

Nirex: Nirex was set up in the early 1980s by the nuclear industry, with the agreement of the Government, to examine safe, environmental and economic aspects of deep geological disposal of radioactive waste. Information about Nirex may be found on its website at www.nirex.co.uk

Nuclear Decommissioning Authority (NDA): The NDA is a public body created by the Energy Act 2004. Its purpose is to oversee and manage the decommissioning and clean-up of the UK's civil nuclear legacy. Its role is to define best practice and develop a world-class centre of expertise that can deliver the very best solutions for local communities, for the taxpayer and for the environment. Information about the NDA may be found on its website at www.nda.gov.uk/

Operational Environmental Safety Case (OESC): For the purposes of this document, the OESC is taken to mean the compilation of documents prepared by BNFL demonstrating that the public are sufficiently protected whilst the site is under institutional control, from hazards which may arise as a result of the disposal of radioactive wastes on the site, in accordance with an authorisation under RSA93.

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. Mmore information is available on the OSPAR Commission website at http://www.ospar.org/eng/html/welcome.html

Plutonium Contaminated Material (PCM): A specific type of Intermediate Level Waste (ILW).

Post-Closure Safety Case (PCSC): For the purposes of this document, the PCSC is taken to mean the compilation of documents prepared by BNFL demonstrating that the public will be sufficiently protected after the period of institutional control, from hazards which may arise as a result of the disposal of radioactive wastes on the LLW Repository site, in accordance with an authorisation under RSA93.

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.

Prospective assessment: A dose assessment of the future radiological impact of proposed discharges of radioactive waste into the environment.

Radioactive Substances Act (RSA93): Legislation that controls the keeping and use of radioactive substances and the accumulation, discharge or disposal of radioactive waste.

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

Radioactive Waste Policy Group (RWPG): This is a Group, chaired by Defra, and made up of UK Government, devolved Administration and regulatory body representatives that meets regularly, several times a year, to discuss radioactive waste management policy and regulatory issues. The Group has the remit to carry out reviews, calling on external advice, as necessary.

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.

Radiological risk: The probability that an individual will suffer a serious radiation induced health effect as a result of the presence of a disposal facility. In this context, a serious radiation-induced health effect is a fatal cancer or a severe hereditary defect.

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

Retrospective assessment: A dose assessment of the current or past radiological impact due to past discharges of radioactive waste into the environment.

Risk target: A level of radiological risk from a single disposal facility which provides a numerical standard for assessing the long-term performance of the facility.

Scottish Environment Protection Agency (SEPA): Agency in Scotland having similar regulatory responsibilities to the Environment Agency in England and Wales. Information about SEPA may be found on its website www.sepa.org.uk

Sievert (Sv): A measure of radiation dose received.
millisievert (mSv): one thousandth of a sievert.
microsievert (microSv or μSv): one millionth of a sievert.

Storage: Placement of waste in any facility with the intent to retrieve it at a later time.

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'.

APPENDIX 1 – New Certificate of Authorisation

RADIOACTIVE SUBSTANCES ACT 1993

CERTIFICATE OF AUTHORISATION
AND
INTRODUCTORY NOTE

DISPOSAL OF RADIOACTIVE WASTE
FROM NUCLEAR SITE

BRITISH NUCLEAR GROUP SELLAFIELD Ltd

LOW-LEVEL WASTE REPOSITORY

DRIGG, CUMBRIA

AUTHORISATION NUMBER BZ2508/BZ2508

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 on or from the Operator's Nuclear Site at Drigg, Cumbria.

IN 3. The low-level radioactive waste (LLW) Repository at Drigg is owned by the Nuclear Decommissioning Authority and currently managed under contract by British Nuclear Group Sellafield Ltd. It is a national facility that receives and disposes of waste generated throughout the UK. The wastes received are mainly from the UK Nuclear Industry, although radioactive wastes from defence sites, hospitals, universities and other small users are also disposed. The site has been receiving waste since 1959, during which time the disposal practice has changed from tumble-tipping into clay lined trenches to the current practice of immobilised containerised waste disposed of in engineered concrete vaults.

