



BNGSL SELLAFIELD, REPOSITORY SITE AT DRIGG AND UKAEA WINDSCALE

WEST CUMBRIA SITES STAKEHOLDER GROUP

QUARTERLY REPORT FOR 1 JANUARY TO 31 MARCH 2007

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. (nrg.north@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.

1 INTRODUCTION

This report presents a summary of our work at Sellafield, Windscale, Calder Hall and the low-level waste repository (LLWR) at Drigg over the 3 months to the end of March 2007.

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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, now and in the future is as small as it can be, we supplement direct regulation with partnership working involving regular dialogue and joint problem solving. If you want to know more about our role on nuclear sites see [Annex 1](#) or see our website at the address below:

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

2 GENERAL REGULATORY MATTERS

2.1 BNGSL Sellafield

Thermal Oxide Reprocessing Plant (THORP)

The increasing trend in levels of caesium-137 radioactivity in the water within the THORP Receipt & Storage Pond (TR&S) has continued. Discharges to the environment remain within the plant limit. BNGSL is trying to identify the cause of the increase in radioactivity and is undertaking a sampling programme to identify which AGR containers hold failed fuel and what measures can be put in place to reduce further transfer of activity to the bulk pond water. They are also looking into ways of removing the radioactivity including the potential use of ion-exchange. We have questioned the management strategy for reprocessing this fuel, and the monitoring/inspection regime.

We met with BNGSL, NII and the NDA to discuss the Advanced Gas Reactor fuel (AGR) Interim Storage Strategy (AGRIS). We have asked BNGSL to provide details of their principles for the management of AGR fuel now, during reprocessing and in the event of a long-term outage for THORP. It is important that we know and are content with the inventory of fuel in the pond will not lead to the production of legacy fuels and secondary wastes.

The proposed decontamination facility for the THORP Multi-Element Bottle Export Facility (MEBXF) is a new development to the facility that we had previously agreed could proceed to active commissioning. We have asked BNGSL for assessments of waste management arrangements, potential effluent arisings, environmental discharges and associated impacts for both facilities, reflecting levels of contamination on the MEBs, before active commissioning starts.

Magnox reprocessing

Magnox reprocessing has been shutdown for a number of months due to the lack of highly active (HA) liquor evaporator capacity. We expect reprocessing of Magnox fuel to re-start in March, but the reprocessing rate is likely to be constrained for a number of months by the available evaporator capacity.

We continue to monitor Magnox reprocessing operations to assess whether they are being conducted in a way that minimises environmental impacts both now and in the future. A key issue is that there can be significant environmental (and safety) implications from the long-term storage of Magnox fuel in water. We are concerned because the current stock of wetted Magnox fuel within the Fuel Handling Plant (FHP) is high and the age profile of this fuel stock is currently increasing. In addition, a quantity of this fuel has suffered significant corrosion and the processing rate to remove this fuel from FHP has been significantly slower than planned.

We have reviewed BNGSL's short-term strategy for the operation of Magnox reprocessing (until July 2007). The assessment supporting the strategy concluded that there are significant environmental benefits from re-starting Magnox reprocessing, including reduction in corroded fuel and overall fuel stocks and reductions in future discharges.

In view of our concerns stated above we support BNGSL short-term strategy and we are seeking information on how BNGSL intend to monitor its implementation.

We have also encouraged Magnox Electric (ME) to support the minimisation of the stock of Magnox fuel stored in water. We understand that ME has now delayed the de-fuelling of Sizewell A and Dungeness A, the two stations which shut down at the end of 2006. This will limit the amount of spent Magnox fuel that will be committed to underwater storage between now and July 2007.

We continue to encourage BNGSL and MEL to develop contingency/alternative plans to Magnox reprocessing.

The longer-term strategy will need to be reviewed around July 2007, when additional HA liquor evaporative capacity may become available and before any significant de-

fuelling of Magnox reactors commences. As part of this work we are encouraging BNGSL/ME to set out how the quantity and age profile of wetted fuel stored within fuel ponds will be minimised.

