



**BRIEF TO WEST CUMBRIA SITES STAKEHOLDER GROUP,
DECOMMISSIONING SUB-GROUP**

[SEPTEMBER 2010 TO FEBRUARY 2011]

This brief provides a summary of the outcome of our regulatory activities associated with decommissioning at Sellafield, Windscale, and Calder Hall during September 2010 to February 2011.

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.

1 Introduction

This brief provides a summary of the outcome of our regulatory activities associated with decommissioning at Sellafield, Windscale, and Calder Hall during September 2010 to February 2011. It should be read in conjunction with our most recent reports to West Cumbria Site Stakeholder Group main committee.

2 Our Regulatory Approach

We aim to do all that we can to facilitate prompt decommissioning at Sellafield and in particular to support hazard and risk reduction associated with the major legacy facilities at Sellafield. Our risk informed approach to regulation in this area was summarised in our last report.

For the last two years we have been working with Nuclear Installations Inspectorate (NII) and Sellafield Limited (SL) to refine "flexible permissioning" which seeks to streamline the SL and regulatory processes. Following a successful trial, the plan is to continue with this approach over the coming year.

Recognising the importance of hazard and risk reduction at Sellafield to protection of the environment, we continue give this outcome priority in our regulatory plans.

3 Decommissioning Lifetime Plan and Strategy

3.1 LifeTime Plan 2011 – Performance Plan

We stated in the last report that we expect the major high hazard and risk reduction at Sellafield to be completed much earlier than the contact baseline. Since this time we have continued to work with SL, NII, NDA and Government to support the development of performance plans that aim to deliver much earlier risk reduction. For example, we have supported upstream value chain reviews, led by the NDA, which seek to explore opportunities to accelerate and streamline the clean-up strategies.

The site lifetime performance plan is scheduled to be complete by the end of March 2011. We have contributed to the parent body review of the high hazard and risk reduction elements of the plan and are participating in NDA reviews. There is evidence of the injection of new ideas, innovation and efficiencies into plans and we expect to see incremental improvement in delivery over the next few years. We will continue to play our part in enabling early risk and hazard reduction. We will also be giving priority to supporting improvement plans to bring the Magnox Operating Plan back on schedule following setbacks this year.

Prioritising effort on major high hazard and risk reduction programme is leading to further deferment of broad front decommissioning at Sellafield next year. We will be working with NII to ensure adequate care and maintenance of redundant facilities, whilst awaiting decommissioning.

3.2 Sellafield High Hazard and Risk Reduction Programme (SHHaRRP)

We continue to promote and support the development of the SHHaRRP report which summarises the current strategies and plans to clean up the legacy ponds and silos plant at Sellafield. Currently a second updated internal version of the report is being written by SL to reflect the performance plan. We continue to press for the development of a public version of this document: – this will help SL and NDA to ensure there is awareness and wide support for their major high hazard and risk reduction plans.

3.3 Technology and Research and Development

Technical reviews of the decommissioning programmes have been undertaken as part of a new Technology Readiness Assessment process introduced at the site. This involves developing Technology Road Maps and reviewing and assigning Technology Readiness Levels to the required technology. This approach provides a critical technology path for the decommissioning programme allowing key technical risks to be identified and addressed. We believe this more structured and systematic approach will help to assure and underpin the clean-up programmes and also allow better integration of research and development.

4 Decommissioning Programmes

There are a number of decommissioning programmes at Sellafield. SHHaRRP encompasses four programmes covering the clean-up of the legacy ponds and silos facilities. In addition, there are programmes which cover the longer term broad front decommissioning required at Sellafield (Site Remediation & Decommissioning Projects) and the Windscale and Calder Hall decommissioning programmes. Another important area is protection and clean-up of land and groundwater.

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

Preparation for waste retrievals and provision of the downstream waste treatment facility, combined with technical solutions to manage the hazards associated with the waste, are the main ways in which the MSSS performance plan seeks to deliver clean up.

4.1.1 Nuclear Safety Events:

Following a number of nuclear safety events at the MSSS facility in the Summer of 2010, NII issued an improvement notice in October 2010. One of these events was associated with the maintenance of gaseous waste abatement equipment. We have ensured that SL's improvement plan addresses issues raised with respect to compliance with the EPR10(RSA) permit.

4.1.2 Internal Ventilation System Condensate Drainage Arrangements Inspection:

As part of our follow up of the condensate leak event on the Magnox Reprocessing ventilation system from January 2009 and the associated Enforcement Notice, we have undertaken a sampling inspection of the MSSS and First Generation Magnox Storage Pond (FGMSP) internal ventilation system condensate drainage arrangements. In summary this generally found good awareness on plant with respect to the maintenance and inspection of ventilation condensate drains and the need to ensure integrity of the ventilation systems and that penetrations are sealed.

