



**QUARTERLY REPORT TO
WEST CUMBRIA SITES STAKEHOLDER GROUP**

1 OCTOBER TO 31 DECEMBER 2009

This report provides a summary of the outcome of our regulatory activities at Sellafield, Windscale, Calder Hall, the Metals Recycling Facility at Lillyhall and the Low-Level Waste Repository (LLWR) near Drigg during October to December 2009.

Our nuclear regulators attend meetings of the WCSSG and most of its sub-committees. We are happy to respond to questions raised there, or you can contact us at our Penrith office:

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We are always looking to improve our reporting and would be happy to hear your views on the format and content of this report.

EXECUTIVE SUMMARY

This report presents a summary of our work associated with Sellafield, Windscale, Calder Hall, the Metals Recycling Facility at Lillyhall and the Low Level Waste Repository (LLWR) at Drigg from October to the end of December 2009.

Highlights include:

- We began consultation on a number of changes to Sellafield's authorisation for the disposal of radioactive wastes;
- We continued to assess the application by WRG to dispose of high volume very low radioactive waste at Lillyhall;
- Radiation doses to the public from the current routine radioactive discharges from Sellafield to sea and air remain low and well within statutory limits;
- Sellafield confirmed a breach of the site limit for aerial discharges of antimony-125;
- Beach monitoring for radioactive particles continued using further enhanced equipment – the most southerly location monitored to date (Silecroft) produced no finds.
- We finalised our report of a team inspection of the management of liquid (aqueous) wastes at Sellafield – there were no significant compliance issues.
- Together with NII we continued to be engaged with the planning and change processes at Sellafield and remain concerned about the timescales for completing some of the key hazard reduction projects at the site.

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1 INTRODUCTION

This report presents a summary of our work associated with Sellafield, Windscale, Calder Hall, the Metals Recycling Facility at Lillyhall and the Low Level Waste Repository (LLWR) at Drigg from October to the end of December 2009. 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 links with the Environment Agency vision and goals

Our role as the Environment Agency

We aim to prevent pollution, to enhance the environment, and contribute to the sustainable development of the UK.

The operation and clean up of nuclear sites generates radioactive and non radioactive waste. Our role as the environmental regulator is to ensure that the management and disposal of those wastes have little or no impact on people and the environment, both now and in the future. We achieve this by both direct regulation and partnership working with the; operators, the Nuclear Decommissioning Authority (NDA), the Nuclear Installations Inspectorate (NII) and others.

We expect the holders of nuclear site permits and authorisations to apply high standards to environmental protection. Our role includes checking that operators are applying high standards and that they comply with the limits and conditions of the authorisations that we issue under the; Radioactive Substances Act 1993 (RSA93), the Environmental Permitting Regulations 2007 (EPR) and other relevant legislation and policy.

If you would like to know more about our role as the regulator on nuclear sites, please follow [this link](#).

2 AUTHORISATIONS AND PERMITS

2.1 Radioactive Substances Act 1993 (RSA93)

Disposal of radioactive wastes is only permitted subject to strict limits and conditions under an RSA93 authorisation.

2.1.1 Authorisation Reviews

As a result of our fifth annual review of the Sellafield and Windscale RSA authorisation, there are changes required to the authorisation and the accompanying Compilation of Environment Agency Requirements - CEAR. We intend to use our powers under RSA93 to revoke the current authorisation and to issue a varied authorisation that consolidates all of the changes made to the authorisation since it became effective on 1 October 2004.

We normally consult our statutory consultees (Health and Safety Executive and the Food Standards Agency) and keep others informed. This time we are consulting more widely because of the nature of one of the proposed changes – a proposed increase in the site authorised limit for antimony-125 as previously reported. A 9 week public consultation began on 7 December 2009.

