



Sellafield Ltd, LLWR at Drigg and UKAEA Windscale

WEST CUMBRIA SITES STAKEHOLDER GROUP

QUARTERLY REPORT FOR 1 JANUARY TO 31 MARCH 2008

FOREWORD

This report is issued to the West Cumbria Sites Stakeholder Group (WCSSG) to provide a summary of the regulatory activities of the Environment Agency relating to the above nuclear licensed sites.

Environment Agency nuclear regulators attend meetings of the WCSSG, and some of its sub-committees, 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. Email: nrg.north@environment-agency.gov.uk. Tel: 01768 215705.

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

EXECUTIVE SUMMARY

This provides a brief summary of some of the highlights of environmental performance and key challenges at the West Cumbria sites during the period. The figures in brackets indicate where to find more detail in the report.

Authorisations and permits

- We expect to issue a variation to the Sellafield RSA93 authorisation on 1 April 2008. This will incorporate the transfer of Windscale from UKAEA to Sellafield Ltd. (2.1, 2.2)
- We issued a variation to the Sellafield PPC permit to enable the Fellside combined heat and power plant to operate with lower height stacks, following recent damage and the discovery of corrosion at the base of the stacks. (2.1, 3.5)

Compliance assessment and enforcement

- Radioactive discharges to air and water were all well below the authorised site limits in the year to the end of December 2007. (3.1)
- We estimate that the annual radiation dose to the most exposed group of the public as a result of current discharges to sea from Sellafield was around 17 microsieverts. This is about 3% of the legal constraint on radiation dose to the public from a single site. (3.1)
- Approximately 350 radioactive items (mainly particles) have been found on the beaches of West Cumbria to the end of February 2008. Advice from the Health Protection Agency remains unchanged, i.e. no special precautions are necessary. (3.2)
- We have recommended improvements in the way that solids are prevented and minimised in liquid waste across the site. (3.3)
- We sent three warning letters to the sites this quarter. (3.4)
- Asset management appears to be associated with several events and incidents at Sellafield this quarter. (3.5)

Progress against our strategic objectives

- Plans are being developed for a sludge packaging plant at the Magnox fuel storage pond. (4.1)
- Preferred options have been identified for managing five different types of LLW. (4.2)
- Revised guidance on higher activity wastes has been issued by the regulators. (4.3)
- A strategy is being developed to improve asset management across the Sellafield site (4.4)
- Potential options for managing spent Magnox fuel. (4.7)
- An independent review of the contaminated land programme found that Sellafield Ltd are making good progress in developing their long-term strategy. (4.8)
- We continue to be closely involved with the competition and transition process for new Parent Body Organisations (PBOs) for the LLWR and Sellafield sites. (4.9)
- Vault 9 at the LLWR has been granted planning permission for storage use only. (4.10)

1 INTRODUCTION

This report presents a summary of our work at Sellafield, Windscale, Calder Hall and the Low-Level Waste Repository (LLWR) near Drigg over the three months to the end of March 2008.

The report covers progress against our regulatory strategy which steers our work at nuclear sites. Our strategy sets out, among other things:

- our long term objectives;
- our expectations of the operator;
- how our strategy connects with the wider Environment Agency vision and goals.

The contents of this issue are:

[Authorisations and permits](#)

[Compliance assessment and enforcement](#)

[Strategic objectives](#)

[Annex 1 – Our role](#)

[Annex 2 – Glossary](#)

Our role

Our role is to ensure the protection of the public and the environment from the radiation exposure that may result from the disposal and discharge of radioactive waste. We also aim to prevent pollution, to protect and enhance the environment, and to contribute to the sustainable development of the UK.

The operation and clean up of nuclear sites generates radioactive and non-radioactive wastes. To ensure that the impact of those wastes on people and the environment is as small as it can be, now and in the future, we supplement direct regulation with partnership working. If you want to know more about our role on nuclear sites see Annex 1 or our website at the link below:

[Environment Agency regulation at nuclear sites](#)

2 AUTHORISATIONS AND PERMITS

The West Cumbria sites hold various environmental authorisations and permits. We aim to issue, regularly review and revise these as necessary to ensure that they are up to date, flexible and fit for purpose.