However, the inspection raised a number of general and installation specific issues which SL will need to consider and address appropriately.

4.1.3 Liquor Activity Reduction project:

The MSSS 3rd extension Liquor Activity Reduction (LAR) project has successfully been implemented and is delivering risk reduction beyond the planned targets for this financial year (see our last report for a brief explanation of the LAR process). The current benefits of LAR are reduced radiation doses to workers, reduced gaseous discharges and transfer of some of the radioactive inventory to more modern containment at the Site Ion Exchange liquid effluent treatment plant, known as SIXEP. The elevated aerial discharges which arose from the initial LAR transfers (covered in our last report) have not reoccurred and the cause has been addressed. We are now working with SL and NII to understand how LAR can be extended to the older compartments of the MSSS facility, where there are significant concerns about the standards of containment and associated land and groundwater protection. In particular we are in discussion about how this could be extended to the original building, which has suffered from leaks in the past. The LAR process has the potential to become an important element of the overall leak prevention strategy for this facility (see section 4.8 below).

4.1.4 Gaseous Effluent Ventilation System:

A number of modifications to the MSSS ventilation system are being progressed in preparation for the waste retrievals operations. An upgrade to the ventilation system serving some parts of the secondary containment is on-going. This includes additional abatement equipment and will provide improved environmental protection, once installed and commissioned. SL has also taken the decision to use a nitrogen injection ventilation system during waste retrieval operations, which will mean that ventilation air flows can be decreased. This decision has caused SL to review their existing plans to upgrade the abatement of the existing ventilation system. The original plan was to look to install additional filtration downstream of the existing wet scrubbers. A range of options have been assessed, and SL will present their preferred solution to us, NII and NDA in late March. We will review SL's proposed solution and consider whether it represents Best Available Techniques (BAT), taking account of space constraints in this old facility and the urgent need to progress with the clean-up programme.

4.1.5 Silos Direct Encapsulation Plant:

The Silos Direct Encapsulation Plant (SDP) will treat the waste retrieved from the MSSS facility. This project is currently in the design phase and we have recently reviewed progress with the technical underpinning programmes and inspected test rigs at Chorley. Work regarding the waste treatment product is also a current area of focus. Although the project now appears to be progressing well, following the hiatus caused by the need to resolve pyrophoricity and effluent management issues, there is still a very significant challenge to design, construct and commission this facility in time to support MSSS waste retrieval.

The Box Transfer Facility (BTF) is being developed to support the retrieval of waste from the legacy silos at Sellafield. BTF is a waste import/export facility allowing access to existing waste stores. In January we reviewed the environment case covering the construction of this facility and raised no objections to this work proceeding, when consulted by NII. The construction work has now commenced.

4.1.6 Silos Maintenance Facility:

The Silos Maintenance Facility (SMF) is vital to sustain waste retrievals from the legacy silos plants, once they have commenced. The project is currently in the design stage and construction site preparation work is currently underway, including site investigation and ecological studies.

4.2 *First Generation Magnox Storage Pond (FGMSP) programme*

The FGMSP performance plan seeks to deliver clean up sooner by developing waste and fuel treatment plants earlier and through developing additional means to recover the waste from the pond. We continue to work with NII and SL to try to facilitate key tasks which are seen as having significant benefits in terms of worker safety, environmental protection, risk reduction, provision of contingency arrangements and programme acceleration. Key areas of focus continue to be ensuring nuclear containment by addressing vulnerable aspects of the facility structure and progressing radioactive sludge removal.

4.2.1 Solid Waste Inspection:

Good progress has been made in addressing the issues associated with the storage of waste in external areas which were raised following an inspection in February 2010. However, SL's internal assurance programme continues to identify shortfalls in low level waste management and housekeeping. A fundamental issue is the lack of facilities to segregate and store waste awaiting collection and disposal. We will continue to monitor progress in this area.

4.2.2 Elevated gaseous discharges:

In December 2010 elevated gaseous discharges were detected from a building which forms part of the FGMSP facility. Investigations have not confirmed the cause,. Aerial discharges since early January have returned to typical levels.

4.2.3 Independent pond water make up trial:

Following a three month trial, the independent pond water make-up system has been switched off. The aim of the trial is to evaluate whether the use of an independent clean water make-up will reduce:

- the pond water activity;
- the worker dose uptake around the FGMSP (potentially allowing the acceleration of the FGMSP clean-up programme); and
- the gaseous discharges from the open pond.