The main proposed changes being consulted on are:

- Increase the site limit for antimony (Sb)-125 in aerial discharges to account for an increase in discharge caused by the processing of Magnox fuel of increasingly higher burn up in the Fuel Handling Plant. Increases in site limits, as a result of increased discharges, require an opinion from the European Commission (EC) under Euratom Treaty Article 37 in relation to the potential impacts on neighbouring European Union member states. The Department of Energy and Climate Change (DECC) sought an opinion from the EC in September 2009 following the preparation of a submission by Sellafield Ltd (SL). This limit cannot be increased before such an opinion is received. The radiological impact of this change on members of the public would be very small, increasing the total radiation dose from aerial discharges by about 0.4%;
- Decrease six site limits: (ruthenium (Ru)-106 in liquid and aerial discharges, iodine (I)-131 in aerial discharges, neptunium (Np)-237 in liquid discharges, curium(Cm)-243+244 in liquid discharges and zirconium/niobium (Zr/Nb)-95 in liquid discharges) to remove unnecessary headroom;
- Decrease twenty plant (or facility) limits, again to remove unnecessary headroom;
- Add a new route to transfer High Volume Very Low Level Waste (HV-VLLW) to the operator of the landfill at Lillyhall for disposal. The Environment Agency is also consulting separately on the application for the use of this landfill for HV-VLLW. We will not permit this transfer route for SL until the specified landfill at Lillyhall is authorised;
- Add a new transfer route for low level waste oils to the operator at the incinerator at Hythe, Hampshire.

Sellafield Ltd has also applied for an increase to plant limits for liquid discharges from Thorp (Thermal Oxide Reprocessing Plant) Receipt & Storage Pond for caesium-137, and total alpha and total beta radioactivity. We agreed that increases were necessary to allow the pond purge to be increased to reduce the level of corrosive ions in the pondwater. The radiological impact from these increases is small and there was no need to change the overall site limits. We consider that this variation will protect the fuel integrity and prevent enhanced discharges of radionuclides in the longer term. These changes were implemented on 1 December after consulting the Health and Safety Executive and the Food Standards Agency.

2.1.2 Disposal of High Volume, Very Low Level Radioactive Waste (HV-VLLW) and Low Level Waste (LLW)

We continued to review Waste Recycling Group's application for disposal of HV-VLLW to landfill at their Lillyhall site. During October, we consulted statutory bodies, local authorities and other interested parties. A number of consultation comments were received which we are now in the process of considering alongside our technical assessment of the application. Our decision will be published in a Decision Document.

Endecom have made proposals to develop the Keekle Head former open cast mine as a disposal facility for lower end LLW. As part of this development Endecom must seek planning permission, an authorisation under RSA93 from ourselves and

potentially also a Nuclear Site Licence from the HSE. During October we attended three days of public exhibitions by Endecom to hear views on the proposals and to explain our role in the authorisation process should an application be made. In December Endecom submitted their planning application to Cumbria County Council and we will comment upon this when consulted. If the development proceeds we anticipate an RSA93 application being made to us at some point during 2010.

2.2 Environmental Permitting Regulations (EPR)

2.2.1 Sellafield's Environmental Permit

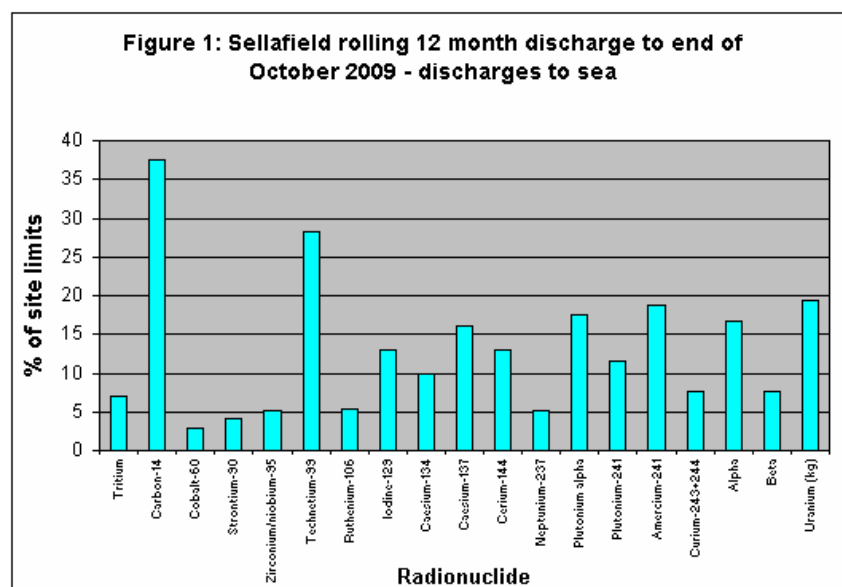
An application to review the Sellafield Environmental Permit is expected to be submitted at the end of December. The application is likely to include some significant changes which may require consultation. The aim of the review is to ensure that the permit and its conditions remain relevant in protecting the environment and human health.