The processing of corroded Magnox fuel has been very low this financial year and we continue to encourage BNGSL to look at all practicable options to accelerate the processing rate. The previous strategy of processing the youngest corroded fuel first ran into difficulties as it moved to de-canning older fuel, which is partially clad. A change to removing the oldest corroded fuel first is currently being investigated. Early signs are that this may be effective in accelerating the processing rate, although there are a number of technical issues which needs to be resolved.

High level waste plants

We have had discussions with BNGSL, NDA and NII regarding the highly active (HA) liquor evaporators and potential knock-on effects to associated plants on the Sellafield site as well as at power stations. BNGSL have drafted 5 potential scenarios. In all cases, the predicted discharges are compliant with the UK Discharge Strategy targets.

Evaporator A has successfully completed run-up testing and we have been informed that it will be used to process effluents from the vitrification plant and the Highly Active Liquor Evaporation and Storage facility. BNGSL are looking at ways in which the delivery of the new Evaporator D can be accelerated.

We have asked BNGSL to consider how the waste stream from bead blasting of the external surfaces of the vitrified product containers in the Residue Export Facility (REF) before export to Japan can be minimised at source. The amount of radioactivity incorporated in the stainless steel beads should, in most cases, be small.

Legacy Ponds and Silos (LP&S)

We have developed a position statement on the treatment of wet silo waste, which represents around 40% by volume of Sellafield's intermediate level waste (ILW). This was used at a workshop with CoRWM, BNGSL, Nirex, NDA and NII in February to help NDA to understand the regulatory issues associated with the proposal for direct encapsulation of the wet silo waste before they gave financial approval for the project to move into detailed design.

Inspection of the original Magnox fuel pond has shown improved housekeeping and positive progress with retrieval of a limited quantity of beta/gamma waste from one of the wet bays. This metal waste was decontaminated in the bay to allow it to be sentenced as LLW.

PCM wastes

We have finalised our position paper on plutonium-contaminated materials (PCM), and have provided comments on a BNGSL paper being prepared for a forthcoming stakeholder engagement workshop in May 2006.

LLW

We participated in a symposium on LLW organised by BNGSL for local stakeholders. We joined a panel with BNGSL and NDA and answered questions from stakeholders on a wide range of issues. BNGSL highlighted at the symposium their plans to undertake a Best Practicable Environmental Option study to support consideration of alternatives to direct disposal of LLW.

We undertook an assessment of the transfer of waste oils to Sweden for incineration on a trial basis, and advised that the transfer be approved under the Transfrontier Shipment of Radioactive Waste Regulations. BNGSL has agreed to ensure that the transfers are transparent to local stakeholders.

Contaminated land and groundwater

NDA approval of the new characterisation, investigation and remediation project is a significant milestone for taking forward our objectives for contaminated land and groundwater protection. We have discussed Quality Assurance (QA) and independent peer review of the programme and the outputs with BNGSL.

Miscellaneous Beta Gamma Waste Store (MBGWS)

We attended the MBGWS Consignors Forum in January 2007. There is a new requirement in the Conditions for Acceptance (CFA) for a BPM case demonstrating that MBGWS is the correct place for each consignor's waste stream. Follow-up sessions are planned with several of BNGSL's Operating Units to explain the QA and BPM requirements.

Sellafield MOX Plant (SMP)

We are in discussion with BNGSL, NII and OCNS regarding the location of a suitable safe interim storage area for residues and recycled material due the current storage areas reaching capacity.

Calder Hall

We have made a number of recommendations regarding our air quality assessors' report for the cooling tower demolition. We advised BNGSL to accept the recommendations and to provide the relevant information.

Re-use of RSA exempt spoil and soil

A meeting was held to review progress with BNGSL's plans to use excavated spoil and soil (essentially uncontaminated material from construction work on site) as landscaping material in an area close to the Calder Hall site entrance prior to eventual re-use in site restoration. We provided guidance on possible approaches to this that would not require a waste management licence.