Whilst early results are encouraging, SL took the decision not to extend the trial immediately because of the cold weather in December. SL are now evaluating the results of the trial. Depending on the outcome of this evaluation, they plan to either extend the trial for another 3 months or develop an operational strategy for the use of the independent pond water make up and to undertake a permanent modification to the safety/environment case. We will review the evaluation of the trial and modifications to the environment case when available.

4.3 Pile Fuel Cladding Silos (PFCS) clean-up programme:

Innovation in terms of the techniques to construct the waste retrieval plant, holes cutting to allow waste retrieval and a single pass waste retrievals strategy are being pursued in the performance plan to seek to deliver clean up sooner. The current main focus for all parties is approval of the safety case for the construction of the waste retrievals building. We are currently reviewing the environment case and intend to respond to NII in March. The PFCS off-gas system has now been commissioned. In addition to operational benefits, the system is providing environmental benefit from reduced argon usage.

4.4 Pile Fuel Storage Pond clean-up programme:

The performance plan seeks to deliver clean up sooner by looking for alternative means (in particular use of existing facilities) to interim store and treat the wastes and fuel retrieved from the pond rather than waiting for new plants to be designed and constructed.

The current focus is on refining the techniques to retrieve sludge from the pond, which has suffered from major setbacks since September 2008. Trials of the latest equipment are said to be encouraging and we hope significant sludge retrieval will commence soon. Another key area is consolidation and removal of fuel from the pond. We are working with SL and NII to ensure that this is undertaken safely and in a manner that protects the environment. The local effluent treatment plant which has been installed to treat pond water discharges during the waste retrieval operations continues to perform well and has reduced significantly, the radioactive discharges from this facility..

It has recently come to SL's attention that there are a couple of small underground tanks close to the Pile Fuel Storage Pond (PFSP) facility. It is understood these were associated with washing/decontamination activities for Calder Hall fuel when it was routed to this pond many years ago. SL are currently investigating the tanks, including what is contained within them, their condition and whether they are connected to the pond. We are monitoring progress in this area due to concerns over the threat to groundwater protection.

4.5 Site Remediation & Decommissioning Projects:

In our last report we noted that SL had slowed or deferred a number of projects in Site Remediation & Decommissioning Projects (SR&DP) operating unit, on the basis of risk reduction and prioritisation. We are continuing to engage with SL, working with NII, to ensure that the impact on safety and environmental protection is not being compromised, as a result. This requires a robust and sustained asset care and maintenance regime.

SL are continuing to develop their environment cases in support of the changes to the decommissioning programme. Once these have been completed, we will review and assess them, to satisfy ourselves that SL are managing and mitigating any environmental impacts associated with these changes.

4.5.1 Pile 1 chimney decommissioning:

We continue to engage with SL to facilitate the delivery of a Best Practicable Environmental Option (BPEO) assessment for this project. We have provided feedback on their assessment and indicated that although we have identified a number of issues with the assessment, we are supportive of the preferred management option identified. This option is to decommission the chimney down to the 35m level by 2017. This decision needs to be made transparent and visible to stakeholders. Continued asset degradation of the filter gallery remains an area for concern

4.5.2 Magnox Reprocessing Stack removal:

SL continues to develop their approach and through contractor support is assimilating information associated with producing an environmental summary report. This report will draw together all the environmental assessment and decision making carried out to date. We still expect a Best Available Techniques (BAT) case to be produced in 2011; the date for this is still to be confirmed.

4.5.3 Solvent Recovery Plant Stack:

A design review of the new stub stack and associated ventilation system has resulted in some minor engineering changes to ensure the design is fully optimised.

As a result of carrying out asset care and maintenance on the roof of this plant, SL identified localised corrosion of the existing gaseous discharge system. We understand that this corrosion has resulted in a small hole in the existing duct work but because of its location i.e. post filtration, it has not resulted in any significant environmental discharge. This is currently subject to investigation.

4.5.4 Separation Area Ventilation:

This project intends to re-direct gaseous effluents discharges, away from the ageing Magnox Reprocessing discharge stacks, to a new stack called the Separation Area Ventilation (SAV) stack. The new 120m high stack is currently being constructed and is visibly changing the Sellafield skyline.

We inspected the construction site in November last year and gained the overall impression that the standards of housekeeping and quality of the construction work are good. However, managing excavated spoil has been problematic due to embargoes in offsite transfers and difficulties with on site disposal. We also continue to engage with SL over the extent and how we can undertake independent check monitoring of discharges when the new stack comes on line.