3 DISCHARGES & THEIR RADIOLOGICAL IMPACT

3.1 Radioactive Discharges

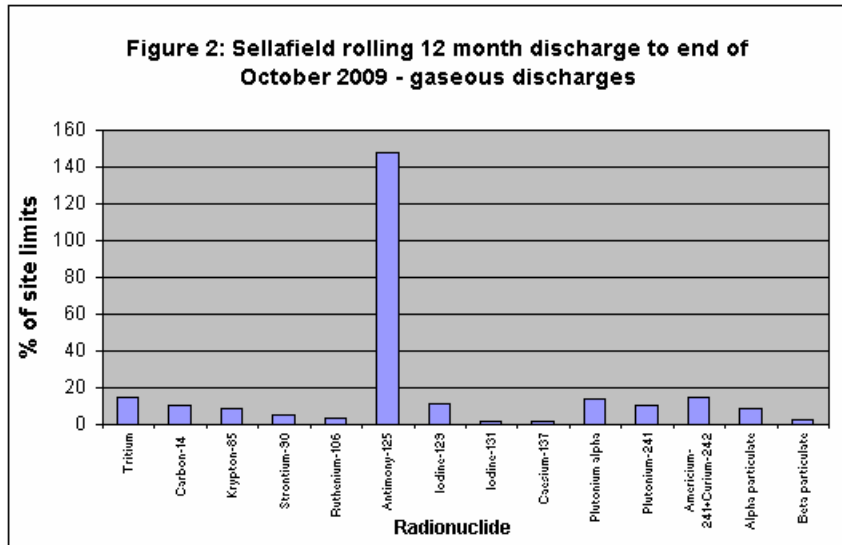
We aim to ensure that the public and the environment are protected from the radiation exposure that may result from the discharge of radioactive waste. There was one breach of authorised site limits regarding aerial discharges in this quarter at the Sellafield site.

3.1.1 Discharges to sea



Radioactive discharges to sea from Sellafield over the 12 months to the end of October 2009 are shown as a percentage of the authorised site limits in Figure 1. All discharges were well below the authorised limits. Note that for certain radionuclides the site limits for calendar years relate to the amount of spent fuel reprocessed ('throughput related inputs').

3.1.2 Discharges to Air



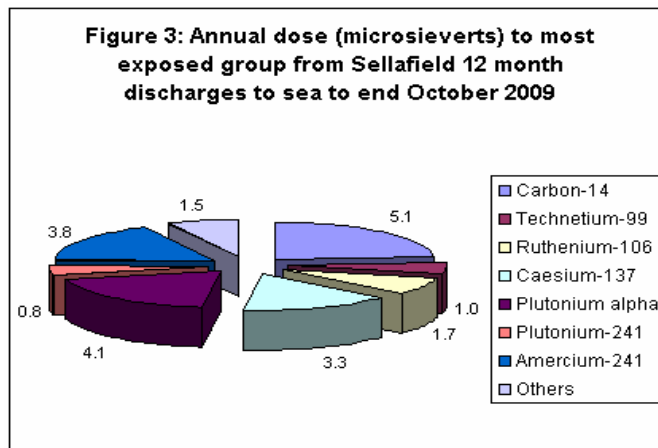
We have previously reported (in previous issues of this report and in a special briefing note available on the WCSSG website) on the unavoidable increase in the discharge of antimony-125 to air. As expected SL confirmed that the site aerial discharge limit was exceeded for antimony-125 for the rolling 12-month period to the end of July (Figure 2 shows the position at the end of October). As previously reported the radiological impact from the discharge of this radionuclide is very small. We have informed SL that no enforcement action will be taken in relation to the confirmed exceedance of antimony-125 noting that we are minded to increase the current limit (see 2.1.1). However, we have required further action by SL to further enhance its arrangements for measuring antimony-125 releases to air.

