BNGSL SELLAFIELD, REPOSITORY SITE AT DRIGG AND UKAEA WINDSCALE

WEST CUMBRIA SITES STAKEHOLDER GROUP

QUARTERLY REPORT FOR 1 JANUARY TO 31 MARCH 2006

FOREWORD

This report is issued to the West Cumbria Sites Stakeholder Group (WCSSG) to make information available about the regulatory activities of the Environment Agency relating to the above nuclear licensed sites.

Environment Agency nuclear regulators attend meetings of the WCSSG and will be happy to respond to questions raised there. Alternatively please contact us at our Penrith office:

Team Leader (Sellafield), Nuclear Regulation Group (North), Environment Agency, Ghyll Mount, Gillan Way, Penrith, Cumbria CA11 9BP. (project.sellafield@environment-agency.gov.uk). tel: 01768 215705.

We would like to improve this report over time and would be happy to hear your views on its format and content.

For more general information about the Environment Agency and its environmental regulation at nuclear sites see our website at the address below:

http://www.environment-agency.gov.uk/business/444304/945835

1 INTRODUCTION

Our Nuclear Regulation Groups work to ensure the protection of the public and the environment from the radiation exposure attributable to the disposal and discharge of radioactive waste. We also aim to prevent pollution, to protect and enhance the environment and to contribute to the UK's aim of sustainable development. We apply a legal framework of licensing (authorisation), compliance assessment and enforcement to ensure that the environmental impact of nuclear sites both now and in the future is as small as it can be. We recognise that to achieve the best environmental outcomes we need to supplement direct regulation with partnership working involving dialogue and joint problem solving. Annex 1 sets out our role at nuclear sites in more detail.

This report presents a summary of our regulatory work at Sellafield, Windscale, Calder Hall and the low-level waste repository (LLWR) at Drigg over the past 3 months. The issues addressed in this issue are:

2 OUR STRATEGIC FRAMEWORK

A significant development during the reporting period has been the initial steps taken to develop our regulatory strategy for the Sellafield site. Before providing a summary of this work is it important to set it in the context of our corporate strategic framework.

The Environment Agency's **vision** for the environment in England and Wales is a better place for people and wildlife, for present and future generations.

In our new **corporate strategy** (*Creating a Better Place)* to be published in April, the Environment Agency describes how we hope to bring about our vision by working towards 9 environmental outcomes. Eight of these are relevant to the regulation of nuclear sites:

- A better quality of life
- An enhanced environment for wildlife
- Cleaner air for everyone
- Improved and protected inland and coastal waters
- Restored, protected land with healthy soils

• A greener business world
• Wiser, sustainable use of natural resources
• Limiting and adapting to climate change

We will deliver these outcomes by applying 5 roles:

• An efficient operator

We focus on environmental outcomes. We carry out our regulatory role in a way that gets the maximum benefit for the environment from public and charge payers' money

• A modern regulator

We work to prevent pollution and protect people and the environment from harm. We aim to find the right balance – a proportionate, risk-based response, that will drive environmental improvements, reward good performance, but still provide the ultimate reassurance that tough action will be taken on those who fail to meet acceptable standards. We aim to be:

- transparent – we must have rules and processes which are clear to those in businesses and local communities;
- accountable – we must explain ourselves and our performance;
- consistent – we must apply the same approach within and between sectors and over time;
- proportionate (or risk-based) – we must allocate resources according to the risks involved and the scale of outcomes which can be achieved;
- targeted (or outcome-focused) – the environmental outcome must be central to our planning and in assessing our performance.

• An influential adviser

We use our knowledge and operational experience to advise others on improving and changing policies and practices for the good of the environment

• An active communicator

We collect and collate data and information on the operation of the nuclear industry and present this in ways that improves understanding of the its environmental impact.

• Champion of the environment (in the context of sustainable development).

We aim to ensure that an appropriate balance is achieved between the interests of the environment and social and economic needs.

In addition to our corporate strategy we have been involved in developing the **Nuclear Sector Plan**. The purpose of the Plan is to promote continuous improvements of the industry's performance in order to deliver environmental

benefits that extend beyond those that can be achieved by regulatory compliance alone.

Based on a strategic review of the Sector's environmental issues (the 'Sector Report'[1]), the Plan identifies high level environmental priorities and objectives for the next five to fifteen years. The aim is to achieve these environmental objectives through a programme of key actions for industry and the Agency, covering both statutory and voluntary activities. Indicators of performance are proposed for monitoring the effectiveness of these actions.

We have certain regulatory responsibilities and will ensure that these are carried out appropriately. However, one of the main features of this Plan is to identify those parts of the nuclear industry that have greatest environmental impact and to identify those areas where we may be able to work with industry to achieve most overall environmental benefit. These priorities need to be identified in order for our regulatory resources to be targeted most effectively. It is likely that we will be unable to influence directly all of the outcomes. The suitability of other instruments, e.g. voluntary agreements, will therefore need to be investigated, where regulation is not possible or suitable.

The first version of the Nuclear Sector Plan provides an initial view of the most important objectives, but it does not reflect an exhaustive analysis of the issues. We need to work with the nuclear industry and other stakeholders to identify gaps in knowledge and establish mechanisms for data gathering. The Plan has been developed in discussion with the industry and now forms the basis for wider stakeholder consultation.