Although the diversion of gaseous effluent to the new stack will not occur for a couple of years, we will be making the necessary changes to the site's permits over the coming period. In summary, this will involve permitting the new stack with limits that are equal to the sum of the existing discharge limits for the Magnox Reprocessing and Magnox cell vent stacks. The limits that apply to the Magnox Reprocessing and Magnox cell vent stacks will be retained until the diversion of gaseous effluent to the new stack is complete. The site gaseous discharge limits will continue to ensure strict control of the overall site gaseous discharges and their impact and we will require SL to notify us, in advance, of the re-direction of gaseous effluents to the new stack to ensure we can monitor closely this transition.

4.5.5 Redundant Plutonium Purification Plant

A radiological survey was carried out in February on the 3rd floor of the building using a probe and swab to establish the characteristics of a 'spillage' under a duct. The area surveyed was around 1 square metre. The survey indicated the presence of significant level of radioactive contamination. A subsequent sample from the duct leak confirmed this. The leak was localised and contained within the building and there was no off-site environmental impact. The levels encountered are likely to be reportable to ministers under the Ionising Radiations Regulations 1999.

We have agreed with the NII that they will lead on the investigation into this incident with ourselves in support.

4.5.6 Demolition of B483 and B1585

These facilities are being demolished to make way for the new MSSS nitrogen plant. We have provided advice regarding the demolition plans and the need to apply the waste management hierarchy. In particular, to segregate the contaminated basement materials as far as reasonably practicable rather than using the planned practice of 'dilute and disperse'. SL has subsequently informed us that they have changed their demolition strategy to ensure that the contaminated basement material is removed, segregated and disposed of appropriately.

4.5.7 Demolition of B100 facilities

We identified in a joint solid waste inspection with NII on Plutonium Contaminated Material in February 2010, our concerns that these ageing assets (B100s) were not being decommissioned promptly but deferred. As a result of further deterioration of these ageing assets through 2010, SL with encouragement from regulators, subsequently made the decision to complete the decommissioning early. We understand that SL are currently progressing the 'soft strip' element of decommissioning, with a target of demolishing the facilities by the end of financial year 2010/11. We welcome this development.

4.6 Windscale Decommissioning Programme

As a result of decommissioning deferrals, SL has carried out a Management of Change assessment (MoCA). This assessment supports the amalgamation of Windscale into SR & DP and changes in organisational structures. The assessment, which has considered individual and cumulative effects, identifies the impact as 'minor'. Therefore there should be no issues with maintaining compliance with the Environmental Permit. We will keep the implementation, which commenced in January 2011, under periodic review to confirm that this is indeed the case.

As we indicated previously, we require SL to demonstrate that they are managing any potential for environmental impact, as a result of decommissioning deferrals, through an environment case review.

4.7 Calder Hall Decommissioning Programme

No report this period.

4.8 Land Quality

The regulators continue to work together with SL, to prevent and minimise further contamination, and to protect groundwater and restore land, so that the site and its environs are suitable for any future use agreed with the community.

The Sellafield Contaminated Land and Groundwater Management Project (SCL GMP) reports of their work were made available to regulators in September 2010. We are currently undertaking our review of these reports but have already provided some initial feedback to SL. SL are also reviewing these reports and together with assessment of historical data and cognisance of our review comments, will be developing a 'Sign post' document by April 2011. This document will set out SL's position on Land Quality management at Sellafield. We will be carrying out a review of this document once it becomes available. We have also encouraged SL to develop a publicly available version of this document.

SL has carried out a high level review of their short to medium term management and remediation strategy. This identifies a number of issues for consideration and identifies some key short term tasks to be delivered. Whilst we welcome this review, a number of issues are raised that will need to be addressed and further clarity is required on how SL are justifying their strategic approach.

SL has provided a justification for their proposed management approach for the Separation Area Waste Disposal Trenches (SAWDA). We have carried out a joint review with the NII and provided our initial feedback to SL. In summary, we have challenged SL that the justification is too limited in scope and should more fully cover the requirements of Best Available Techniques (BAT). SL has committed to undertake a BAT assessment in FY 11/12. We have asked that the scope of this assessment includes an area immediately north of SAWDA, where elevated H-3 levels have been encountered. We noted also that the assessment should incorporate a level of stakeholder engagement commensurate with the significance of the project.

We have expressed our concerns both at an operational unit and executive level within SL over the continuing uncontrolled groundwater plumes migrating from the environs of SAWDA.