2.1 Sellafield Ltd

Radioactive Substances Act (RSA93)

Disposals and discharges of radioactive wastes are only permitted subject to strict limits and conditions under an RSA93 authorisation.

We completed our periodic review of the Sellafield RSA93 authorisation and our consultation on the proposed variation to the authorisation last quarter. We expect the varied authorisation (which will include the transfer of Windscale - see below) to come into effect on 1 April 2008. In summary the main changes are:

- Changes (increases and decreases) to a small number of plant limits;
- Increase in the site limit for antimony (Sb)-125 gaseous discharge to account for improved discharge accountancy;
- Increase in the iodine (I)-129 limit for disposal to LLWR to allow for increased arisings due to decommissioning and clean up work;
- Introduction of conditions related to the operation of the Calder Floodplain Landfill Extension Segregated Area (CLESA) that were previously in the lower tier Environment Agency Requirement (EAR); and
- A number of administrative, consistency (e.g. modifications to bring consistency with RSA93 authorisations for other nuclear sites) and typographical changes.

In addition there are a number of changes to the lower tier EAR documents.

As reported in December 2007 these changes will not have a significant effect on the radiation dose to the public from discharges made at site limits from the Sellafield and Windscale sites.

Pollution Prevention & Control (PPC)

The prevention and control of non-radioactive pollutants, and other environmental impacts, at the Sellafield site is regulated under the PPC regime.

Following the recent discovery of stack corrosion at Fellside Combined Heat and Power plant (see 3.5 below), we granted permission for the plant to operate one gas turbine with a short stack to back-up the auxiliary boiler which had become the sole supplier of steam (an essential service which provides various nuclear safety functions) to the Sellafield site. We followed this up with the issue of a variation to the PPC permit to allow the three gas turbines at Fellside to operate with a lower stack height for around six months while replacement stacks are bought and installed. This is likely to result in a minor increase in concentrations of nitrogen oxides (NOx) at ground level close to the plant, but we do not expect the effect on air quality to be significant. We have required local monitoring for NOx to be carried out more frequently while the plant is operated in this way.

2.2 UKAEA Windscale

Transfer of the RSA authorisation to Sellafield Ltd

No concerns were raised when we consulted on the proposed transfer of the Windscale RSA authorisation from UKAEA to Sellafield Ltd. We plan to transfer the authorisation from UKAEA to Sellafield Ltd, and issue a combined authorisation which incorporates the provisions of the Windscale authorisation on 1 April 2008. The need for the transfer has been brought about by the NDA's industry restructuring and competition plans.

3 COMPLIANCE ASSESSMENT AND ENFORCEMENT

Compliance assessment is an important part of our regulatory strategy. One of our strategic objectives states that “we will continue to assess compliance with the limits and conditions of the permits and authorisations”. This section provides highlights of our assessment and site inspection activities over the reporting period.

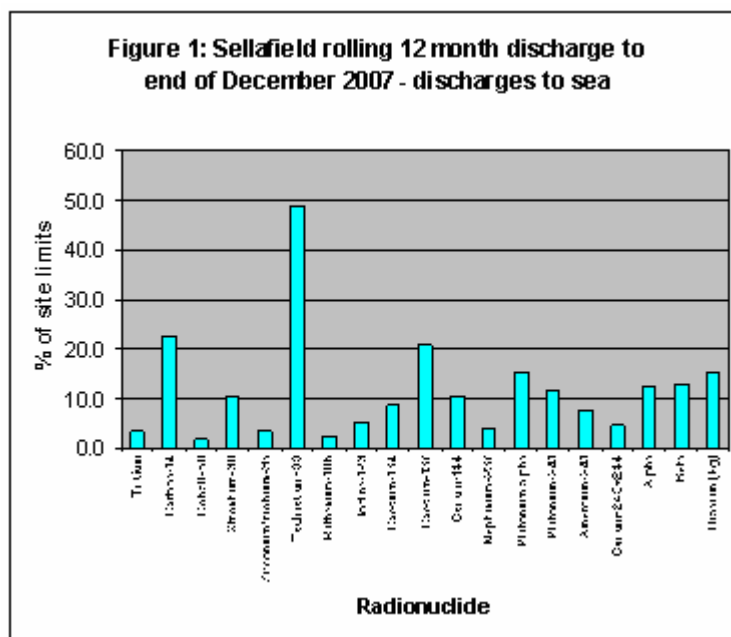
More details of discharge and environmental monitoring data can be found in our annual Radioactivity in Food and Environment (RIFE) report. RIFE is published jointly with the Food Standards Agency, Scottish Environment Protection Agency (SEPA) and the Environment and Heritage Service of Northern Ireland. The RIFE report for 2006 can be found at: [RIFE 2006](#)