Operators of nuclear licensed sites and those carrying out licensable activities at defence installations have committed to use this framework to set environmental performance targets, monitor their performance and report publicly on their performance.

Our developing regulatory strategy for Sellafield

We believe it is important for a number of reasons to set out our long-term strategy for regulation at Sellafield. For example, it will apply our wider strategic framework summarised above to the unique and complex long-term issues at Sellafield and provide clear expectations during a period of change.

We have begun developing a draft paper to build on the wider strategies outlined above to provide a regulatory strategy for the specific challenges at Sellafield. It details how on-going compliance should be regulated but also how the best future environmental outcomes can be delivered through a collaborative approach that embraces integrated strategic waste planning guided by environmental protection and modern regulation principles. The strategy also details our strategic aims and

[1] The Sector report is available from www.environment-agency.gov.uk/sectorplans

objectives. We intend this to be a living document which will be adapted as we respond to changes and feedback, and as we deliver our desired outcomes.

Although still in its early stages we decided to share our draft paper as 'work in progress' with BNGSL, NDA and NII in January. We are considering feedback from these partners and will continue to work on improvements before we share it more widely.

3 COMPLIANCE ASSESSMENT

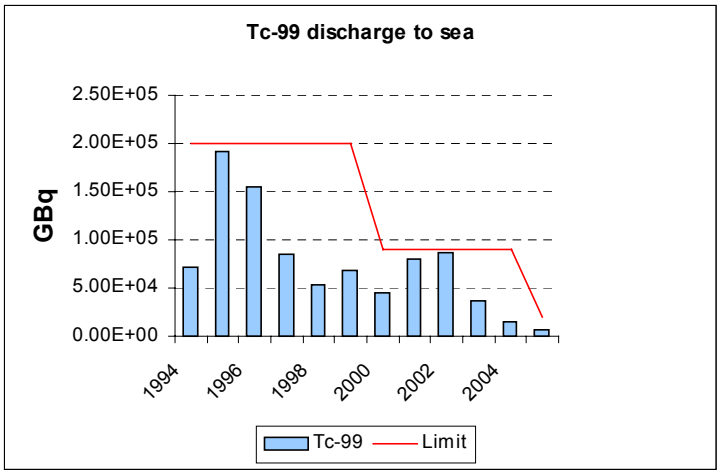
3.1 Radioactive Discharges

Review of discharges for 2005 - Highlights

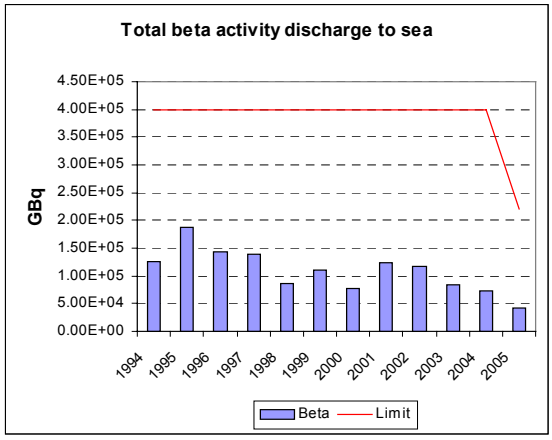
We have recently received the final set of discharge data for 2005 and are able to present an initial summary of the highlights. A more comprehensive report of discharges, environmental monitoring and the resulting radiation doses to the public will be published in the Radioactivity in Food and Environment (RIFE) report later in the year.

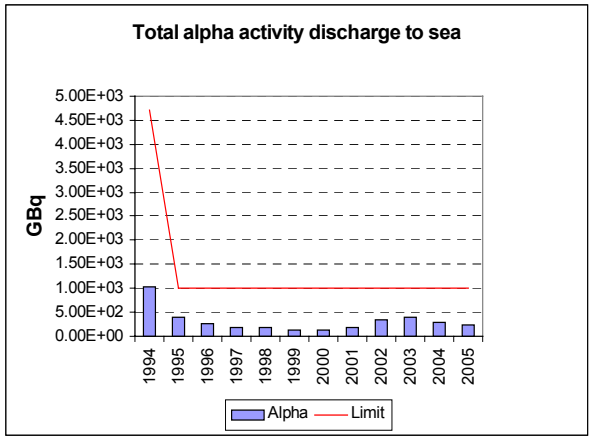
During 2005, no discharge exceeded 34% of the relevant site limit. The maximum discharge to atmosphere in 2005 (as a percentage of the relevant site limit) was for carbon-14, which was 28%. For liquid discharges to sea the maximum figure was for technetium-99 (Tc-99) at 34%.

Discharges of technetium-99 to sea decreased for the third consecutive year reflecting the successful implementation by BNGSL of the two process changes required by the Environment Agency (see chart below). This has been the subject of our previous reports to the WCSSG and is covered again in section 4 below.



Discharges of total alpha and beta radioactivity to sea also decreased in 2005 largely as a result of the low spent fuel reprocessing rates but also as a result of waste management changes e.g. abatement of Tc-99 has contributed to the reduction in beta radioactivity discharges (see two charts below).