2.2 Low Level Waste Repository (LLWR)

Vault 9

Development of the new Vault 9 Best Practicable Environmental Option (BPEO) and Best Practicable Means (BPM) documentation has been delayed again and is now expected around the end of March 2007.

PCM retrievals

We have continued to monitor progress in PCM retrieval from Magazine 9 but have been informed by BNGSL that the expected 1 April 2007 completion date will not be achieved. The work has been delayed due to additional problems caused by the discovery of acidic liquids in a number of process vessels.

Water Framework Directive

Drigg Stream has been identified as a water body possibly requiring improvement under the Water Framework Directive.

New rail sidings planning application

Comments were provided on the LLWR new rail sidings planning application. The new rail sidings will move ISO container receipts further into the site, reducing visual impacts and freeing up the existing sidings for receipt of bulk construction materials. Significant numbers of trees would be lost, but key trees providing screening would be retained. The east-west stream will be slightly affected by a retaining wall required on a 10m stretch. The rail sidings development will generate significantly increased surface water run off.

2.3 UKAEA Windscale

Sampling results for contaminated oil indicate that the oil is within the Conditions for Acceptance for off-site incineration, the project's currently favoured option for its disposal. However, the variation that UKAEA were likely to apply for to enable this route will be put on hold until after the Windscale transition. The project has invested in new arrangements to safely store the oil until this time.

Following our requests UKAEA are producing site wide systems and procedures for demolition waste management.

UKAEA provided its conclusions on optioneering for the continuing dismantling of the WAGR and managing the asbestos wastes from that project. We recognise the efforts the project is making to ensure it is using the 'best practicable means' to avoid or reduce wastes.

3 COMPLIANCE ASSESSMENT

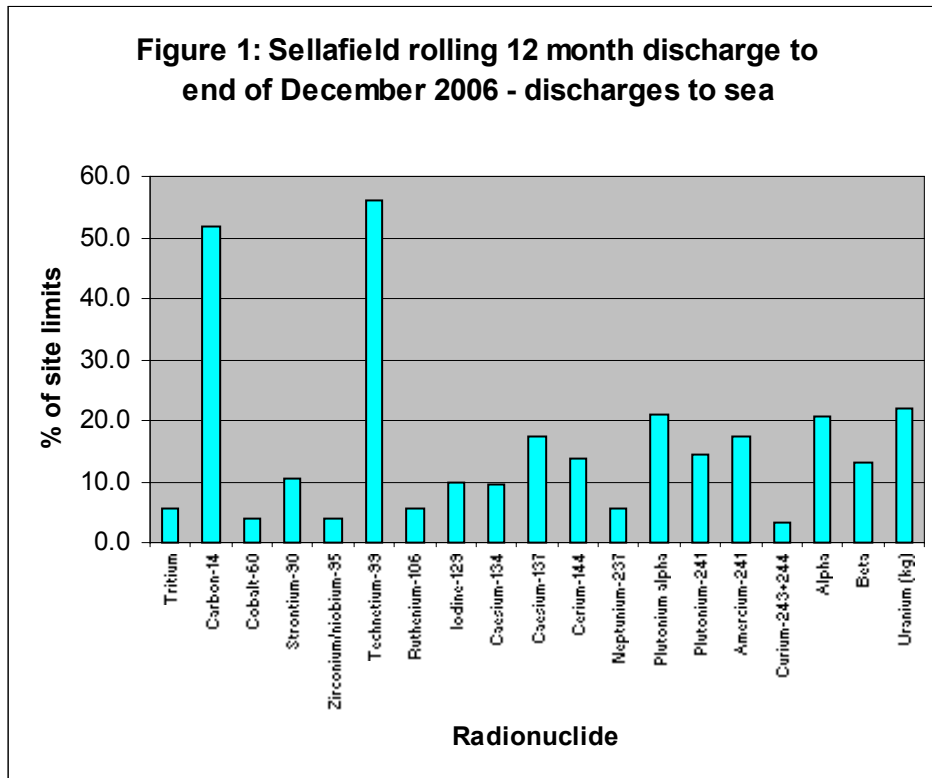
We assess compliance with authorisations and permits using a range of activities including data assessment and site inspection. This section provides highlights of various compliance assessment activities. More details of, for example, discharge or environmental monitoring data can be found in our Radioactivity in Food and Environment (RIFE) report published annually jointly with the Food Standards Agency, Scottish Environment Protection Agency (SEPA) and the Environment and Heritage Service of Northern Ireland. The RIFE report for 2005 can be found at: <http://publications.environment-agency.gov.uk/pdf/PMHO1006BLJP-e-e.pdf>