3.1 Radioactive discharges

There were no breaches of the site limits on radioactive discharges to land, sea or air during the reporting period at any of the West Cumbria sites.

Discharges to sea

Radioactive discharges to sea from Sellafield for the 12 months to the end of December 2007 were all well below the authorised limits – see Figure 1 below. Note that for certain radionuclides the site limits for calendar years relate to the amount of spent fuel reprocessed (‘throughput related limits’).



Our assessment of the annual radiation dose to the most exposed group of the public from the discharges of radionuclides subject to numerical limits is given in Figure 2. The total dose was about 17 microsieverts, which is about 3% of the constraint on dose from discharges from a single site (500 microsieverts per year) and less than 1% of the average dose from natural background radiation. Note that this dose assessment does

not include the radiation dose from radioactivity already in the environment from discharges made in the past.

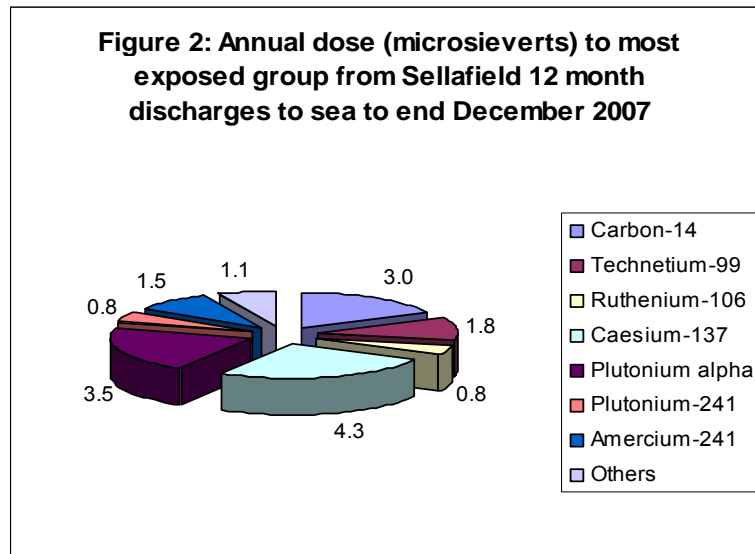
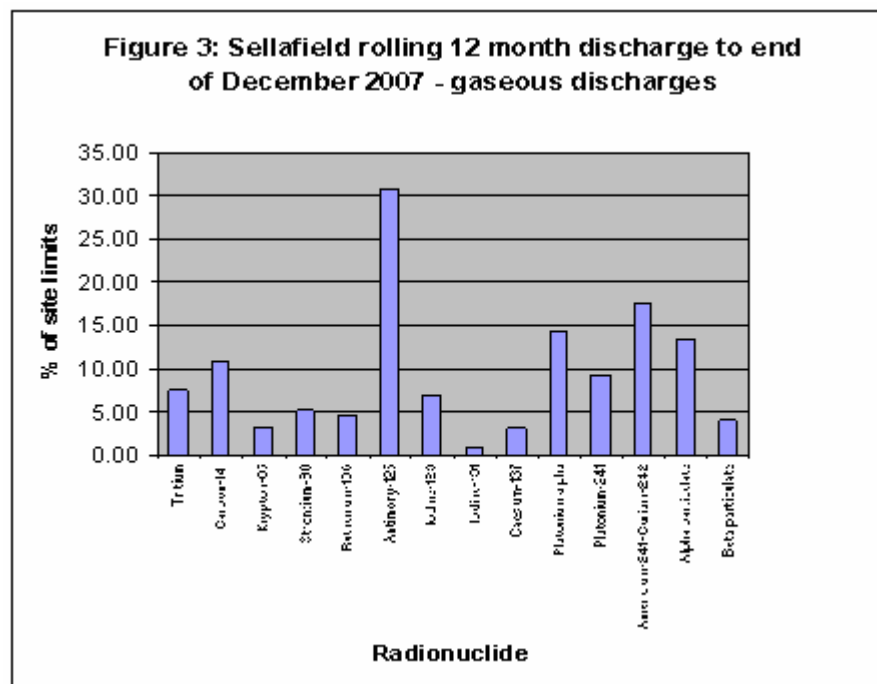