Under-reporting of I-129 discharges

In November 2005, BNGSL reported to the Environment Agency that re-calibration of the techniques used to determine the gaseous discharges of iodine-129 (I-129) had revealed that an incorrect (low) factor had been applied to the calculations. Consequently I-129 discharges from specific THORP streams (i.e. those from the Dissolver Off Gas and Vessel Vent systems) have been underestimated.

BNGSL's investigation report was provided to the Environment Agency at the beginning of March 2006. The report states that the underestimation is restricted to the two effluent streams mentioned above and dates back to June 2003. The root cause of the event was failure to adequately manage changes affecting personnel, procedures and technical aspects when analysis of the samples for I-129 was transferred from the off-site to the on-site laboratories.

The extent of underestimation is thought to be by a factor of between 2.5 and 3. Although the gaseous effluent streams in question are major contributors to the site discharges of I-129, the under-reporting does not mean that discharge limits have been exceeded.

The BNGSL report identifies 12 specific recommendations. We shall review the recommendations and specific issues that led to this event and consider our actions in line with our enforcement and prosecution policy.

Implementation of best practicable means cases

Assessments of the application of the 'best practicable means' (BPM) to minimise waste and when carrying out other activities related to compliance have now been undertaken by BNGSL for most of the major facilities at Sellafield in line with our requirements. Our attention is now moving to the implementation and development of such BPM 'cases'. The Fuel Handling Plant (FHP) and SIXEP were among the first facilities to attempt to implement their BPM assessment.

3.2 Inspection Visits

Site inspections of facilities by our Nuclear Regulators and independent monitoring of disposals are, together with the other forms of compliance assessment, essential for effective regulation of nuclear sites. The inspections aim to provide assurance that an operator is complying with the relevant limitations and conditions of its authorisations issued under the Radioactive Substances Act 1993 (RSA 93) and the Environmental Protection Act 1990 (EPA 90). Our Nuclear Regulators made a total of 81 inspection visits to the Sellafield (including Calder Hall), LLWR at Drigg and Windscale sites over the three month period to the end of February (the latest month for which we have compiled data).

Team inspection of operational storage ponds

In addition to individual site inspection visits we also carry out team inspections where a team of Regulators will visit the site, typically over a period of a week, to assess compliance in specific areas.

We carried out a team inspection of the operational fuel storage ponds at the site during the w/c 13 February. The inspection included colleagues from the Nuclear Installations Inspectorate. The inspection scope included the following main themes:

- Compliance against the RSA93 Authorisation.
- Integrated approach to managing the ponds and their wastes.
- Evidence of sharing best practice and continuous improvement.
- Asset care.
- Application of the 'Waste hierarchy'.

We are currently considering our findings from the inspection and will be making recommendations where appropriate.

4 GENERAL REGULATORY MATTERS

4.1 BNGSL Sellafield

Magnox Reprocessing

The reprocessing throughput of Magnox fuel this financial year has been low. This has been due to a longer than planned shutdown and operational problems that have arisen since the process re-started. This has increased both the amount of fuel stored and the time it is stored at the Fuel Handling Plant (FHP) at Sellafield and at the Magnox power stations. It has also had an impact on the processing of the backlog of corroded fuel in FHP, which is now likely to take until at least mid-2008 to complete.

We continue to monitor closely Magnox reprocessing operations to assess:

- whether they are being conducted in a way that minimises environmental impacts both now and in the future; and

- progress towards meeting the Government strategy target that *"By around 2012, reprocessing of spent Magnox Fuel is expected to cease*"[2].

Processing of fuel from in the Fuel Handling Plant

A single skip of fuel was exported in January from the legacy Magnox pond and decanning facility on a trial basis to the Fuel Handling Plant (FHP).

We have been monitoring this trial closely and provided comment on the environmental assessments. We have a regulatory interest in this project because:

- There is currently no disposal route for such fuel;
- There is an opportunity for early reduction in environmental risk;
- There was potential for this work to impact on discharges;
- We are keen to ensure the maximum learning from this trial.

Overall the processing and reprocessing of the old fuel appeared to be relatively straightforward as FHP has experience of processing corroded fuel.

THORP

We have been involved with the NII in a review of the proposed strategy for the potential re-start of THORP, which had been submitted by BNGSL to the NII. The document lists the time scales for potential hold points and when applications for licence instruments need to be submitted to the NII prior to full restart.

Inter-site transfers of radioactive waste

The lifetime plans for many sites contain the assumption that they will move wastes to another site, frequently to Sellafield. Such movements have been routine in the past but there is a need for greater transparency and scrutiny on a national scale. The scale of the potential transfers that were envisaged in the draft NDA strategy represented a significant and novel development of Sellafield's operations.

We are participating in a tripartite working group relating to transfers of waste between nuclear sites with the aim of taking forward an effective, efficient, and transparent system to allow transfer of radioactive materials and wastes between sites including Sellafield.

Treatment of medium active concentrate

The final treatment campaign for medium active concentrate (MAC) was completed in December 2005. This represented a significant milestone in the reduction of hazard at the site because liquid MAC will no longer be stored in an ageing storage facility. It also means that the Tc-99 discharge from site will drop to below 10 TBq/y well before the target deadline of the end of 2006 set out in our 2001 Decision Document which is also included within the UK National Discharge Strategy. Tc-99

[2] UK Strategy for Radioactive Discharges 2001-2020, DEFRA, July 2002.

discharges for 2005 were 6.7 TBq, decreased from 87, 37 and 14 TBq in the previous three years.

