



## **BNGSL SELLAFIELD, REPOSITORY SITE AT DRIGG AND UKAEA WINDSCALE**

### **WEST CUMBRIA SITES STAKEHOLDER GROUP**

#### **QUARTERLY REPORT FOR OCTOBER 2005**

#### **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:

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We wish 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, including public consultations for radioactive waste discharge and disposal authorisations, see our website at the addresses below:

Environment Agency – Radioactive Substances Regulation pages:

[www.environment-agency.gov.uk/yourenv/eff/business\\_industry/213963/513813](http://www.environment-agency.gov.uk/yourenv/eff/business_industry/213963/513813)

Environment Agency North-west Region – Nuclear pages:

[www.environment-agency.gov.uk/regions/northwest/850243/871159](http://www.environment-agency.gov.uk/regions/northwest/850243/871159)

## **1 INTRODUCTION**

Our Nuclear Regulation Groups work to ensure the protection of the public and the environment from 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 achieve this not only by the application of a legal framework of licensing (authorisation), compliance assessment and enforcement but also by seeking to inform and educate in order to influence strategies and plans for the future to protect the environment. Annex 1 sets out in more detail our role at nuclear sites.

This is the first of a new series of quarterly reports to align with the quarterly frequency of meetings of the new WCSSG. This replaces our previous six-monthly reports, the last of which was issued in December 2004. A verbal report was presented to the final meeting of the Sellafield Local Liaison Committee (SLLC) in April 2005. This first quarterly report provides a summary of the three month period up to the date the report was submitted to WCSSG (19 September) plus any other significant issues since the final meeting of the SLLC in April.

## **2 COMPLIANCE ASSESSMENT**

### **2.1 Radioactive Discharges**

The authorisations held by nuclear sites contain numerical limits on the amount of radioactivity that can be disposed of in liquid, gaseous or solid wastes. These limits can apply to both individual radionuclides or to groups of radionuclides such as 'total alpha' emitting radionuclides. In addition to limits there are also conditions in the authorisations which require the application of the 'best practicable means' to minimise discharges below the limits. Limits are applied both to the site as whole (site limits) and to individual facilities (plant limits). There are a larger number of plant limits which are often, but not always, set at a small fraction of the corresponding site limit and were introduced in October 2004 to encourage greater focus on the measurement and minimisation of radioactive wastes at their source of origin.

During 2005 there have been no breaches of authorised site limits at any of the three sites.

We have been monitoring Sellafield's discharges against the new, generally lower, limits introduced on 1 October 2004 in the site's new authorisation under the Radioactive Substances Act 1993. For the 12 month period up to the end of June 2005 most of the discharges to sea were well below 50% of the authorised site limits with the exception of carbon-14 which was at 61% of the limit. Discharges to atmosphere over the same period have been made at up to 36% of the site limits. Both Magnox reprocessing and THORP have been shutdown since April, the former due to a routine maintenance outage and the latter because of the discovery of a leak from primary into secondary containment, and this has contributed to lower than normal discharges over this period.

In August BNGSL confirmed that as a result of an incident at the Waste Vitrification Plant in April the plant limit for WVP for caesium-137 discharges to air had been breached (see below).

We carry out a 'check monitoring' programme in relation to discharges whereby our contract laboratory analyses a sub-sample of discharge samples taken by nuclear operators and the results from the two analyses compared. For samples taken during Quarter 1 in 2005 83% of the 130 intercomparisons for discharges at Sellafield were in good agreement while a further 11% indicated that BNGSL was measuring higher than our contract laboratory. This indicates an acceptable declaration of discharges. Together with our contract analysts we continue to liaise with BNGSL analysts to investigate the small number of differences.

## **2.2 Inspection Visits**

Site inspections by our Nuclear Regulators of individual facilities disposing of radioactive waste 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 49 inspection visits to the Sellafield (including Calder Hall), LLWR at Drigg and Windscale sites over the three month period to the end of August (the latest month for which we have compiled data).

## **3 GENERAL REGULATORY MATTERS**

### **3.1 BNGSL Sellafield**

#### ***Liquid Effluent Team Inspection***

We carried out a team inspection in relation to the management and control of liquid effluent in February 2005. This was the first routine team inspection since the introduction of the new authorisation (see below) and included support from the NII. The new authorisation has a stronger emphasis on minimising the production, and the discharge to the environment, of radioactive waste. The new authorisation also requires BNGSL to demonstrate that its management systems are sufficient to do this.

The team inspection focussed on surface water drainage systems and the Segregated Effluent Treatment Plant (SETP). SETP is designed to handle low risk, low active effluents arising from reprocessing operations, in addition to other liquid waste from across the site.