Another source of data is our Pollution Inventory: <http://www.environment-agency.gov.uk/maps/info/pi/>

3.1 Radioactive discharges

There have been no breaches of site limits during the reporting period at any of the sites.

Radioactive discharges to sea for the 12 months to the end of December 2006 were all well below the authorised limits for Sellafield – 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 these discharges of radionuclides subject to numerical limits is given in Figure 2. The total dose was about 26 microsieverts, which is about 5% of the constraint on dose from discharges from a single site (500 microsieverts per year). Note that this dose assessment does not include the radiation dose from radioactivity already in the environment from discharges made in the past.

Figure 2: Annual dose (microsieverts) to most exposed group from Sellafield 12 month discharges to sea to end December 2006

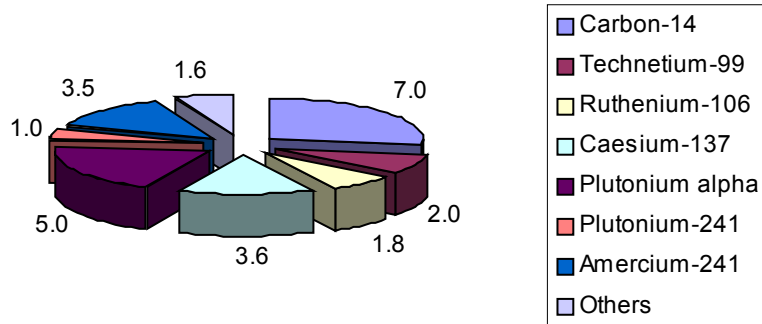
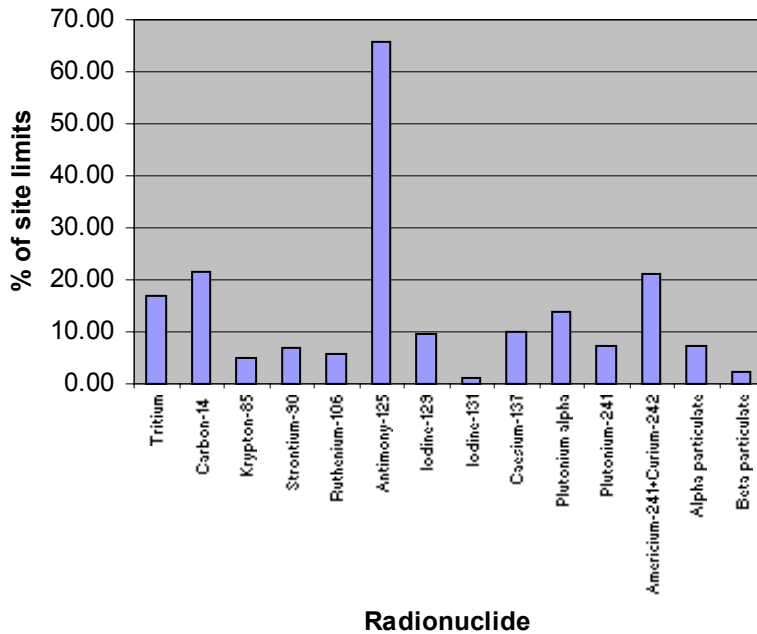


Figure 3 gives the rolling 12 month discharges to air to the end of December 2006 as a percentage of the site limits.

