

**Accelerating Decommissioning at Sellafield: A New Management Approach -
10052**

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ABSTRACT

Sellafield site, on the North West coast of England, has been synonymous with the UK's nuclear programme for over 50 years, and the site contains some of the most challenging nuclear wastes in the world today. Some of this is the result of commercial reprocessing operations however a large proportion is legacy waste, arising from five decades of operations in facilities dating back to the 1940's.

In 2008 a two year competition process for the management of the site resulted in new parent body organisation. Nuclear Management Partners (NMP), bringing a fresh perspective to the process. This has resulted in a significant programme of changes both on a site wide level, and more specifically, across the portfolio of legacy facilities on the site.

Under the new management approach there will be a significant impact on decommissioning the legacy facilities at Sellafield and this paper outlines the approach taken and seeks to illustrate how this will help accelerate risk and hazard reduction at the site.

INTRODUCTION

Historically Sellafield site was owned and operated by British Nuclear Fuels Ltd, however the formation of the Nuclear Decommissioning Authority (NDA) changed the focus of the site from operations to accelerated decommissioning.

Following an extensive competition process for the Management of the site, on 24 November 2008 the shares for Sellafield Ltd were transferred from British Nuclear Fuels Plc to new parent body organisation Nuclear Management Partners Ltd, a consortium consisting of three companies; URS Washington Division, AMEC and AREVA

At this time, a new Managing Director and Board Chairman were appointed, along with a new Sellafield Executive Team. To ease the transformation process to a new Site Executive Team the strategy employed was to establish a like for like replacement with all existing Sellafield Ltd organisation structures remaining unchanged.

IMPLEMENTING THE CHANGES

On 1 December 2008 Sellafield Ltd launched a strategy for transformation focussed around three fundamental principles of People, Partnering and Performance which culminated in a "100 Day Plan". The goals for the first 100 days were to:

- Maintain safe operations of facilities and the sites
- Engage and energise the workforce, customers and stakeholders
- Build the foundation for efficiency initiatives

Six key elements were established with the aim to gather information that would inform the development of future efficiency initiatives as well as adding value in the key areas of People, Partnering and Performance -

- Environment, Health, Safety and Quality
- Organisational Development
- Partnering with Nuclear Decommissioning Authority and Stakeholders
- Implement PAIS (Partner, Assess, Innovate, Sustain) Team Activities
- LTP Strategy and Delivery
- Support of Current Activities

In order to achieve the six key elements, a PAIS team approach was applied, a management approach new to the site. The PAIS approach utilised the skills and expertise from within the Site Licence Company combined with “reach back” expertise from the parent companies to bring together nuclear industry wide expertise and best practices to develop the improvement programme.

During the first 100 days, an Organisational Transformation PAIS team was also established, responsible for driving forward the site reorganisation. This resulted in the creation of 16 Directorates and Directors being put into place by 12 March 2009, together with the development of an Integrated Change Programme to deliver the maximum impact on operational effectiveness.

At their inaugural meeting, the Organisational Development PAIS Team was challenged to deliver a benefits driven, optimised organisation design that aligned the Sellafield Sites organisation to the declared new structure.

This was an interim step towards a projectised organisational structure to provide the following benefits:

- Deliver clear Roles, Responsibilities, Accountabilities and Authorities (R2A2) for all of the 16 Directors
- Provide a platform to launch the projectisation effort
- Provide for more direct interaction with the senior management team during a period of change
- Align communications
- Provide the network to support the change programme
- To define the necessary steps and performance measures required to deliver the organisation design changes in accordance with its values and in full compliance of License Condition 36 of the Sellafield Site License.

The organisational PAIS team developed and recommended a three phased approach to delivering the scope of the transformation consisting of:

- Phase 1 - Enabling changes to establish the 16 Directorate structure

- Phase 2 - Organisational Optimisation and re-alignment
- Phase 3 - Projectisation

The team developed an organisational goal to guide the development of “blueprints” to underpin phase 1 of the plan, namely to ‘Establish a fully optimised organisation structure that enables the Site’s strategic imperatives to be delivered safely, reliably and efficiently within a ‘projectised’ framework.’ This blueprinting approach enabled the Organisational Development PAIS team members to achieve absolute clarity on what specific changes would be achieved by the end of Phase 1.