Figure 3 gives the rolling 12 month discharges to air to the end of December 2007 as a percentage of the site limits.



Minor change to discharge monitoring

We have agreed that Sellafield Ltd do not need to continue to analyse and report discharges of promethium-147; the dose from this radionuclide is extremely small. The Food Standards Agency (FSA) will continue to measure promethium-147 in selected environmental samples.

3.2 Environmental monitoring

Beach monitoring programme

Since January 2008 the beach monitoring programme being carried out by Sellafield Ltd, as required by the Environment Agency, has concentrated on the areas closest to Sellafield, moving north to Whitehaven and Parton. Bad weather and rough terrain have made monitoring difficult, and a smaller area has been monitored than originally planned. To the end of February about 350 items (mainly small particles) have been found. More detailed analysis of the particles is underway. Advice from the Health Protection Agency remains unchanged i.e. no special precautions are necessary.

For more details see our website at:

[Beach monitoring and Sellafield particles](#)

More details are also available via the Sellafield website:

[Sellafield Sites - Beach monitoring](#)

CLESA monitoring programme

We are assessing a review of the environmental monitoring programme for the first three months of operation of the Calder Floodplain Landfill Segregated Area (CLESA), which is used to dispose of high volume low-level radioactive waste on the Sellafield site. Sellafield Ltd are only permitted to use the bottom section of the landfill at present. This should provide capacity for another 2 years. We expect Sellafield Ltd to submit an application to dispose of waste along the side walls, which will more than double the available space, later this year.

Iodine in milk

There was an abnormal increase measured by Sellafield Ltd in concentrations of iodine-129 in samples of milk from a local farm in late 2007. However, the levels involved were still very low and not significant in terms of radiation dose to people. There is no obvious cause for this increase. The issue is being investigated – this will include analysing samples from another nearby farm to see if an increase is evident there.

3.3 Site inspection and assessment

Site inspections and assessment by our nuclear regulators are essential for effective regulation of nuclear sites. The main aim of our site inspection and assessment is to provide assurance that an operator is complying with the relevant limits and conditions of its authorisations issued under the Radioactive Substances Act 1993 (RSA 93), the Environmental Protection Act 1990 (EPA 90) and other relevant legislation and policy. The following provides some highlights of our site inspection and assessment activities over the reporting period.

Prevention and minimisation of suspended solids in liquid waste

As reported last quarter, we carried out an inspection in December 2007 to check progress with measures across the site to prevent solids and particles entering liquid waste streams destined for sea discharge. In summary, we expect Sellafield Ltd to improve the final filtration of liquid effluents before discharge to sea and to continue

work to prevent and minimise solids in liquid effluent at source. Sellafield Ltd are currently considering how to address our recommendations.

Solid waste audit

Sellafield Ltd have responded to our solid waste audit report, which was issued in July 2007. In general, they have made satisfactory progress against our recommendations. However, we have suggested that the waste management arrangements could be improved and that an independent review be carried out to inform any future reorganisation in this area.

We have been discussing how best to take forward issues arising from this audit with the HSE, who are responsible for regulating the storage and accumulation of radioactive waste at nuclear sites.