Best Practicable Environmental Option for wet silo wastes

The treatment of waste to be retrieved from the wet silos in accordance with NII specifications is a high priority project for the Environment Agency. The inventory of waste represents a significant fraction of the UK's intermediate level waste (ILW). We have been monitoring and assessing progress with studies to determine the BPEO for the treatment of the waste. A range of options is being looked at with significant environmental implications for both the short and long-term.

Calder Hall power station

Work progresses with preparation for cooling tower demolition. BNGSL have now removed large volumes of plastic, wood and asbestos waste from the internals of the towers. We have reviewed the process for exemption of this waste from authorisation considering the large volumes involved. The assessment of the concrete towers is now complete. The concrete will be re-used (according to the waste management hierarchy) as in-fill for the tower basins. A small percentage of the concrete in lower basins of two of the towers is not exempt from authorisation under RSA93 and they will be segregated and disposed of under authorisation. The Environment Agency undertook independent check analysis of selected areas of the basins to confirm the BNGSL assessment.

Contaminated land and groundwater

We have received a comprehensive written response to our ten regulatory objectives for contaminated land and groundwater protection at Sellafield. This response and the significant programme of work supporting our objectives planned for 2006-8 provide increasing confidence that BNGSL are now moving forward very positively with this issue.

Borehole monitoring

Over the last few years we have been encouraging and requiring enhancements to the borehole monitoring in order to characterise the extent of groundwater contamination and to provide early warning of deteriorating environmental conditions. BNGSL has proposed an integrated groundwater monitoring programme that seeks to address the monitoring of sources of contamination both on and off-site and which is aligned to monitoring objectives. We have agreed with NII that the integrated groundwater monitoring programme should be required through the RSA93 authorisation. This new programme will replace the existing programme that focuses principally on site perimeter monitoring of the groundwater.

We consider that the proposed programme has a number of benefits over the existing programme i.e.

- it is linked to clear monitoring objectives;

- it is based on the latest information regarding contaminated land and groundwater at Sellafield and the site's hydrogeology;
- it seeks to monitor sources of contamination, groundwater quality and migration within the groundwater rather than being focussed on perimeter monitoring; and
- it is more extensive and will provide more information regarding the hydrogeology, the distribution of contamination, the impact on people and the environment arising from the contamination and the need for remedial action.

The main focus of the operator's characterisation and assessment work over the coming years is within the 'contamination controlled' area at the centre of the site, known as Separation Area. We will continue to monitor progress of this work with NII and ensure that the findings of both this work and the monitoring programme are reflected in subsequent revisions of the groundwater monitoring programme. Annual review of the programme will remain a statutory requirement.

Sea discharge pipelines

We continue to monitor and assess BNGSL's work on the sea discharge pipelines. We staged a meeting with BNGSL on the current work on the sea lines and sealine pipebridge. Current projects on the sea lines are:

- Replacement of the two diffusers at the end of the two operational pipes – planned for mid March – end April 2006.
- Sea Line 3 patches – repairs to the 2 patches are planned for March (Greenpeace patch) and April (inter-tidal area patch).
- Sealines pipebridge – work on this is progressing well, but the vulnerable tasks will be delayed until the sealine 3 supports across the pipebridge are improved and in a satisfactory condition. The concrete cover over the pipebridge is to be removed, this will make replacement of the supports easier, make future inspection of the supports easier, and, given the low activity of current (and predicted future) discharges, is not required for shielding.

On-site disposal

We are continuing with engagement on BNGSL's latest plans for taking forward the permitting of an expansion of on-site LLW landfill disposal – an existing facility has been extended but an application for operation has not yet been made. Renewed borehole sampling is planned to inform an application, similar to one that would be expected under the Pollution Prevention and Control (PPC) Regulations, to be made later this year. Meanwhile BNGSL are developing existing arrangements for the temporary storage of LLW that is not destined for the LLWR at Drigg.

Plutonium contaminated waste

We have developed a position statement with HSE/NII to inform discussions with BNGSL on the future treatment of plutonium contaminate waste (PCM). BNGSL have agreed to undertake a BPEO assessment to support decisions on the future of PCM treatment at the site. This BPEO will consider opportunities for the processing of PCM from other sites in the UK.

4.2 LLW Repository at Drigg (LLWR)

Planning applications

As part of BNGSL strategy to ensure uninterrupted receipt of LLW on the LLWR site, we have participated in the stakeholder workshops associated with contingency storage arrangements on the site, pending availability of the proposed Vault 9. As the arrangements relate to storage, prime responsibility will pass to HSE. However, we are working closely with BNGSL, HSE and the Planning Authorities to ensure that the arrangements will not result in discharges to the environment or prejudice the safe disposal of the waste at some point in the future.

4.3 UKAEA Windscale

Pile Projects

We attended the routine Regulator Liaison meeting. UKAEA continue to develop their programme in response to an NDA request to consider the impact of the removal of the care and maintenance period and early dismantling. UKAEA have delayed some design work and postponed the next stakeholder conference until this work is completed.