Phase 1 – Re-organisation

Phase 1, which covered all the enabling changes necessary to help the site transition to a new structure, saw the introduction of a PAIS (Partner, Assess, Innovate, Sustain) team approach to establish a new site organisational structure, consisting of a core of four central delivery directorates, underpinned by ten Mission Support Functions

In order to deliver the first phase of changes, a framework of thirteen PAIS teams in total, each sponsored by a member of the Executive Team, was established across six core areas - Support, Execution, Project Management, Clean Up, Assurance, Organisation. Consisting of a combination of Parent Body Organisation and Sellafield Ltd employees, the thirteen teams conducted an in depth review of all aspects of operations at Sellafield, focussing on twelve topical areas that ranged from Safety Case management and Disciplined Operations to Project Management and Decommissioning.

During the review process, over 600 interviews were conducted and over 4,700 observations were made prior to a final report being received on 14 April 2009. This contained a breakdown of

- The issues
- Recommendations
- Benefits
- Suggested approach for implementation
- Reachback capabilities for support
- Quick wins
- Best/Good Practices
- Details of themes that didn’t elevate to the status of becoming an innovation

The output of the PAIS team report was to identify a number of key drivers, namely:

- Accelerated Hazards Reduction
- Reduction in number and severity of injuries, abnormal operational and security events and environmental releases
- Efficiency improvements in support areas
- New Construction and Plant Enhancements Re-engineering
- Production Optimisation
- Waste Management Re-engineering
- Applied Technology

These drivers would then be implemented during future phases of the site reorganisation process.

Phase 2 – Optimisation

The second phase, Organisational Optimisation and Realignment, takes the recommendations of the PAIS report a stage further and positions the organisational structure for a projectisation based approach in the future.

In order to achieve this, an assessment was carried out of the relationships and interdependencies between the delivery areas and their upstream/downstream plants, the support services and the business priorities for the company.

By ensuring greater alignment with the lifetime plan programme structure, the optimisation phase will enable the organisation to maximise operational synergies, and deliver customer alignment and organisational balance.

Phase 3 - Projectisation

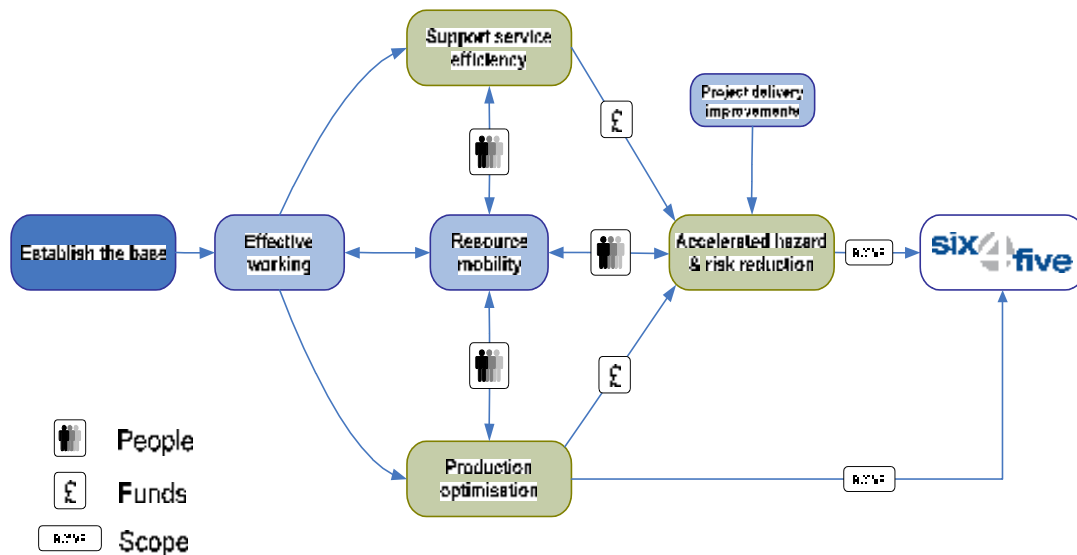
The third and final phase, projectisation, aims to create a one-site culture by transitioning the site licence company from maximising performance within organisational silos to integrating site-wide performance through common metrics and goals.