3.1.3 Disposals to Land

These figures are compiled on an annual basis, please refer to the April-June 2009 report for 2008/9 totals.

3.2 Radiation Doses

Radiation doses to the most exposed groups of people from liquid and gaseous discharges from the Sellafield and Windscale sites continue to be well below the statutory public dose limit of 1 milliSievert (mSv) per year. For example the assessed annual radiation dose for discharges to sea made during the 12 month period up to the end of October 2009 is about 21 microsieverts - Figure 3 gives the contributions to this dose from the various radionuclides.



3.3 Environmental Monitoring

Radioactive particles in the environment

Beach Monitoring

The improved 'Synergy' beach particle detection system has been fully deployed during the quarter. This system is more sensitive for the detection of particles containing americium-241 (Am-241) than is the old Groundhog Evolution II system. Surveys carried out at Sellafield and Braystones beaches have revealed higher proportions of Am-241 containing particles than have been seen previously.

The increased find rate with the Synergy system is as a result of lower activity, and/or deeper buried alpha-rich particles being detected than were seen previously. The activities of alpha-rich particles have been no greater than those detected by the previous system. There are no significant implications in terms of the risk assessment, nor general advice on risk; the probability of encounter leading to ingestion remains extremely low, and estimates of committed effective dose if a particle were to be ingested do not exceed the threshold for an 'urgent review of health effects' advised by the Health Protection Agency (HPA).

Monitoring was carried out at Silecroft during the quarter. This is the most southerly beach area surveyed to date. There were no finds.

A successful calibration exercise was conducted on the beach at Barn Scar in October, to support the deployment of the Synergy system. The visit was attended by the Committee for Medical Aspects of Radiation in the Environment (COMARE), HPA, Nuvia (SL's beach monitoring contractor), SL and EA.

Habits survey

A second CEFAS beach user habits survey to support the particles programme has now been completed. This work will be used to support the detailed risk assessment that HPA is undertaking on the beach particles, on EA's behalf.

Intervention strategy

Following final consultation with HPA the Sellafield beach particles response/intervention strategy document has been finalised and published.

Environmental Monitoring Programme

Sellafield Ltd has suggested a number of amendments, improvements and additional work to improve the environmental monitoring programme. In general, we were supportive of Sellafield's proposals based on the continuing requirement to demonstrate 'Best Practicable Means' are being applied to the programme. The relevant Environment Agency Requirement (EAR) has been amended and issued to reflect the outcome of the review.

4 COMPLIANCE ASSESSMENT

4.1 Site Inspection & Compliance

4.1.1 Solid Waste Inspection

A solid waste inspection was undertaken at the Legacy Ponds and Silos plants in November 2009. This formed part of a wider follow-up of the recommendations from our joint (with NII) solid waste team inspection undertaken in 2006. The inspection included desk based assessment of SL's progress with the 2006 recommendations, inspection of procedures and records and inspection of the separation area transit stores and management of Low Level Waste (LLW) at Magnox Swarf Storage Silos.

We found a few issues associated with storage and segregation of LLW and have arranged a return inspection in early 2010 to ensure progress is being made.

We have been carrying out preparatory work for a team inspection with the Nuclear Installations Inspectorate (NII) on Plutonium Contaminated Material (PCM), planned for the next quarter. This inspection will form part of a wider joint intervention programme with NII on wastes and storage as part of a follow up to the solid waste team audit carried out in 2006.