The LLW site also currently stores Plutonium Contaminated Material (PCM), which is being progressively retrieved and transferred to the Sellafield site for long-term storage. All PCM waste is expected to have been removed from the LLW site by end 2006.

IN 4. The Certificate of Authorisation comprises a signed certificate together with 9 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 8 include limitations and conditions on the radionuclides in the waste and the physical nature of the waste streams. Schedule 9 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 Certificate requirements will also be placed on the registers.

IN 6. This note does not form part of the Certificate of Authorisation.

RADIOACTIVE SUBSTANCES ACT 1993

Authorisation to Dispose of Radioactive Waste on/from the premises occupied by British Nuclear Group Sellafield Ltd on the Nuclear Site at Drigg

British Nuclear Group Sellafield Ltd

BZ2508/BZ2508

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 Group Sellafield Ltd
(Company Registration No 1002607)
("the Operator")

whose Registered Office is

1100 Daresbury Park, Daresbury
Warrington, WA4 4GB

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

Drigg, Holmrook
Cumbria, CA19 1XH

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

This Authorisation shall come into effect on <<**DD/MM/YY**>>

Signed .....
I W Parker

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 on the site 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 LLWR 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 LLWR 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;

"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 volume as specified in writing by the Agency;

"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;

"LLWR waste" means solid radioactive waste, including any immediate package, intended by the Operator for final disposal at the Low Level Waste Repository at Drigg;

"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;

"package" includes any sack, drum, container or wrapping;

"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;

"Sellafield Site Operator" means the current holder of the licence issued under the Nuclear Installations Act 1965 for the Sellafield Site;

"year" means any period of 12 consecutive months;

(b) "Conditions for Acceptance" means quantitative or qualitative criteria specified by the operator, for solid radioactive waste to be accepted by the operator of the LLW repository for disposal. Waste acceptance requirements might include, for example, restrictions on the activity concentration or the total activity of particular radionuclides (or types of radionuclide) in the waste or requirements concerning the waste form or waste package.

"Environmental Safety Cases" means the compilation of documents prepared by the Operator to demonstrate that the public are sufficiently protected from hazards which may arise as a result of the disposal of radioactive wastes on the site;

"Substances", where not radioactive, shall have the same meaning as used in the Pollution Prevention and Control (England and Wales) Regulations 2000 (SI 2000 No. 1973).

(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
Solid Waste	Transfer to the Sellafield Site Operator at Sellafield for the purpose of treatment prior to final disposal at the Low-level Waste Repository at Drigg
	Transfer to the Sellafield Site Operator at Sellafield for the purpose of storage
	Deposit on the premises

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 Table 1 in this Schedule and such other outlets as the Agency may approve in writing.

Table 1

Authorised Gaseous Discharge Outlets
B734.1 stack serving Magazine 4 Retrieval Facility
B735.1 stack serving Magazine 5 Retrieval Facility
B739.1 stack serving Magazine 9 Retrieval Facility
B740.1 stack serving Magazine 10 Retrieval Facility
B743.2 stack serving Backlog LLW Processing facility
B746 stack serving PCM Drum Processing Building
B747 stack serving Transportable PCM Waste Storage facility
B755 stack serving the Grouting Facility

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.

Table 1

Authorised Aqueous Discharge System
System provided by the Operator for the discharge of process water and leachate from the low-level waste disposal site at Drigg to the Irish Sea via the marine pipeline.

3. In the event of exceptional storm conditions and provided that:

   i) the maximum capacity of the marine pipeline (50 l s^{-1} in total) is exceeded; and

   ii) the maximum storage capacity (469 m^3) in the Marine Holding Tank is fully utilised.