Figure 3: Sellafield rolling 12 month discharge to end of December 2006 - gaseous discharges



3.2 Environmental monitoring

Enhanced beach monitoring trial

On 2 February 2007 we observed BNGSL's second beach monitoring trial at Braystones using improved monitoring equipment. BNGSL reported three finds of contaminated items during their 5 day survey. One of the finds was a small particle containing americium-241 and plutonium isotopes (similar finds occurred in the mid 1980s). The analysis of this particle and other finds from Braystones and Sellafield beaches (the site of the first trial in November 2006) is currently ongoing.

BNGSL are now looking at further survey and analytical requirements. Our requirements will include a review of what represents the best practicable means for such monitoring, statistical modelling and a review of habit surveys.

Groundwater monitoring

BNGSL have produced a Quality Plan for groundwater monitoring, and we have asked them to look at producing similar documentation to cover wider environmental monitoring.

The first results of our independent groundwater monitoring suggest that there is a discrepancy between results for total beta activity concentrations. This is being investigated.

Sellafield Tarn

As previously reported we identified slightly elevated radiation levels in the offsite Sellafield Tarn area, during an inspection in February 2005. BNGSL subsequently confirmed that there are slightly elevated activity concentrations of caesium-137 and other radionuclides in the soils/sediments in this area. A preliminary dose assessment suggests doses to the most exposed members of the population to be around 65 microSv per year. More information and interpretation is needed to understand the source(s) of this contamination but it would appear that much of the contamination is historical and perhaps derived from the Windscale fire in 1957. This work has also highlighted that sometime between 1945 and 1950 the tarn was partially filled with soil and rubble. This waste arose from clearance work, which took place to prepare the land for the construction of the original Windscale nuclear site. BNGSL intends to undertake an assessment to review the potential for contamination resulting from this historic disposal of non-radioactive waste in the tarn. The BNGSL assessment will start with a detailed desk-top study. If this study suggests there could be significant pollutant issues then a site investigation and risk assessment will follow.

LLWR environmental monitoring

We met with BNGSL to review the statutory environmental monitoring programme. The type and frequency of sampling and the analyses required were updated to align with the requirements for Sellafield, and improvements to LLWR's reporting were agreed.

3.3 Inspection visits

Calder Hall

We undertook an inspection of Calder Hall in January. The purpose of the inspection included a review of operations and progress with remediation. Final de-fuelling preparations are well advanced and a BPM case to support these operations has been prepared. The main non-radioactive waste issue has been the storage of asbestos at the site. This is now being disposed of to a hazardous waste landfill in Cumbria. Calder Hall appears to have made good progress with LLW issues, but has yet to consider ILW arisings. We are encouraging Calder Hall to ensure early dialogue with us on ILW proposals in the context of the developing Integrated Waste Strategy.

Calder Hall is the lead Magnox site for developing alternatives to safe store for the heat exchangers (6000 te of metal at Calder Hall). We will continue to monitor progress with the project to develop local decontamination.

Pile fuel storage pond decommissioning project

We undertook an inspection of the Pile fuel storage pond facility in February 2007. Generally there have been improvements in housekeeping, although we pointed out poor maintenance of the bund area, which had significant accumulations of sludge. We required samples to be taken prior to the cleaning of this area. BNGSL are now taking steps to minimise the potential for solids to be washed into the low active drain from this accumulation. A similar observation was made in January at the legacy Magnox pond.

BNGSL are due to undertake a Best Practicable Environmental Option (BPEO) study to justify the remediation strategy for the pond. Issues to be considered include pond covers, groundwater protection, treatment of the sludge and storage of fuel.