4.1.2 Pile 1 chimney decommissioning

We have been discussing the Best Practicable Environmental Option (BPEO) for the decommissioning of the Windscale Pile 1 chimney with Sellafield Ltd and the Nuclear Installations Inspectorate (NII). We are supportive of Sellafield Ltd reviewing the work to date to produce a BPEO, based on the potential reduction in schedule and cost savings that may be achieved, while delivering the best environmental outcome and reduced time at risk.

4.1.3 Fuel Handling Plant (FHP)

A visit was made to the Fuel Handling Plant (FHP) to follow up on recommendations following the 2006 team inspection for fuel storage arrangements at Sellafield. The inspection revealed that most of the actions have been completed with a number remaining outstanding. The implementation of principles and standards for pond storage of Magnox fuels needs more work.

SL's programme for achieving improved reprocessing rates for corroded fuels in FHP has been examined. This programme now appears to be well developed, and was beginning to show signs that a corroded fuel feed rate sufficient to achieve the MOP end dates might be demonstrated in 2010.

4.1.4 Low Level Waste Repository (LLWR) and Vault 9

Vault 9 construction continues to make progress. We regularly inspect construction activities and monitor the quality assurance of construction activities. We have been paying close attention to methods proposed for the construction of the vault sidewalls which represent a new and unique engineering challenge. We believe reasonable approaches have been identified, but will closely monitor trials to demonstrate the efficacy of the proposed approach. During October we were able to accept validation of the quality assurance of a portion of the construction site, subject to further information.

During November we inspected Vault 9 activities and no concerns were identified. The sites Environmental Management System was also reviewed.

The Operators of the LLWR are required to submit an updated Environmental Safety Case for continued disposal at the site by May 2011. We continue to review progress and clarify our expectations for this submission. During December we attended a workshop run by the operators to consider options for and optimisation of the future engineering and closure of the site (e.g. future vault and cap design). We observed good progress in understanding the issues to be considered, and will review the outputs of this work when they become available.

4.1.5 Studsvik Metals Recycling Facility, Lillyhall

Following receipt of the first consignment of radioactive metal for treatment in September, inspection visits were undertaken. No issues were identified and the first consignment of metal for treatment was safely managed.

Following active commissioning, the first set of reported discharge figures were all within authorised limits.

4.1.6 Magnox Operating Plan (MOP)

We attended the final quarterly MOP Regulatory Forum of the year where several key points arose; Magnox reprocessing performance for the year continues to fall behind target, and the low rate of corroded fuel throughput is contributing to the low performance in reprocessing. MOP end dates will now be confirmed when the next revision to MOP8 is undertaken in March 2010, although it is still intended that the existing MOP completion deadline of 2016 will be met.

4.1.7 Magnox Swarf Storage Silos (MSSS) clean-up programme

The project to reduce the liquid arisings in the cavity sump (see last report) is almost ready for delivery.

4.1.8 Gaseous waste management at Sellafield

SL is undertaking a project to redirect gaseous effluents away from two ageing chimney stacks which serve the Magnox Reprocessing Plant and other facilities, to a new stack. We expect that this project will deliver environmental benefits in terms of reduced discharges, improved monitoring and greater dispersion of discharges. We continue to review progress and to work with Sellafield and NII to allow this important project to progress without delay. Much design and enabling work is on-going and ground works have commenced. Diversion of gaseous effluent to the new stack is currently planned to start around 2012.

An on-going regulatory issue, highlighted through our inspection programme, is the application of standards with respect to the age of HEPA (High Efficiency Particulate Arrestor) filters at Sellafield. In response to this, SL has developed a programme to comply with the site standards, which are aligned with US Dept of Environment standards. Full compliance is expected by 2012.