Western Area (WAGR, B52 & BOSS projects)

We attended a routine Regulator Liaison meeting and received briefing on UKAEA progress with rescheduling of dismantling of the WAGR pressure vessel in response to regulator concerns about HEPA filter waste production. The project has redirected its resources towards optimising the ventilation arrangements and other waste management tasks for the next few months.

Waste transfers from Sellafield

We attended a meeting with UKAEA and BNGSL to agree waste transfer arrangements in support of the monitoring of demolition wastes from Sellafield on the Windscale site.

Demolition Operations

We inspected arrangements for the management of dismantling and demolition wastes from B25 and F213. UKAEA have expended much effort in the segregation of LLW, hazardous wastes, metal wastes, and concrete/brickwork wastes arising from the demolition work. However the anticipated on-site recycling of concrete and small amounts of brickwork from B25 and F213 has not occurred and all demolition 'rubble' was consigned to off-site landfill. Options studied during the BPEO assessment for this work are not considered to have been broad enough and written feedback has been provided to UKAEA indicating our disappointment and our desire that they consider the waste recycling options more carefully for future demolition projects. As a result of this situation we have arranged a meeting with the NDA to discuss the generic issue of applying the waste management hierarchy.

We received UKAEA's response to our letter expressing disappointment and a desire that they consider the re-use/recycling options more carefully for waste from future demolition projects. The response indicated that UKAEA would no longer consign wastes to off-site landfill where there was potential for future re-use/on-site disposal but would temporarily store the wastes on-site. They noted the developing Integrated Waste Strategy (IWS) should inform future decisions.

Surplus source disposal programme

There was a potential delay to receipts of radium sources into B13. UKAEA had not received enough information from Nexia to allow UKAEA to demonstrate compliance with the RSA93 authorisation BPM condition and the Rn-222 discharge limit. The issue was finally resolved resulting in source receipt being approved by UKAEA from 1 February.

We have been involved in discussions regarding the issue of a disposal authorisation for radium sources from Protectis to B13/MBGWS (as part of the Surplus Source Disposal Programme).

5 AUTHORISATIONS

5.1 BNGSL Sellafield

Radioactive Substances Act 1993 (RSA93)

The current authorisation became effective on 1 October 2004. This authorisation is a 'multi-media' or integrated authorisation covering radioactive waste disposals to land, sea and air. The authorisation is associated with a 'lower-tier' Compilation of Environment Agency Requirements (CEAR) which adds more detail to those parts of the authorisation where, for example, Environment Agency specification, agreement or approval is required.

We plan to carry out regular reviews of the authorisation and CEAR to ensure that they are kept up to date and fit for purpose. We hope to perform these every year so that, should any changes be needed, they are available in time to be taken into account in the Site Licensee Company's Lifetime Planning process.

Work is nearing completion on the first such 'periodic review' and we have identified some changes which will be implemented by issue of a 'minor variation' to the authorisation. We have consulted with our two statutory consultees (NII and FSA) and have also, on this occasion, extended the consultation to Cumbria County Council, Copeland Borough Council and UKAEA Windscale. The NDA have been kept informed.

The key changes associated with the minor variation are:

- confirmation of a reduction in the site limit for discharges to sea of technetium-99 to 10TBq/y;

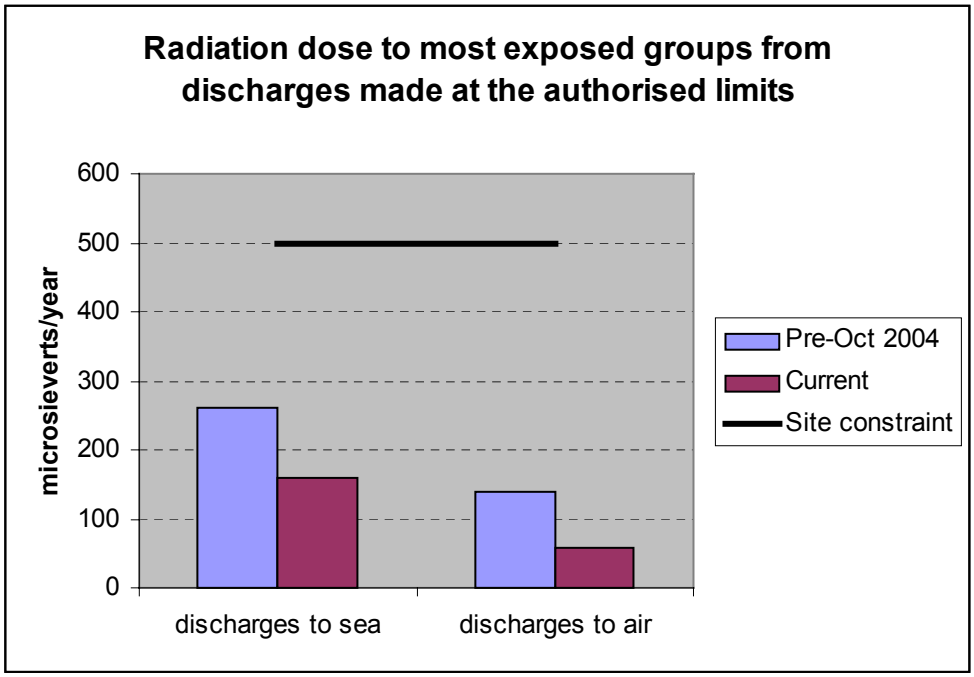
- changes to a small number of plant limits (increases and decreases);
- modification and addition of improvement or information requirements; and
- removal of completed improvement or information requirements.