LLWR at Drigg

We inspected the drainage systems at the LLWR in February and did not find any significant issues. We will use the information we gathered to review the site's consents for discharges of non-radioactive substances under the Water Resources Act.

3.4 Enforcement

We expect full voluntary compliance with legal requirements and authorisations. However, we will not hesitate to use our enforcement powers, if necessary, to secure compliance, or to ensure that preventative or remedial action is taken to protect the environment. The need for enforcement may stem from an unauthorised 'incident' or from a breach of the conditions of an authorisation or permit. This section contains a summary of enforcement activity during the quarter and any follow-up of previous action.

Sellafield

We sent two warning letters to Sellafield Ltd in February, in relation to the following:

1. Elevated discharges of caesium-137 from the Fuel Handling Plant (reported previously), which breached the plant limit during the period September 2005 to August 2006. The work carried out by Sellafield to address the root cause of the elevated discharge has led to a better understanding of the processes which generate the radioactive contamination in air at the plant, and how to control them. This has led to a significant reduction in discharge.
2. Failure to report promptly, damage to the final effluent filters on sealine 3 in March 2005 and November 2006. We have recently been informed of a further incidence of damage to the final effluent filters. We are investigating this and considering further enforcement action.

LLWR

We sent a warning letter to the LLWR in January to indicate to the site that we consider recent failures to monitor and sample properly (reported previously) to be a breach of authorisation conditions. We inspected sampling arrangements at the LLWR in January, and are satisfied that the site has taken action to improve arrangements.

3.5 Events and incidents

This section contains a report of events and incidents of relevance from an environmental perspective.

Corroded discharge stacks at Fellside Combined Heat and Power plant

The CHP plant at Fellside is the main source of essential steam for the Sellafield site. One of the Gas Turbine (GT) discharge stacks became unstable following the high winds in late January/early February. Two of the three Gas Turbines were subsequently shut down, and the steam supply to the Sellafield site was maintained via the remaining Gas Turbine and the Auxiliary Boiler. Subsequent inspections by Sellafield Ltd revealed significant corrosion around the bases of all three GT stacks which meant that all three needed to be taken down. All three GTs are now operating with shorter stacks while new stacks are installed (see 2.1 above). This has restored an adequate supply of steam to the site to support nuclear safety, provide space heating and continue hazard reduction (e.g. operation of the vitrification plant).

We have begun an investigation into whether Sellafield Ltd have breached any conditions of their PPC permit. We will also be looking at why Sellafield Ltd decided to stop commissioning of the new boiler park which would have provided backup in such events.

Thorp fuel elevator failure

The fuel elevator in the Thorp head end feed pond failed in late January while carrying Advanced Gas Reactor fuel pins. The failure resulted in irradiated fuel rolling down the ramp and back into the feed pond coming to rest on shock absorbers. It appears that the two cables that pull the elevator bogie up the ramp failed.

Enhanced sampling of the pond water and sumps has shown no increases in levels of radioactivity, and there are no direct increases in discharges to the environment as a result of this event. The NII is leading on the follow-up to this incident.

High Level Waste Plants - Borehole 68 (BH68)

Following the discovery in December 2007 (reported last quarter) of a failed sample valve and elevated contamination in BH68 during an inspection we, in collaboration with the NII, undertook further investigation into this incident.

4 STRATEGIC OBJECTIVES

In addition to the areas covered in sections 2 and 3, we carry out a wide range of other work aimed at achieving the objectives set out in our strategy. This section provides a summary of progress against these other objectives.

4.1 Reduction of environmental risk and avoidance of further legacies

Wet silo

The wet silo is used to store waste cladding from spent Magnox fuel under water. A recent assessment carried out by Sellafield Ltd suggests that a few cubic metres of highly active radioactive liquid from the silo appears unaccounted for. We have requested more information to help us understand whether the problem is due to errors

in the liquor balance measurements or calculations, or whether liquid has actually leaked into the ground – however the local borehole monitoring has not shown an increase in radioactivity levels in groundwater. The development of a modern leak detection system for the wet silo remains a high priority project.