Radioactive discharges from Sellafield are below authorised limits but BNGSL's authorisation also requires it to do all it can to manage and minimise all its waste discharges. Our inspection indicated that BNGSL needs to address certain issues if it is to fully demonstrate this and we therefore recommended a number of improvements, some of which were made subject to formal enforcement action (see section 7).

We have continued to follow-up the issues from that inspection. For example monitoring results have confirmed that there are slightly elevated activity concentrations of Cs-137 and other radionuclides in the Sellafield Tarn area as initially identified by the monitoring undertaken by us during the February inspection. Further results are awaited. A possible explanation is that the radioactivity is derived from the Windscale fire in 1957 rather than from on-site surface water drainage systems but no firm conclusions have yet been reached. The radiological and environmental implications of this contamination are yet to be assessed but are not expected to be of great significance.

We are encouraging BNGSL to consider the possibility of other areas of hitherto unknown offsite contamination. A paper considering the findings from the above work and the sampling being conducted in the adjacent on-site drainage system and their wider implications will be prepared by BNGSL for the forthcoming environmental monitoring review.

### ***Magnox reprocessing***

Magnox Reprocessing is currently undergoing its routine 2-year shutdown. This started at the beginning of April and is now likely to continue until the end of September.

Our formal Memorandum of Understanding with the Health and Safety Executive (HSE) requires that we consult with the Nuclear Installations Inspectorate (NII – part of the HSE) before either regulator makes significant regulatory decisions. Before providing a response to the NII in relation to the re-start of Magnox reprocessing, we asked how BNGSL is addressing the wider environmental issues raised by the THORP incident in April. A response has been received detailing the measures to be pursued within the Magnox operating unit. We will monitor their implementation.

### ***Environmental Monitoring***

An inspection of the BNGSL's arrangement was carried out in August covering the analytical laboratories and sampling regime. It also allowed the follow up of the relevant recommendations of the Article 35 inspection by Euratom inspectors in March 2004, our February 2005 team inspection and a recent independent review of groundwater monitoring. No major issues were identified.

### ***Legacy Ponds and Silos***

We carried out a joint inspection in July with the NII to inspect the containment of aqueous radioactive waste at the wet silo facility. We raised a concern with BNGSL with respect to the proximity of a surface water drain to a facility which is known to have leaked to ground in the past. We have recommended that BNGSL assess the potential for radioactivity entering the surface water drainage and hence the system for discharging effluent to sea.

### ***Sealine Pipebridge Refurbishment***

BNGSL has begun preparatory work for refurbishing the pipebridge which takes the two operational sea discharge pipes over the River Ehen and the railway line. We have required that BNGSL have adequate contingency arrangements in the unlikely event that a discharge

pipeline is damaged during the work. We are pleased that BNGSL has put in place the necessary contingency arrangements.

During the preparatory work several small patches of radioactive contamination above background levels have been found since 8<sup>th</sup> August around the base of the pipebridge. The levels of radiation range from slightly above background to one localised spot where the dose rate was higher (e.g. up to approximately ten times natural background). The available evidence suggests that it is likely that the contamination is historic, possibly linked to the removal of the old sealine from the bridge deck and pipe trench many years ago when some contamination of the bridge deck was known to occur. The whole area is barriered off in preparation for the 18-month refurbishment job and the area is therefore not accessible to the public. Plans are being put together to fully sample the area with a view to deciding on the clean-up plan for the area.

### ***Calder Landfill Extension Segregated Area (CLESA)***

BNGSL has completed the construction of this facility aimed at the on-site disposal of very low level radioactive waste but has yet to submit the appropriate application for its operation. BNGSL is aiming to bring CLESA into use in some way, following a permit application.

### ***Development of BPM (or Environmental) cases***

We have required BNGSL to produce cases for each of its major plants that help to demonstrate that the ‘best practicable means’ are being applied to, for example, the prevention and minimisation of radioactive waste. BNGSL has produced and is implementing a programme that will see full or interim cases produced for all major facilities by the end of September. The Fuel Handling Plant currently leads the way in this area.

### ***Calder Hall Power Station***

We met with Calder Hall de-commissioning teams in July. The focus of current work is the demolition of the cooling towers. We remain in the characterisation phase for the project. BNGSL have taken samples from all of the towers according to an initial sampling plan agreed with the Environment Agency. Analysis of these samples has revealed that Towers 1 and 2 are clear of radioactive contamination but Towers 3 and 4 show contamination at lower levels of the towers. The extent of this contamination has yet to be accurately determined but it is likely that a significant volume of cement will need to be disposed of as low-level radioactive waste. We are taking independent samples for analysis by our contract laboratory. We are encouraging good waste characterisation and segregation so as to minimise the volume of waste that will need disposal as low-level radioactive waste.