   Aqueous effluents as specified by the Agency may be discharged to the Drigg Stream.

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 THE SELLAFIELD SITE OPERATOR AT SELLAFIELD FOR THE PURPOSE OF TREATMENT PRIOR TO FINAL DISPOSAL AT DRIGG UNDER SCHEDULE 8 OF THIS CERTIFICATE

1. The Operator shall not transfer any consignment of LLWR 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;

2. The Operator shall not transfer LLWR 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 LLWR 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 LLWR 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 the Table in Schedule 8;

(b) obtain a record signed on behalf of the person to whom LLWR 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 LLWR 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 Low Level Waste Repository at Drigg.

Schedule 7

LIMITATIONS AND CONDITIONS RELATING TO DISPOSAL OF RADIOACTIVE WASTE BY TRANSFER TO OTHER PREMISES

1. The Operator shall not, except as allowed by Schedule 6, transfer radioactive waste to a person specified in the Table in this Schedule after 31 December 2006.

2. 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.

3. The Operator shall:

   (a) ensure that the person to whom waste is transferred receives at the time of transfer of each consignment a clear and legible note signed on the Operator's behalf stating the total activity in the consignment of each relevant radionuclide or group of radionuclides listed in the Table in this Schedule;

   (b) obtain a record signed on behalf of the person to whom waste is transferred, at the time of transfer, stating that the transfer has taken place.

4. If required by the Agency, the Operator shall ensure that any consignment or part of any consignment of 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 Low-Level Waste Repository at Drigg.

Table

Person to whom waste may be transferred	**Radionuclide or Group of Radionuclides**
The Sellafield Site Operator at Sellafield for the purposes of storage.	Total Alpha
	Total Other

Schedule 8

LIMITATIONS AND CONDITIONS RELATING TO DISPOSAL OF SOLID RADIOACTIVE WASTE BY DEPOSIT ON THE PREMISES

1. The Operator shall not, by deposit on the premises:

   (a) dispose of any consignment of solid 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 dispose of solid waste in which, in total, the activity of any radionuclide or group of radionuclides listed in the Table in this Schedule exceeds the relevant Annual Limit;

2. The Operator shall not dispose of, by deposit on the premises, solid 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 use the best practicable means to limit the migration of any radionuclides from the deposited waste.

4. The Operator shall use the best practicable means to collect leachate arising from previously deposited waste, which shall be discharged via the systems referred to in Schedule 4, unless otherwise agreed in writing by the Agency.

5. The Operator shall design, operate and close the facility in accordance with the assumptions made in the most recent environmental safety cases, unless otherwise agreed in writing by the Agency.

Table 1

Radionuclide or Group of Radionuclides	Annual Limit, TBq
Uranium	0.3
Radium-226 plus Thorium-232	0.03
Other alpha emitters [1]	0.3
Carbon-14	0.05
Iodine-129	0.05
Tritium	10
Cobalt-60	2
Other radionuclides [2]	15

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

Schedule 9

IMPROVEMENT AND ADDITIONAL INFORMATION REQUIREMENTS

1. The Operator shall complete the requirements specified in the Table in this Schedule 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 practices for waste generated on the site continue to represent the best practicable environmental option, 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 the impacts from all waste disposals on the site. This shall include a comprehensive review of options for reducing the peak risks from deposit of solid waste on the site, where those risks arise from potential site termination events (e.g. coastal erosion and glaciation) and potential future human action.	2 years from the effective date of this Authorisation and at such intervals thereafter as the Agency specifies in writing.
3. 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.
4. The Operator shall establish and carry out a programme of research and development in support of items 1, 2 and 3 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.
5. The Operator shall prepare a document that states how it will address the findings of the Environment Agency's review of the 2002 Environmental Safety Cases.	6 months from the effective date of this Authorisation.