Fuel Handling Plant (FHP) ponds

Sellafield Ltd developed a strategy for cleaning up the ponds in FHP in 2004. They now believe they can store Magnox fuel for more than 750 days with no evidence of any corrosion, and that they have identified the last major source of radioactivity leaking into the pond water. Progress with the processing of corroded fuel is very encouraging. Activity levels in the pond water have declined significantly since 2004 and are now around 2,000 Bq per millilitre. Following recent increases (see 3.4), discharges of caesium-137 and total beta radioactivity to air have now returned to levels typical of the mid 1990s.

Magnox sludge packaging plant (SPP1)

We have informed HSE that we have no objection to Sellafield Ltd's proposal to build and operate a sludge buffer store for the first generation Magnox fuel storage pond. Sellafield Ltd have started to develop plans for this facility. Moving the sludge will be challenging, and may have implications for the management of liquid effluents on the Sellafield site. We have reviewed the integrated environmental assessment for the construction phase.

Raising awareness of environmental issues

We gave a presentation to the Sellafield Contractors Safety Working Group. This was part of our drive to raise awareness among all those who may impact on the site's environmental performance and compliance. We explained our role and highlighted the main strategic and compliance issues at the site.

4.2 Integrated waste strategy and its improvement

LLW strategy development

Sellafield Ltd have now run five workshops to identify the 'best practicable environmental option' (BPEO) for five types of low level radioactive wastes. We attended the asbestos wastes BPEO workshop as an observer. The preferred options were landfill disposal for exempt asbestos waste and compaction followed by disposal to LLWR for LLW asbestos in the short term. In the medium to long term, thermal treatment (preferably with a useable end product) appeared to be a favoured option. It is likely that asbestos wastes from other sites or other wastes from the Sellafield site would need to be included to make this option viable.

We also attended the high volume, low activity wastes BPEO workshop as an observer. A symposium was held in March to draw together the results from the five LLW BPEO workshops. This involved external stakeholders. The results of this process will be used to develop and inform the LLW strategy, and will feed into the integrated waste strategy.

4.3 Disposable waste forms

Radioactive Waste Management Cases

In December 2007 we published, jointly with the NII and the Scottish Environment Protection Agency (SEPA), Part 1 of guidance on the management of higher activity radioactive waste on nuclear licensed sites. Part 1 deals with regulatory process and builds upon various guidance issued in the past. A key aspect of the guidance relates to the need for site operators to develop a Radioactive Waste Management Case (RWMC) for each solid waste stream or each group of similar waste streams. The RWMC should address the long term safety and environmental issues associated with the waste, including whether it will be possible in future to dispose of the waste, with minimal environmental impact, to a deep geological repository.

We have been discussing a programme for the development of RWMCs with Sellafield Ltd.

4.4 Infrastructure and asset care

Asset management

Good asset management is an important factor in reducing the risk of accidents, avoiding chronic deterioration of plant, and ensuring compliance with the terms of our authorisations. Recent events and operational performance issues have highlighted asset management as an area of concern.

We were informed by NII in December 2007 that a significant number of routine maintenance operations in the Highly Active Liquor Evaporation and Storage (HALES) plants had not been completed within the timescales required in the Plant Maintenance Schedule (PMS). We are assisting the NII in their investigations.

Highly Active Liquor Evaporation and Storage (HALES)

We have previously reported on the problems of corrosion in the highly active storage tanks (HASTs) and the high level waste evaporators. Sellafield Ltd had proposed dosing the cooling water system with nitrate to reduce the corrosion. We attended a workshop to peer review this proposal in January. The workshop concluded that nitrate dosing would not be effective, and Sellafield Ltd are now reviewing a number of other methods that could be employed to extend the life of the HASTs and evaporators until such time as additional capacity can be brought on-line.

4.5 Development of guidance on Best Available Techniques (BAT)

Environmental standards

We have completed a review of standards and guidance for delivering BAT on nuclear sites. We hope to persuade NDA to use this and to take a lead in co-ordinating work by the site licence companies to develop environmental standards and guidance for contractors. This should ensure that best practice is shared widely.