4.1.9 Aqueous Waste Management at Sellafield

We issued our final report covering our aqueous waste team inspection of June 2009. We found no significant compliance issues and assessed that SL's level of compliance with the conditions of the RSA93 authorisation and EPR07 permit has improved significantly with respect to the use of Best Practicable Means (BPM)/Best Available Techniques (BAT) for the minimisation of aqueous discharges. However, we also concluded that there are a number of areas in which SL should take action to demonstrate continuous improvement in the application of BPM/BAT. In summary we recommended that SL:

- Set out a clear vision, objectives, targets and monitoring tools within their Integrated Waste Strategy (IWS) that drive waste prevention and minimisation;
- Develop a programme for delivery of the aqueous waste strategy to achieve the vision;
- Recognise, standardise and implement good practice; and
- Improve quality assurance and executive oversight.

We will monitor and review SL's progress with the recommendations.

4.1.10 Maintenance Re-engineering Programme (MRP)

Working jointly with NII, we met with Sellafield Ltd to review progress of the MRP, a key component of SL's Integrated Change Programme (ICP). We have written a joint letter to SL expressing our continued support for the MRP and also made the following points:

- If decommissioning of high risk legacy plants is not significantly accelerated from the LTP10 assumptions, then significantly increased provision for asset care will be essential along with the improved regimes for asset management, care and maintenance.
- We expect SL to continue to improve its understanding of plant condition (particularly on high risk legacy plants), in order to inform future asset management decisions.
- We consider that elements of the Maintenance Re-engineering Programme (MRP) have nuclear safety and environmental benefits. We expect that these elements will be appropriately prioritised.

4.2 Incidents and events

4.2.1 First Generation Magnox Storage Pond (FGMSP)

The FGMSP was built to support the early Magnox fuel reprocessing route through providing a means of receiving, storing and de-canning Magnox fuel prior to reprocessing. Whilst plant operations ceased many years ago the plant still contains spent nuclear fuel and radioactive waste stored under radioactive liquor. In September 2009, an external corroded pipe connecting into the pond was found to be dripping into a trench running around the outside of the plant. Whilst this effluent could be collected and returned to the pond (i.e. it and was not released into the environment), this leak into secondary containment needed urgent attention. We have monitored developments to ensure this is addressed without delay.

Characterisation work has revealed the most likely source of the leak has been identified, and controlled lowering of the pond water level in the area concerned has stopped the leak. SL are developing plans to permanently isolate the source of the leak and work continues to develop plans to permanently isolate a potential secondary source.

4.2.2 Magnox Swarf Storage Silos (MSSS)

The MSSS stores Magnox swarf generated through the de-canning of Magnox fuel during the early Magnox programme. In June 2009 Sellafield notified us of increasing levels of arisings in one of the cavity sumps within the MSSS facility, and we have been monitoring the situation to ensure the issue is addressed without delay. Whilst, in common with the FGMSP (see above), the effluent could be collected and returned to the silos (i.e. it was not released to the environment), this leak needed urgent attention to prevent any escalation. SL investigations have found that the main source of the increased arisings is the 1st extension cavity sumps effluent via seepage through a construction joint. The silos and cavity sump liquor level operating regime will be modified to prevent/minimise the potential for further leakage.

It appears to us that SL has acted quickly and decisively to establish and address the cause of this and the incident described above (4.2.1).

4.2.3 Loss of FHP chiller capacity

In December one of the chillers at the Fuel Handling Plant failed, causing the loss of water/glycol coolant to the chiller room floor, and from there to an external underground concrete duct. SL subsequently confirmed that the water/glycol (which was not radioactive) was contained in the duct, and no discharge to the environment occurred. However, chiller capacity was lost for a week, over which time pond water temperature increased by about 2deg.C, with a corresponding increase in pond water beta activity of about 300Bq/ml. The other two chillers have been brought into

service, and pond conditions have returned to normal. We await SL's investigation report.

4.2.4 Low Level Waste Repository

Last quarter we were informed of two events which required further investigation.

Camera inspections had identified the possible collapse and damage to a drainage pipe under Vault 8, leading to some of the pipework becoming flooded. We closely monitored this and following completion of an investigation by LLWR Ltd, we were satisfied that there had been no environmental impact, appropriate remedial work had been instigated and identification of such issues would be improved in the future.