The maximum radiation doses to the public in the unlikely event that future discharges equal the new discharge limits are given in the table below.

Discharges	Radiation dose (microsieverts per year)	Percentage of the public dose limit[1]	Percentage of the site constraint[2]
To sea	160	16	32
To air	57	5.7	11.4

1. The radiation dose limit for members of the public from manmade radiation (other than medical sources) is 1,000 microsieverts per year.
2. The constraint of radiation dose to the public from discharges from a single site is 500 microsieverts per year.

The chart below illustrates how changes in the discharge limits brought about recently because of waste management improvements and the closure of Calder Hall has resulted in a decrease in the maximum permitted doses.



We have just finalised changes to the CEAR and are consulting the operator on the proposed changes. The most significant element of this work has been the revision of the environmental monitoring programme. The programme has been re-focussed by reduction foodstuff monitoring (removing replication of the FSA programme) and a substantial increase in groundwater monitoring (including the introduction of groundwater independent check monitoring). The programme is now linked to clear monitoring objectives, which have been subject to consultation through the local stakeholder meetings.

IPC minor variation

BNGSL has applied for and been granted a variation to the IPC Authorisation to increase both the chromium concentration limit, from the EARP Concentrates process, and the overall chromium load from the site to allow the processing of legacy floc. Authorisation to discharge small quantities of ammonia and BUTEX, whilst processing floc, was also included.

5.2 LLW Repository at Drigg

Previous reports have provided an update on our review of authorisations for the LLWR. The final stage of that review was completed in February with the issue of our Decision Document. As part of the regulatory process, the Decision Document has been sent to the Secretaries of State, and we intend to implement our decision on 1 April 2006 (effective 1 May) unless we are directed by Ministers to do otherwise.

In our Decision Document, we propose combining the existing four separate authorisations into one modern authorisation, which will ensure that the generation of waste is minimised and that the radiological impact from disposals on the site will be kept as low as possible – both now and in the future.

Taking into account the possible effects of coastal erosion in the future, and after listening to the views of the general public, environmental organisations and other interested parties, we have also amended the conditions of the authorisation regarding solid waste disposal on the site.

BNGSL can continue to dispose of low-level solid radioactive waste in the current disposal area (known as Vault 8). However, we will not authorise disposals in a proposed new vault until the Local Planning Authority (Cumbria County Council) has granted planning permission and BNGSL has provided a detailed risk management study to demonstrate that the potential future impacts from coastal erosion are minimised. We will then review the remaining capacity of the LLWR, and publish our findings. Neither will BNGSL be allowed to construct the final cap over the older disposal areas at the site until we have received this study, required within two years.

The authorisation also includes updated conditions regarding discharge of radioactivity to atmosphere, discharge of contaminated water via a pipeline to the Irish Sea, and transfer of solid waste to the Sellafield site.

Our decision document can be found at:

http://www.environment-agency.gov.uk/commondata/acrobat/dd_final_1303041.pdf

Work continues on the Compilation of Environment Agency Requirements (CEAR) document, that will support the new Authorisation. We are also undertaking a readiness review, to assess whether BNGSL has suitable arrangements to ensure compliance with the new authorisation.

As part of the NDA's proposed competition of the management of the LLWR, a new and separate Site Licensee Company (SLC) will have to be created to hold the various regulatory permits. This will also entail separating the LLWR management from the Sellafield site. As part of this process, we attended a number of meetings with BNGSL, NII and NDA to discuss our regulatory expectations and the resource constraints. Comments have been made on the first draft of the application by BNGSL to transfer the authorisations to the new SLC. It is intended that the transfer application will be finalised at the time the new RSA 93 authorisation is issued on 1 April 2006.

5.3 UKAEA Windscale

The new RSA 93 authorisation was made effective from 1 January 2006.

6 STRATEGY AND PLANNING

We believe that it is important for us to work in partnership with other organisations in order that nuclear site clean-up is carried out so as to ensure the best overall environmental outcome and that future, as well as current, environmental impacts are minimised.

6.1 BNGSL Sellafield

RSA93 Authorisation Strategy

We held a workshop with BNGSL to consider the development of an authorisation strategy to 2020 and beyond. This considered the role of regular periodic reviews and decision points when a major review/public consultation might be appropriate. We plan to develop this strategy (as a supporting strategy to the overall regulatory strategy for Sellafield – see section 1 above) over the coming few years. This will take account of national developments.

Sellafield integrated strategy and integrated waste strategy

We continue to be engaged in the development of remediation strategy at Sellafield particularly in the development of the integrated waste strategy. This quarter we have provided advice on the analysis of the developing integrated strategy to ensure that environmental and safety principles such as the waste management hierarchy (WMH) continue to frame the strategic direction. We have developed joint guidance with the HSE/NII on the application of the WMH at Sellafield.