4 AUTHORISATIONS

4.1 BNGSL Sellafield

Pollution Prevention and Control (PPC)

Drafting of Sellafield's new PPC permit has continued, and we are awaiting BNGSL's response to a first tranche of questions.

We have asked our Strategic Permitting Group (SPG) to determine the PPC permit for the gas odourising plant, a minor installation which supports Fellside Combined Heat and Power Plant, in parallel with our determination of the Sellafield application.

Radioactive Substances Act 1993 (RSA93)

We have completed our annual periodic review of the RSA93 multi-media authorisation. No changes to the authorisation are required at this time, but we have made minor changes to several Environment Agency Requirements (EARs) which provide further details of our requirements for compliance with the authorisation. In particular, the environmental monitoring programme has been enhanced to improve

groundwater sampling and to include large area beach monitoring following the recent successful trials.

Improvement programme submissions

We are currently finalising our assessment of BNGSL's post closure radiological and environmental safety assessment for the disposal of waste on the South Landfill and the Calder Landfill, including the extension (Schedule 9 Requirement 12). We are also finalising our assessment of the associated PPC-type application required to cover the non-radiological aspects of the new landfill facility (Calder Landfill Extension Segregated Area (CLESA)).

4.2 UKAEA Windscale

Transfer to BNGSL

We consider that a single RSA93 authorisation covering Sellafield and Windscale would be appropriate when the sites are amalgamated in 2008. This will be achieved in two steps – the Windscale authorisation will be transferred from UKAEA to BNGSL, then the Sellafield authorisation will be varied to incorporate the Windscale provisions and revoke the Windscale authorisation.

We have met with UKAEA/BNGSL to discuss details of the transfer and variation processes, particularly how they will fit in with the scheduled annual review of the Sellafield authorisation, the information requirements for the transfer application, and the Windscale limits and conditions likely to be varied into the Sellafield authorisation.

Improvement programme submissions

We have reviewed UKAEA's progress with the RSA Improvement Programme which was developed after our inspections last spring. We are pleased that most of the issues have been addressed. However, there is still concern about the lack of effective self-auditing for RSA compliance. UKAEA are intending to address this with a detailed self-audit in March 2007.

Maintaining progress with these activities, along with the planning required for the Windscale transition to Sellafield has resulted in a greater workload for the site's environment team. UKAEA will need to ensure it maintains adequate resources and organisational arrangements to keep on top of the environment-related workload.

4.3 LLW Repository

Transfer to LLWR SLC

Transfer of the RSA93 authorisation to the new SLC (name confirmed as Low Level Waste Repository Site Licence Company Ltd) is on hold until the remaining plutonium-contaminated material (PCM) is retrieved and transferred to Sellafield. BNGSL therefore hope to achieve authorisation transfer by around June-July 2007. We have carried out a final readiness review during March 2007 and consider that all requirements for the transfer are, or will be, in place before it occurs.

Variation request for Outo Kumpu slag pots

We expect to receive a request for a variation to the RSA93 authorisation soon after the authorisation transfer to the LLWR SLC has taken place. This will be for an increased limit for “other alpha emitters” to allow the disposal of a slag pot contaminated with plutonium-238 from the Outo Kumpu steelworks in Sheffield. The contaminated material is believed to have arisen from a pacemaker smelted with scrap metal in error. A BPEO has clearly identified disposal at the LLWR as the preferred option. There are three other pots being sent for disposal with lower levels of contamination that do not necessitate a variation to the authorisation. The transfers are expected to start in the early summer. BNGSL is in discussions with the local community and the local authority regarding transport issues as these large items will require road transport through the village. We are currently seeking advice on the nature of the variation required, along with the extent of consultation necessary.

Improvement programme submissions

We have arranged regular meetings with the BNGSL to discuss Schedule 9 responses under the LLWR authorisation, leading up to the delivery of the updated Post Closure Safety Case in 2011. These will aim to ensure shared understanding of regulatory expectations and monitor site progress.