We were also informed of elevated suspended solids for discharges from a settling pond used to handle water from the Vault 9 construction area. Since this issue was first identified we have visited the site and communicated with the operators on this matter several times. Site investigations were undertaken and additional samples taken. A number of possible issues were identified, such as inappropriate sampling techniques leading to inaccurate sample results. Additional protection measures were therefore implemented such as settlement ponds, 'siltbusters' to remove high suspended solids from water, and cessation of discharges. During this quarter the operators have continued careful management of water on the construction site, although we agreed that rainwater run-off from the area can be handled via other, non-consented routes. Water will continue to need careful management until the whole construction area is lined, although this has now been completed for the vast majority of the area. There is no reason to believe any environmental harm has been caused, although we continue to monitor the site's efforts to manage this issue.

4.3 Enforcement

4.3.1 B6 Vessel Vent condensate leak

SL has submitted a number of responses to the requirements contained in the Enforcement Notice that we issued in July relating to this event. These relate to putting in place design and maintenance standards for, and assessing the condition of, existing condensate drain systems, improve arrangements for notifying of incidents, and for allocation of responsibility for assets on site, and developing proposals for assessing remediation requirements for the contaminated area.

All responses received were deemed adequate, except that relating to establishing management arrangements for asset ownership. SL was given an extension to the end of January 2010 to resubmit this response.

Our formal investigation into this incident continues. We are making arrangements for an independent audit of, and sample testing for, the next phase of the contamination assessment (due early 2010).

5 OTHER WORK AREAS

We work with the site licence companies (SLCs), parent body organisations (PBOs), NDA, NII and others to make sure the environmental impact of day-to-day operations and decommissioning activities on nuclear sites is minimised, and that the risks posed to our environment from hazardous activities at Sellafield are reduced. This section highlights some of the progress this quarter.

5.1 Life Time Plan 2010 (LTP10)

SL has commenced the production of the detailed Life Time Plan 2010 (LTP10) (see last report). We have observed, supported and commented on the process to date,

seeking to ensure that environmental protection and risk are appropriately considered.

As previously reported we remain concerned about the emerging timescales for the completion of some of the key major hazard and risk reduction work. We will continue to play our part in supporting the NDA, SL and others in developing and underpinning a plan that delivers improved performance. At the same time we will continue to contribute to the development of a sustainable decommissioning and site restoration plan and the optimisation of the supporting waste infrastructure.

5.2 Hazard and Risk Reduction

We consider there is a need to develop new ways of working to help to secure early reduction in the major hazards/risks at Sellafield, in particular those associated with the Legacy Ponds and Silos plants. Working with NII, we have been proposing the development of a High Hazard and Risk Reduction Plan and supporting framework as a means to address this issue. SL are now committed to developing this plan and associated framework, and we are working with them and NDA to facilitate the development of the first version by around the end of this financial year. We believe that these developments should help to secure more certainty, transparency, accountability, momentum and consensus in taking forward major clean-up at Sellafield.

5.3 Integrated fuel management

We have continued to press for the development of contingency arrangements that could be deployed in the event that the Magnox fuel reprocessing route fails. The technical development by SL of a fuel drying and dry storage option continues to progress, and we are encouraged to see that there is consideration of this option as a potential alternative to reprocessing (potentially to be deployed before any acute failure of the wet reprocessing route occurs). To support this work, we have asked SL to develop a BPEO baseline position for Magnox reprocessing, which will set out objective and measurable criteria against which any alternative or contingency arrangements could be assessed, in the context of the wider integrated fuel management picture across site. Work on this is progressing.

5.4 Groundwater and contaminated land

We reviewed SL's preliminary strategy for managing contaminated land which will require a combination of remediation options. Contaminated land and groundwater protection management will need to take account of any extensions to decommissioning timescales.

We reviewed SL's annual groundwater report which has been much improved,. We have recommended further improvements including further consideration of the potential impacts of climate change and flood risk management on the groundwater monitoring programme.

Elevated levels of nitrate have been found close to the River Calder. The groundwater monitoring at this location has been increased to a monthly sampling frequency. SL are now investigating the potential sources.