4.8.1 Groundwater Protection

4.8.1.1 Magnox Swarf Storage Silos:

Working with NII, we have continued to promote the development and implementation of an aqueous waste leak prevention, containment and mitigation strategy, without delay and ahead of the commencement of retrievals of solid radioactive waste from the MSSS facility. A project seeking to hydraulically isolate the facility from the groundwater has been brought to a hold point and closed down. This is because there are concerns that the planned use of dewatering could impact on the MSSS facility and surrounding structures. However, in February SL commenced the development of the MSSS leak prevention strategy, which is now undertaking a holistic review of existing arrangements and additional techniques that could be employed. This is being supported by us, NII and NDA and is drawing from international practice including the approach and techniques used at the US DoE nuclear site at Hanford. In addition, specific project work continues to look at enhancing the leak detection capability and the potential to reduce the activity

concentration of silo's liquor to help to reduce the safety and environmental consequences of a leak should it occur.

4.8.1.2 New Waste Stores for Decommissioning Waste:

SL has already constructed the Box Encapsulation Product Packing Store 1 (BEPPS1) and is currently moving towards the construction of a facility to allow import and export of waste to this store. It has recently come to light that limited part of the basements of these facilities may be below the water table. We have challenged the project to understand this issue and to prevent/minimise construction below the water table. SL has undertaken studies regarding changes to groundwater levels over the lifetime of the plant and options to re-design its layout. In summary SL do not believe changes to groundwater levels are an issue other than the potential arising from global warming (& increased rainfall). This latter issue is very difficult to predict. In addition, they have not been able to identify any practicable options for re-design. In summary to address this issue, they intend to use enhanced engineering to make the facility water tight through high specification construction materials, design improvements and external tanking. At this time, SL also do not intend to do any specific groundwater monitoring around these facilities. We continue to engage with SL and NII over these issues seeking to ensure ground water protection both now and in the future.

4.8.1.3 Sludge Storage Tank :

SL have provided an updated factual report (January 2011) on their enhanced monitoring programme carried out to understand the impact on groundwater quality from the Primary Storage Tank 4 (PS4) floc retrievals. A final report is due for subsequent issue shortly.

The results indicate a high variability in both Tritium (H-3) and Technetium (Tc-99) activity concentration values in boreholes downstream of the PS4, both historically and post retrievals. This makes it difficult to demonstrate a 'cause and effect' relationship, with only one of the monitoring wells appearing to show such a response.

Chemical data has indicated a high variability in bicarbonate and associated with this, nitrogen compounds. The presence of nitrogen compounds has caused a reappraisal and consideration of these analytes on groundwater geochemistry, not only in the environs of PS4 but on a site wide scale.

SL will be investigating whether the variability seen in measurements can be attributed to environmental factors, such as rainfall and infiltration, prior to or after retrievals occurring.

SL are continuing to process the retrieved waste from PS4 through their Enhanced Actinide Removal Plant (EARP) and Waste Processing and Encapsulation Plant (WPEP) to produce an encapsulated waste form. SL is currently behind programme because of operational issues in these plants.

4.8.1.4 Site Leak Prevention :

We continue to provide support to NII in promoting the need for a step development in SL's arrangements with respect to the escape and leakage of radioactive substances. SL have developed an implementation plan identifying key milestones to deliver activities, in a prioritised manner. These are being reported on periodically to demonstrate progress and identify any areas at risk.

5 Decommissioning Development

The Regulators participated in an SL meeting on decommissioning development. This is a revival of previous, similar, subject based meetings. We welcome this initiative, as it provides a valuable platform to discuss and debate the challenges that future decommissioning presents.

In developing future decommissioning strategy SL need to consider setting an End State Goal and working back from this, identifying interim states that need to be achieved on the way. There should be a drive to better the current 2120 site end date. We expect the choreography and timing of decommissioning to be a key consideration in ensuring maximum efficiency and benefits are gained with achieving early site remediation. Also new construction needs to be considered as part of the strategy i.e. ease of future decommissioning.

A draft long term strategy is being developed by SL that will consider the impact of longer term changes. The advent of the LTP 10 has provided a reasonable platform from which to develop the strategy, with the new NDA strategy 'opening doors' of opportunity. We suggested that when this strategy is more developed it is presented to the Decommissioning Sub Group. We recognised that this is only a stepping stone in developing a robust integrated decommissioning strategy

A POCO (Post Operational Clean Out) manual and three associated SLPs (Sellafield Limited Practices) have been developed. Their implementation is being trialled.

The mandates are being subject to review by NDA. The objective of the review is to obtain assurance of how robust these mandates actually are and whether they are suitable to underpin out year modelling and liability estimates

R&D is an important element to support decommissioning and achieving acceleration. Technology road maps will be used to identify any gaps. R&D needs to be optimised and coordinated to ensure maximum value is accrued.