We have informed BNGSL that we intend to inspect against Schedule 9, Requirement 12 (maintenance of environmental systems) before 1 May 2007 when the requirement is due.

5 STRATEGY AND PLANNING

5.1 BNGSL Sellafield

UK Discharge Strategy review

We have commented to DEFRA on BNGSL’s submission of predicted future discharges. We have no serious issues with the submission, which is based on Lifetime Plan (LTP) 2007/08 and uses the latest modelling, and we believe that BNGSL have made a reasonable attempt at summarising a complex situation.

IWS improvement

We have agreed a process with BNGSL for moving forward on making important decisions identified by the Integrated Waste Strategy for Sellafield. We are pleased that work on the 2nd version of the IWS appears to be progressing well.

5.2 LLW Repository

Post-Closure Safety Case (PCSC)

NDA consider delivery of the 2011 PCSC as one of their key strategic projects and are looking at increasing incentivisation for the site. We are also placing significant early effort into monitoring PCSC progress and have informed BNGSL that we expect adequate and suitably qualified resource to be deployed to ensure a robust safety case is delivered on time.

Site end states

We have discussed LLWR site end states with BNGSL, NII and NDA and have contributed to the initial end states definition process. We have indicated that we expect to see a robust BPEO process being followed that will develop this initial work and take into account the significant technical information available and being developed to understand the site and possible future options. We have emphasised that any final end state must take into account regulatory requirements.

6 EVENTS AND INCIDENTS

Elevated gaseous discharges from Fuel Handling Plant (FHP)

We have received a draft report of BNGSL's investigation into the recent elevated gaseous discharges of caesium-137 from FHP. We intend to assess our enforcement decision once information on wider learning from the incident is available. As a result of the lessons learnt and the changes made to the way the plant is operated, recent caesium-137 discharges have declined significantly. Antimony-125 discharges have also declined but the cause of the elevated discharges is still not fully understood. Work continues to investigate this issue.

Contamination incident at Sellafield MOX Plant (SMP)

We were notified of a contamination incident involving five operators, which led to an area of the plant being closed until it could be successfully decontaminated. There were no releases of radioactivity to the environment during the incident or whilst the area was being cleaned.

Low Level Waste Repository

We were notified of two minor incidents. In the first a patch of contamination originating from a leaking Gemini Container was found. This contamination was contained indoors and there were no releases of radioactivity to the environment. In the second incident an independent site inspection found that there had been no written recording of alarms relating to site leachate as required by the discharge consent. The leachate had been sampled, analysed and reported as required and there had been no breach of any discharge limit. Therefore there was no environmental impact associated with this event.

7 ENFORCEMENT ACTIVITY

Sea discharge pipelines

We served an Enforcement Notice on BNGSL Sellafield under the Radioactive Substances Act in January 2007, in relation to maintenance of Sealine 3.

8 EMERGENCY PREPAREDNESS

We attended the WCSSG emergency planning sub group on 12 March 2007 and gave a presentation on the outcomes from a multi-agency workshop that we organised to consider how to deal with milk that may be contaminated as a result of an accident at Sellafield. This workshop was held to further our understanding in this key aspect of recovery planning.

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). We also work with 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.

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.

BNGSL: British Nuclear Group Sellafield Ltd – the company that operates the Sellafield and Calder Hall sites i.e. the Site Licence Company and Authorisation holder.

CoRWM: Committee on Radioactive Waste Management – CoRWM is appointed jointly by Ministers of the UK Government and devolved administrations of Northern Ireland, Scotland and Wales, to oversee a review of options for managing solid radioactive waste in the UK and to recommend the option, or combination of options, that can provide a long term solution, providing protection for people and the environment.

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.

OCNS: Office of Civil Nuclear Security - the nuclear security regulator.

PCM: Plutonium Contaminated Material – a type of intermediate level waste contaminated with plutonium.

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 caesium-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.

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**.

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