Requirement	Completion Date
6. The Operator shall update the Environmental Safety Case(s) for the site covering the period up to withdrawal of control and thereafter.	5 years from the effective date of this Authorisation, and at such intervals thereafter as the Agency specifies in writing.
7. The Operator shall establish a comprehensive programme of monitoring to confirm the integrity of both the interim cap covering past disposals, and the bentonite cut-off wall constructed to the north and east end of the disposal area. A report shall be provided to the Agency of the output from that monitoring programme.	1 year from the effective date of this Authorisation, and annually thereafter.
8. The Operator shall establish and implement a monitoring programme to determine the extent of groundwater contamination around the site arising from LLW disposals. A report of the programme and how the results have been used to both inform risk management options for the site and build confidence in safety assessment models, shall be provided to the Agency.	1 year from the effective date of this Authorisation, and annually thereafter.
9. The Operator shall develop Conditions for Acceptance (CFA) that are consistent with the assumptions made in the environmental safety cases.	6 months from the effective date of this Authorisation.
10. The Operator shall develop and implement a strategy for the long-term maintenance and active management of records associated with the deposit of low-level waste on the site.	1 year from the effective date of this Authorisation.
11. The Operator shall carry out appropriate monitoring related to Natura 2000 sites and Sites of Special Scientific Interest in west Cumbria. The Operator shall also carry out a comprehensive assessment of the impact of its radioactive discharges and disposals on ecosystems and wildlife species. The assessment shall use the most up to date assessment framework together with the results of relevant environmental monitoring. The Operator shall submit a written report to the Agency covering the monitoring and assessment.	1 year from the effective date of this Authorisation.
12. The Operator shall ensure that all environmental systems and equipment that are required to be maintained/tested in compliance with the Authorisation are categorised, clearly labelled and are clearly identifiable within a written maintenance schedule.	Implemented within 1 year from the effective date of the Authorisation.

Requirement	Completion Date
13. The Operator shall undertake a review that considers the nature, quantities and sources of foreseeable emissions of non-radioactive substances from the installation into each environmental medium, and a description of any foreseeable significant effects on the environment, and provide a detailed written report to the Agency.	2 years from the effective date of this Authorisation.

APPENDIX 2 – Statutory Consultees and Other Organisations Invited to Comment

Statutory Consultees under Sections 16(4A(a)) & 16(5) of the Radioactive Substances Act 1993 (as amended).

Food Standards Agency (FSA)
Health & 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
Nuclear Decommissioning Authority
United Utilities
English Nature

Other Organisations Invited to Comment:-

Government Departments, Advisory Committees and other Non-Departmental Public Bodies

Department of Trade and Industry (Dti)
Department of Health (DoH)
Department of the Environment, Food and Rural Affairs (Defra)
Department of Environment, Northern Ireland (NI)
Isle of Man Government (Department of Local Government & the Environment)
Lake District National Park Authority
National Assembly for Wales
North West Regional Development Agency
Nuclear Safety Advisory Committee (NuSAC)
Scottish Environment Protection Agency (SEPA)
UK Nirex Limited

Local Authorities and Parish Councils

Drigg and Carleton Parish Council
Gosforth Parish Council
Lancashire County Council
Ponsonby Parish Council
Seascale Parish Council
St Bridgets Beckermet Parish Council
St Johns Beckermet Parish Council

Waste Generators and associated organisations:

AWE plc
BAE Systems Marine Ltd
British Energy Generation Ltd
British Nuclear Group Sellafield Ltd

Devonport Management Ltd
Genesis Oil & Gas Consultants Ltd
GE Healthcare
Magnox Electric Ltd
Ministry of Defence (MOD)
Rolls Royce Marine Power Operations Ltd
Rosyth Royal Dockyard Ltd
Sellafield Shop Stewards Committee
Small Users
Springfields Fuels Ltd
United Kingdom Atomic Energy Authority
Urenco (Capenhurst) Ltd
West Cumbria Sites Stakeholder Group (formerly the Sellafield Local Liaison Committee)