We have asked Sellafield Ltd to review all of its site environmental standards and guidance, and to consider whether they need any other standards or guidance to cover aspects of environmental control. We were not satisfied with the documented site

standards Sellafield Ltd recently developed on the management of liquid effluents; we have discussed how to improve them.

4.6 NDA issues and national waste strategy

We have continued to play an active role in discussing both Sellafield and NDA plans and strategies. In particular, we have commented on the NDA's draft business plan for 2008/11 and on their proposed performance measures for health, safety, security and environment (HSSE).

Windscale lifetime plan (LTP08)

We have questioned whether the Piles decommissioning programme should be delayed, as we consider that early removal of the fuel and isotope cartridges from Pile 1 represents good value for money in hazard reduction terms. We are concerned that the improvement programme for the Post Irradiation Examination (PIE) shielded facility may be at risk due to NDA funding constraints.

4.7 Integrated fuel and nuclear materials management

Magnox Operating Plan (MOP)

The NDA has completed initial work on options for managing spent Magnox fuel in case Magnox reprocessing is required to cease in 2012. Two possible contingency options have been identified: reprocessing Magnox fuel through Thorp, or vacuum-drying the fuel and storing it. We have asked for more information and will discuss the role of BPEO assessment with NDA.

4.8 Contaminated land and groundwater

Borehole network

We have received a draft layout of the extended borehole network which is to be constructed in Separation Area. This will help to improve understanding of the contamination in that area.

Review of contaminated land programme

An independent review of Sellafield Ltd's plans found that they are making good progress in developing an achievable long-term contaminated land strategy. We are pleased that some of our concerns will be addressed in the 2008/09 work programme. These include more effective sampling systems, quality assurance/quality control and widening the scope of the 'best practicable means' (BPM) assessment to include more emphasis on managing contamination already in the ground and on integrating modelling work.

We attended a presentation by Sellafield Ltd and its contractors which explained current thinking on modelling and its objectives, and support the approach being taken. We have also agreed proposals for a peer review panel.

NDA prioritisation for contaminated land and groundwater

We provided comments to NDA on their contaminated land and groundwater protection prioritisation process. The process provides a high priority to sources that are close to receptors.

4.9 Organisational change

LLWR transition

We continue to be closely involved with the transition process for the LLWR at Drigg. Ministerial approval for the transition to UK Nuclear Waste Management Ltd, the new parent body organisation (PBO) for the LLWR, was delayed until late February. The transition is now expected to take place on 1 April 2008.

We carried out a 'readiness review' in February, and are content that all of our regulatory requirements had been met or will be met before the transition.

Sellafield transition

We continue to be closely involved with the PBO competition process and transition for Sellafield, and attended the first of a new series of working group meetings in January. A new PBO is expected to take on the contract and share ownership of the Sellafield site later this year.

The changes in site management, as well as any subsequent changes, will be subject to the management of change process which in turn will be subject to regulatory scrutiny by NII and ourselves. We welcome Sellafield Ltd's work to develop a set of performance indicators for this transition.

Review of contracts with former BNG-owned companies

The sale of British Nuclear Group (BNG) is now complete. Sellafield Ltd is reviewing its contracts with former BNG-owned companies to make sure they are still delivering the services that are required. This includes key compliance-related activities, such as analysis of environmental samples. We support this initiative.

4.10 Post Closure Safety Case (PCSC) and future options for LLWR at Drigg

Vault 9

Cumbria County Council granted temporary planning permission (for ten years) for Vault 9 in January, on the basis that it is used for storage only. LLW Repository Ltd have been slow to provide documentation on the design and construction proposals for Vault 9. We have written to let them know what information is outstanding, and when and how we intend to review all of the information. We completed an initial review of the construction specifications against landfill requirements, and we have written to the LLWR outlining some extra expectations in this area.

BPEO for trenches

We attended a second meeting to discuss the BPEO for the LLWR trenches in January. The meeting was reasonably well attended by the public and local council members. LLW Repository Ltd explained how they had developed a shortlist of potential options, and the criteria and the process they intend to use to help make a decision.