### ***Sellafield Contaminated Land and Groundwater***

We have submitted our review report of BNGSL’s recent environmental assessment of contaminated land and disposals at Sellafield to BNGSL for factual comment. We intend to ensure that the work to satisfy the recommendations in our report is incorporated within the relevant improvement condition in the Authorisation. We were given a progress report on the work associated with the relevant Authorisation improvement requirement. This requires an

environmental assessment of the South and Calder floodplain landfills and the site generally. A final report is not required until Oct 2007.

### ***Research and Development***

The RSA93 Authorisation includes improvement conditions related to radioactive waste R&D. We continued to monitor progress in this area and to seek improvements in how BNGSL manages its R&D in this area.

### **3.2 LLW Repository at Drigg (LLWR)**

We attended a second stakeholder workshop at Drigg village hall on 28<sup>th</sup> June, organised by BNGSL to discuss contingency arrangements on the LLWR site when waste will have to be stored after Vault 8 is filled and before Vault 9 is ready.

### **3.3 UKAEA Windscale**

#### *Pile Projects*

We attended a Stakeholder Workshop where the project top-level BPEO study was reviewed.

#### *Western Area projects*

The demolition of 'non-active' buildings on the UKAEA site necessary to allow the B29 local treatment plant project to proceed has prompted some dialogue on waste disposal requirements for demolition wastes. UKAEA have indicated some ideas about filling in the basements of other redundant buildings with the demolition wastes. Our waste management licensing colleagues have identified some options for UKAEA to consider in the event that the waste is not classified as radioactive.

## **4 AUTHORISATIONS**

### **4.1 BNGSL Sellafield**

#### ***Radioactive Substances Act 1993 (RSA93)***

The new authorisation became effective on 1 October 2004. This new 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 provides more detail to those parts of the authorisation where Environment Agency specification or approval etc is required.

We have decided, following 12 months of experience of the new authorisation and CEAR, that it is time to carry out a minor update to both documents as appropriate. This update process will be carried out over the next few months.

#### ***Application under the Pollution Prevention and Control Regulations (PPC)***

These regulations have introduced a new regime to be applied to non-radioactive pollution and other environmental impacts from industrial sites that is gradually replacing the Integrated Pollution Control (IPC) system.

We received Sellafield's PPC application in August.

## **4.2 LLW Repository at Drigg**

The 12 week consultation period commenced on 15<sup>th</sup> June and ended on 7<sup>th</sup> September. The consultation's Explanatory Document was distributed to a wide range of statutory and non-statutory consultees. The review will now proceed into an analysis of responses and the decision stage.

Our review of the BNFL 2002 Environmental Safety Cases (for the operational and the post-closure phases) was issued as supporting information to the authorisation review consultation.

Two 'public surgeries' were held in July in Drigg Village Hall and Whitehaven Civic Hall. In excess of 80 people attended, with turnout at the Drigg event boosted by the leafleting of the village by the local Parish Council.

We have also undertaken specific briefings with Copeland Borough Council's Nuclear Working Group on 26 July 2005 and Cumbria County Council's Nuclear Decommissioning Working Group on 31<sup>st</sup> August.

## **4.3 UKAEA Windscale**

The public consultation, to which we received 11 responses, ended on 30<sup>th</sup> June. The Decision Document is drafted and has been passed to UKAEA for comment. We continue to work with UKAEA as they prepare to implement the likely requirements in the forthcoming authorisation.

# **5 STRATEGY AND PLANNING**

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

## **5.1 BNGSL Sellafield**

### ***Life-cycle baseline (LCBL)***

The continued development of these plans is an essential feature of the NDA's ownership of the nuclear liabilities. We have continued to discuss with operators the environmental outcomes we wish to see from these plans. Our involvement includes close working with the NII and the NDA.

As part of our work to assist with, and influence, the development of long term plans at Sellafield we have looked at and commented on the developing strategies which will

underpin future versions of the LCBL. In our consideration of the strategies we chose the Overall Effluent Strategy (OES) by way of example to show how ‘environmental principles’ can be used to examine the suitability of strategic proposals from an environmental perspective.

### ***Near Term Work Plan (NTWP)***

We continued to work with BNGSL and NII to ensure that all work related to compliance with environmental legislation is adequately programmed. In particular we have worked with BNGSL and NII on a ‘regulatory schedule’ which will help to make the NTWP more accessible to regulators.

## **5.2 UKAEA Windscale**

We attended a tri-partite ‘Strategic Issues’ meeting held to aid understanding of issues of concern to the NII regarding some of the programme assumptions in the LCBL.

We responded with comments to the UKAEA’s submission of an interim Integrated Waste Strategy.

## **6 EVENTS AND INCIDENTS**

### ***Sea line 3***

BNGSL discovered a leak from sealine 3 on 7<sup>th</sup> June from a routine pressure test. The leak resulted from a failed patch which had been applied to a hole cut in the pipe 18 years ago by protesters. The leak was from a point about 500m below low water – the pipe length is about 2km. Discharges were successfully diverted by BNGSL into the other operational line while the BNGSL’s dive team effected temporary repairs. Temporary repairs were successful and now BNGSL is looking to apply a permanently engineered solution.