We have promoted the use of decision logic and calendars to ensure that strategic decision making is more transparent and supported by Best Practicable Environmental Option (BPEO) assessment where appropriate. There is now a well-developed logic to support decision making for remediation of the legacy ponds and silos. This approach is being developed for other priority areas for the site.

AGR Long-Term Storage (LTS) Strategy

We met with BNGSL and NII to review the work programmes commissioned to assess the potential corrosion rates of AGR fuel during long-term storage in pond water and the future designs of AGR containers capable of storing more irradiated fuel.

The predicted fuel quantities to be stored range from 4011tU (assuming THORP shutdown in 2011) to 5223tU (assuming early shutdown of THORP) or 6500tU (assuming early shutdown and the extension to AGR reactor lifetimes). We have advised BNGSL that a BPEO study should be to support the strategy.

Overall Effluent Strategy

We continue to monitor progress with the developing Overall Effluent Strategy being developed by BNGSL which attempts to provide a long term view of effluent management (liquid and gaseous) and long term predictions of effluent arisings.

Key findings of the work so far (to be confirmed) are:

- Discharges from site clean-up activities are not expected to challenge the current site discharge limits;
- Predicted discharges appear to be consistent with meeting the aims and targets of the UK National Radioactive Discharge Strategy.

7 EVENTS AND INCIDENTS

Advanced Gas Cooled Reactor (AGR) fuel pond

We visited the AGR fuel storage facility in February 2006 in order to gather information about the cause of a reported incident related to the leakage of pond water from the side of one of the pond walls.

We established that pond water did not overtop the confines of the facility but escaped through a thin gap in an expansion joint between abutting concrete blocks. Under normal operating conditions pond water would not travel via this route (as the pond water level is maintained below this level), however, at the time of the incident the pond level had been raised in order to test the response of specific equipment. It is not yet clear as to why the pond water level continued to rise and eventually escape via the breach in the expansion joint. This issue will be investigated further.

Samples taken from the pond sumps showed an increase in both beta/gamma activity and pH, indicating that pond water had moved into the under pond drainage network that leads to the sumps as designed. It appears that there was no spillage beyond the pond wall. BNGSL carried out procedures to ensure that the situation returned to normal and the pond level lowered.

The pond water collected, currently held in effluent tanks, may eventually be discharged to sea via a discharge route (SETP) that is different from that normally taken by the pond discharge (SIXEP), however, it will contribute only a small fraction (<1%) of the radioactivity normally discharged by this discharge route.

We are working with NII (who are also investigating this event) and considering our findings against our enforcement and prosecution policy.

SIXEP

An inadvertent release of inactive cooling water occurred at SIXEP on 30th January 2006. It is understood that the release was made via the authorised route and did not breach any limits. However, an inspection is planned to assess whether there are any IPC compliance or wider issues.

8 ENFORCEMENT ACTIVITY

None to report.

9 EMERGENCY PREPAREDNESS

We have assisted in the planning of the forthcoming emergency exercise for Sellafield (known as 'OSCAR 8'), which will take place in October.

ANNEX 1

THE ROLE OF THE ENVIRONMENT AGENCY AT NUCLEAR SITES

The Environment Agency has two Nuclear Regulation Groups (NRG), one covering nuclear sites in the north and the other covering sites in the south, with responsibility for the delivery of environmental regulation at such sites. NRG (North) is based at the Environment Agency's offices at Penrith and includes a team of Nuclear Regulators which cover Sellafield, Calder Hall, Windscale and the low-level waste repository at Drigg.

The NRGs work with numerous other Environment Agency groups in particular those which advise on policy, radiological monitoring and assessment and nuclear waste assessment. We also work very closely with colleagues in other functions such as water quality, waste, contaminated land and ecology to ensure an integrated approach.

We also work closely with a wide range of external stakeholders - local, national and international. In particular we work very closely with our colleagues in the Nuclear Installations Inspectorate (NII) of the Health and Safety Executive (HSE), the Food Standards Agency, local authorities and the Department for Environment, Food and Rural Affairs.

The NRGs work to ensure the protection of the public and the wider environment from radiation, to prevent pollution, to protect and enhance the environment and to contribute to the UK's aim of sustainable development. This is achieved through influence and education in addition to licensing/authorisation, compliance assessment and enforcement under legislation such as the:

- Radioactive Substances Act 1993 (RSA 93) (which deals with the disposal and discharges of radioactive waste from nuclear sites),
- Pollution Prevention and Control Regulations 2000 (PPC),
- Environmental Protection Act 1990 (EPA 90) (which deals with Integrated Pollution Control (IPC) among other things), and the
- Control of Major Accident Hazards Regulations.

The Environment Agency also has teams who deal specifically with water abstraction licensing, non-radioactive waste management licensing and liquid effluent discharges not covered under the above regulatory regimes but by 'consents' issued under the Water Resources Act 1991.

GLOSSARY (Not all terms may have been used in this report)

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

Activity: The rate of radioactive decay. Measured in the standard international unit, Becquerels (Bq).

Alpha particle/radiation: A particle consisting of two protons and two neutrons. Emitted by some radionuclides.

Authorisation: Permission given by the Environment Agency under certain environmental legislation e.g. the Radioactive Substances Act 1993, subject to limits and conditions which must be met.