PCSC-related developments

Under their RSA authorisation, the LLWR are required to undertake a comprehensive review of best practice for minimising the impacts from all waste disposals on the site. We are satisfied with the approach that the LLWR are proposing to report on this requirement.

Community benefits package

We met with Cumbria County Council and Copeland Borough Council in January to discuss whether the data we collect could be used to track the rates of disposals at the LLWR.

ANNEX 1: THE ROLE OF THE ENVIRONMENT AGENCY AT NUCLEAR SITES

We have two Nuclear Regulation Groups (NRGs), one group covering nuclear sites in the north and the other covering sites in the south. NRG (North) is based at our office at Penrith in Cumbria and includes a team of nuclear regulators who cover Sellafield, Windscale and the Low Level Waste Repository.

We collaborate with a number of other Environment Agency groups – in particular those which advise on policy, process, radiological monitoring and assessment and nuclear waste assessment. We also receive support from colleagues in other functions such as water quality, waste, contaminated land and ecology. Close working ensures an integrated approach to environmental protection.

We also work with a wide range of external stakeholders – local, national and international. In particular, we have close working arrangements and liaison with our colleagues in the Nuclear Installations Inspectorate (NII) of the Health and Safety Executive (HSE). We maintain good contacts with the Food Standards Agency (FSA), the Nuclear Decommissioning Authority (NDA), other regulatory bodies, local authorities and our sponsoring department, the Department for Environment, Food and Rural Affairs (Defra). We also have good links with our regulatory counterparts abroad, particularly in Norway, Ireland and France.

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. We achieve this through influence and education in addition to licensing/authorisation, compliance assessment and enforcement under legislation such as the:

- Environment Act 1995, which gives us our regulatory powers, etc
- 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), which covers non-radioactive pollution, and
- Control of Major Accident Hazards (COMAH) Regulations.

We also have 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.

The Sellafield site is moving from an operational to a decommissioning and clean up phase. Decommissioning and clean-up will involve the facilities which are currently operating, as well as the legacy facilities which contain radioactive wastes from the early days of civil and military operations. It is important during this period of change that the strategic long-term aspects of the regulation of Sellafield are managed so as to prevent and minimise future environmental impacts and risks.

In summary, we are responsible for regulating and encouraging the prevention and minimisation of the current and future environmental impacts and risks from all activities at Sellafield.

ANNEX 2: 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.

CEAR: see EAR

COMAH: Control of Major Accident Hazards Regulations

CHPP: Combined Heat & Power Plant

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).

EAR: Environment Agency Requirement – a supplement to an RSA93 authorisation which details an approval, agreement, specification or notification referred to in the authorisation. The set of EARs for a particular authorisation is known as the Compilation of Environment Agency Requirements (CEAR).

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.

Exposure: In the context of radiation, exposure refers to the radiation dose - see effective dose.

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.

Lifetime Plan (LTP): 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.

LLWR: Low Level Waste Repository near Drigg

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 Lifetime Plan.

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.

Non-radioactive waste: Solid waste that contains no radioactivity of manmade origin and with sufficiently low levels of natural radioactivity for it to be excluded from the provisions of the Radioactive Substances Act.

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.

PBO: Parent Body Organisation. The company or group of companies that owns the shares in the Site Licence Company. The PBO has no direct operational responsibilities. However, for the SLC it owns, the PBO should provide the vision for the site, the key personnel to be seconded into the SLC to translate the vision into reality and provide the leadership and management support for the SLC to deliver the NDA contract.

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 (μ Sv): one millionth of a sievert.

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

Site Licence Company (SLC): Responsible for the day to day operation of a nuclear licensed site under contract to the NDA. They hold the nuclear site licence and the majority of the environmental authorisations.

SIXEP: Site Ion Exchange Plant

SL/Sellafield Limited: The company that operates the Sellafield and Calder Hall sites i.e. the Site Licence Company and authorisation holder.

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.

THORP: Thermal Oxide Reprocessing Plant

UKAEA: United Kingdom Atomic Energy Authority – the company that operates the Windscale site i.e. the Site Licence Company and authorisation holder.