Health related organisations

Carlisle & District Primary Care Trust
West Cumbria Primary Care Trust
Morecambe Bay Primary Care Trust
Cumbria & Lancashire Strategic Health Authority
Health Protection Agency (Cumbria & Lancashire Health Protection Unit)
Health Protection Agency (North West, Regional Environmental Advisor)
Health Protection Agency (Radiation Protection Division)

Non-Governmental Organisations (NGO) and other interested groups

Association of Nuclear Free Local Authorities
Cumbria Sea Fisheries Committee
Cumbrians Opposed to a Radioactive Environment (CORE)
Friends of the Earth
Greenpeace
National Farmers Union (North West Region)
West Cumbria and North Lakes Friends of the Earth

APPENDIX 3 – List of Organisations responding to Our Consultation

Statutory Consultees

Food Standards Agency (FSA)
Health & Safety Executive (HSE)
Cumbria County Council
Copeland Borough Council
Allerdale Borough Council
Nuclear Decommissioning Authority
United Utilities
English Nature

Government Departments, Advisory Committees and other Non-Departmental Public Bodies

Isle of Man Government (Department of Local Government & the Environment)
Nuclear Safety Advisory Committee (NuSAC)
Committee on Medical Aspects of Radiation in the Environment (COMARE)
UK Nirex Limited

Local Authorities and Parish Councils

Drigg and Carleton Parish Council

Waste Generators and associated organisations

British Energy Generation Ltd
British Nuclear Group Sellafield Ltd
Small Users (c/o Griffiths Consultancy Services)
United Kingdom Atomic Energy Authority

Health related organisations

North Cumbria Primary Care Trusts
Health Protection Agency (Radiation Protection Division)

Non-Governmental Organisations (NGO) and other interested groups

Association of Nuclear Free Local Authorities
Cumbria Sea Fisheries Committee
Cumbrians Opposed to a Radioactive Environment (CORE)
Greenpeace
All Ireland Nuclear Free Local Authority Forum

Others

Jackson Consulting (UK) Ltd + 5 Individuals

APPENDIX 4 – Places where Consultation Documents can be viewed

Cumbria County Council
The Courts
Carlisle
Cumbria
CA3 8LZ

Copeland Borough Council
The Council Offices
Catherine Street
Whitehaven
Cumbria
CA28 7NY

Allerdale Borough Council
Allerdale House
New Bridge Road
Workington
Cumbria
CA14 3YJ

Barrow-in-Furness Borough Council
Town Hall
Duke Street
Barrow-in-Furness
Cumbria
LA14 2LD

Carlisle City Council
Civic Centre
Carlisle
Cumbria
CA3 8QG

Eden District Council
Town Hall
Penrith
Cumbria
CA11 7QF

South Lakeland District Council
Lowther Street
Kendal
Cumbria
LA9 4UD

Cumbria Library
Arroyo Block, The Castle
Carlisle
Cumbria
CA3 8XF

Workington Library
Vulcan Lane
Workington
Cumbria
CA14 2ND

The Daniel Hay Library
Lowther Street
Whitehaven
Cumbria
CA28 7QZ

Charles Edmonds Library
Wyndham School
Egremont
Cumbria
CA22 2DH

Millom Library
St George's Road
Millom
Cumbria
LA18 4DD

Gosforth Library
Public Hall
Gosforth
Seascale
Cumbria
CA20 1AS

Cleator Moor Library
Market Square
Cleator Moor
Cumbria
CA25 5AP

Seascale Library
Gosforth Road
Seascale
Cumbria
CA20 1PN

Environment Agency
North Area Office
Ghyll Mount
Gillan Way
Penrith 40 Business Park
Penrith
Cumbria
CA11 9BP

Environment Agency (NW Region)
Appleton House
430 Birchwood Boulevard
Birchwood
Warrington
WA3 7WD.