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

- MBq equals 1 million transformations per second.
- GBq equals 1 billion transformations per second.
- TBq equals 1000 billion transformations per second.

Best Available Techniques (BAT): The use of the most effective process in preventing, minimising or rendering harmless polluting emissions taking into account availability.

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

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

Beta activity: Radionuclides that decay by emitting a beta particle.

Beta particle/radiation: An electron emitted by the nucleus of a radionuclide.

Critical group: A term used in radiation protection which refers to a small group of members of the public whose radiation exposure (or radiation dose) is reasonably uniform and is typical of people receiving the highest dose from a given source such as a nuclear power station. If the radiation exposure of this group is within statutory limits, then it can be inferred that the exposure of all others will also be within limits.

Dose: A measure of the radiation received. Various forms of dose are commonly referred to, including equivalent dose, effective dose and absorbed dose (measured in Sieverts and Grays). In this document it is used primarily to mean the effective dose.

Dose limit: For the purposes of discharge authorisations under the Radioactive Substances Act 1993, the UK applies a legal limit of 1 milliSv/y (1,000 microSv/y) to members of the public from all man-made sources of radiation (other than from medical exposure).

Effective dose: The quantity obtained by multiplying the equivalent dose to various tissues and organs by a weighting factor, appropriate to each, and summing the product. It allows the various equivalent doses in the body to be represented by a single number giving a broad indication of the health impact on an individual from an exposure to ionising radiation, regardless of the energy and type of radiation. This is the radiation dose quantity most often used and is often shortened simply to "dose".

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

Equivalent dose: The quantity obtained by multiplying the absorbed dose by a factor to allow for the different effectiveness of various types of ionising radiations in causing harm to tissue.

Food Standards Agency (FSA): The Food Standards Agency was formed in April 2000. It took over responsibility for food safety issues in the UK from MAFF.

Fuel reprocessing: The processing of spent uranium fuel from nuclear power stations to separate it into plutonium, uranium and waste fission products. The plutonium and uranium may be used again in new nuclear fuel.

Gamma ray/radiation: A discrete quantity of electromagnetic energy without mass or charge. Emitted by a radionuclide.

Half-life: The time required for the radioactivity of a radionuclide to decrease by radioactive decay to one half of its initial value.

Integrated Pollution Control (IPC): A statutory means of controlling pollution from major (non-nuclear) industry set up under the Environmental Protection Act 1990 (EPA 90). The main objectives are to prevent, minimise or render harmless polluting substances and to consider discharges from industrial processes, to all media, in the context of the effect on the environment as a whole.

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.

Isotope: Any of two or more species of atoms of a chemical element with the same number of protons but different numbers of neutrons.

Lifecycle Baseline (LCBL): The long-term plan covering the remaining lifetime of a nuclear site covered by the NDA.

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.

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

Magnox reprocessing: The reprocessing of Magnox fuel. See fuel reprocessing.

Medium Active Concentrate (MAC): A liquid waste arising during fuel reprocessing. It is concentrated by evaporation for storage purposes. It is similar to highly active liquor but is less radioactive.

Microsievert: See Sievert.

Most exposed group: Those members of the public who share similar habits and receive the highest dose from radioactive discharges. It should be noted that unlike the critical group definition, this does not take account of direct radiation from the site and therefore the most exposed group may not always be the same as the critical group.

Multi-media Authorisation: Authorisation issued by the Environment Agency under the Radioactive Substances Act 1993 of a 'multi-media' or integrated type covering radioactive waste disposals to land, sea and air.

Near Term Work Plan (NTWP): The detailed work plan over a three-year period for a nuclear site covered by the NDA. See also Life-cycle Baseline.

NII: Nuclear Installations Inspectorate is the part of the Health & Safety Executive which has responsibility for enforcing legislation relating to nuclear safety under the Nuclear Installations Act 1965 (NII 65). The NII is also responsible for regulating the storage and accumulation of radioactive waste on nuclear sites while the Environment Agency is responsible for regulating the disposal of that waste.

Nuclear Decommissioning Authority (NDA): A public body to come into force on 1 April 2005 to oversee and manage the decommissioning and clean-up of the UK's civil nuclear legacy.

Pollution Prevention and Control Regulations 2000 (PPC): The system of Integrated Pollution Prevention and Control applies an integrated environmental approach to the regulation of certain industrial activities. This means that the non-radioactive component of emissions to air, water, and land, plus a range of other environmental effects, must be considered together. The PPC regime is gradually replacing the Integrated Pollution Control regime (IPC).

Radioactive Substances Act (RSA) 1960, 1993: Statutory legislation to control the

keeping and use of radioactive substances and the accumulation, discharge or disposal of radioactive waste.

Radioactive waste: Material that contains radioactivity above the appropriate levels specified in the Radioactive Substances Act 1993 and which meets the definition of waste given in the Act.

Radionuclide: A general term for an unstable nuclide that emits ionising radiation (e.g Cs-137).

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

Often presented as a dose received over a period of time (dose rate) e.g. microSv per year

Technetium-99 (Tc-99): A radioactive element (half-life of 213,000 years) that is a product of nuclear fission. An emitter of low energy beta particles.

Terabecquerel (TBq): see **Becquerel.**