Environmental monitoring has not indicated any abnormal results and it appears unlikely that the small leak had a significant impact on the dispersal of authorised discharges.

A further leak was found as a result of a pressure test on 15<sup>th</sup> September. This was found to be the result of a small slit in the steel pipe at a point closer to the shore than that above and close to the low water mark. At the time of writing it is not known what caused the damage in the pipe. Discharges have been diverted into the other operational sealine while repairs are made.

### ***Waste Vitrification Plant (WVP) Cs-137 aerial plant limit***

Due to an incident at the Waste Vitrification Plant in April, British Nuclear Group Sellafield Ltd (BNGSL) confirmed (following a provisional result in June) that the annual plant limit for caesium-137 discharge to air has been exceeded by 17%.

The incident lasted for about 35 minutes and led to an elevated discharge. Environmental monitoring did not indicate anything abnormal and assessments indicate that any health or

environmental impact of the event was very small. The plant limit in question is set at 2% of the site limit.

Notwithstanding the above we have been investigating and will be considering appropriate enforcement action in line with our enforcement policy.

### ***Elevated release from Highly Active Liquor Evaporation and Storage (HALES)***

On the morning of the 25<sup>th</sup> August there was an elevation of radioactivity in the stack discharge from the HALES stack for a period of about 2 hours. Although the release does not appear to have challenged the relevant authorised discharge limits it did result in a transitory increase in the levels of radioactivity detected in the air by the downwind site perimeter monitors. The level measured at the site perimeter was over 1,000 times smaller than the level that would trigger off-site countermeasures to be taken.

Downwind grass samples at the site fence indicated an elevation in Cs-137 in particular but the levels were within the range normally seen at other locations around the site fence. Milk monitoring carried out by the Food Standards Agency did not reveal any elevation in activity levels.

At the present time it is not known what caused the elevated discharge – we are investigating in collaboration with NII.

### ***THORP***

We continue to liaise with the NII and BNGSL about the leak discovered in the Feed Clarification Cell (FCC) in April. We are satisfied that the event has not resulted in any significant impact on the environment and we have not, as yet, identified any breach of the site's authorisation held under the Radioactive Substances Act 1993. The NII is the lead regulator in this case. However, we have been and will continue to follow-up the wider potential environmental implications of this event including:

- the potential knock-on effects of prolonged THORP shutdown; and
- any learning to be applied more widely in relation to management and engineered control which may impact directly on environmental performance elsewhere.

### ***Beach Find***

The daily beach survey (in operation while the redundant sealine removal project is ongoing) located a contaminated item in the upper end of the intertidal zone on 17<sup>th</sup> August. The item is an old steel pipe blank which may date from the time that the original two pipes (now being removed) were commissioned. The levels of radioactivity on the item were less than the reporting level agreed in the environmental monitoring programme. The item was removed and taken onto the Sellafield site.

## **7 ENFORCEMENT ACTIVITY**

We issued a warning letter and enforcement notice to BNGSL Sellafield in June in relation to a number of non-compliance areas discovered during a team inspection in February. The Enforcement Notice required improvements to be made in several areas related to how liquid

effluents are managed, and in particular minimised, and included a requirement to produce an aqueous waste strategy.

Among the areas needing improvement were:

- The arrangements for minimising the build-up of solid material in the ‘lagoon’, which is designed to hold surface water run-off from the site before it is discharged into the Irish Sea.
- The management arrangements that specify how BNGSL will minimise liquid waste from Sellafield.
- The means, such as filtration, that BNGSL uses to minimise solids in the liquid waste produced and discharged.
- Inconsistencies in the way that some discharges and disposals are measured and reported.
- Failure to report to the Agency, that liquid waste discharged from the on-site lagoon contained a radioactive substance which had not been reported from this particular source before.

## **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, process, 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 subject to limits and conditions which must be met.

**Becquerel:** The standard international unit of radioactivity equal to one radioactive transformation 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 as an electron (where positively charged, the particle is termed a positron).

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

**Critical group:** A group of members of the public whose radiation exposure is reasonably homogeneous and is typical of people receiving the highest dose from a given source.

**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, the UK has (since 1986) applied a

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). This limit is now incorporated into UK law.

**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 detriment to the health of an individual from an exposure to ionising radiation, regardless of the energy and type of radiation. Often shortened 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 has taken 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 will not always be 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).

**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 ( $\mu$ Sv):** 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**.

**TPP, TPPBr:** Tetraphenylphosphonium bromide. A chemical now used in EARP to precipitate technetium-99 in a solid form.