Projectisation is a concept that treats all organisations on the site as projects. Within the project structure, all resources for the project to perform its day to day responsibilities are identified and dedicated to the team. In most cases this assigns functional resource such as project controls, finance, engineering and radiation protection, directly into the delivery organisations. These resources retain alignment in a matrix fashion back to the site level functional directorate for technical programmes, processes, training and career development.

The projectisation approach has already been successfully used across a wide diversity of sites, contracts and business sectors. The approach works best when forming an organisation aimed at safe delivery against an established baseline. Direct benefits include:

- Clarification of roles, responsibilities, accountabilities and authorities enabling all employees to have a clear understanding of the scope of their efforts and how they relate to the overall success of the site.
- Creation of a streamlined organisation with no duplication or omission of efforts, to reduce cost and free resources that can be utilised to accomplish additional work scope.
- Creation of an accurate execution baseline against which clear performance metrics can be developed to accurately reflect actual performance, eliminating surprises, surfacing issues and providing transparent reporting to all stakeholders.
- Creation of a disciplined framework within which activities can be performed in a consistent manner being confident of safe execution to workforce and stakeholders.

- A delivery focused culture within the organisation, which recognises the importance of safely managing hazards and risks to maximise delivery of work scopes. This culture is self challenging and will strive to create world class performance within the workforce.
- Increasing efficiency through the introduction of the six4five initiative (illustrated below) resulting in more focus on High Risk and High Hazard reduction, therefore accelerating the programme of work within decommissioning.



Although the site is still going through the optimisation phase, projectisation pilot schemes are currently underway in two key areas on site, covering both an operational plant and a project oriented Decommissioning facility, to enable the Sellafield Management team to determine how to best fit the projectisation approach to Sellafield.

The principles of projectisation will then be applied in a layered approach across the entire Sellafield Limited organisation. That is, they will first be applied at the site level, assigning resources and clarifying roles and responsibilities for each directorate. They will then be applied as appropriate within each directorate assigning resources and clarifying roles and responsibilities for major work initiatives within the directorate.

Under a projectised approach, all major work activities (including the functional areas) are treated as a project with specific project management techniques applied to each. These techniques have been proven to consistently produce successful projects across a diversity of business sectors including – Government, infrastructure, nuclear, oil & gas research and manufacturing.

Once the organisation is fully projectised, a clear baseline of work scopes will be identified for each organisation, performance goals and metrics will be established against a baseline, the smaller centralised functional organisations will be aligned with the delivery programmes and excess resources (both human and financial) will be identified and directed towards new work scope to accelerate future High Risk and High Hazard Reduction.

KEY ISSUES FOR SELLAFIELD LTD

The Strategic Aim for the Decommissioning Department is to remove the risks and hazards posed by the inventories and degraded facilities within the Legacy Ponds & Silos area. This is underpinned by a number of objectives, including:

- Safe stewardship of the Nuclear Material and the facilities in which they are contained.
- Restoring and maintaining the basic condition of the assets and facilities.
- Reducing or mitigating the impact of the risk of a loss of containment of Nuclear Materials.
- Preparing the facilities for retrieval operations
- Retrieving the waste (reducing risk)
- Immobilisation of the waste (reducing risks/hazards)

One of the greatest challenges, becoming increasingly more apparent, is the emerging frailty of assets, many of which are now classed as high hazard both radiologically and conventionally.

Many of the facilities were constructed in the 1950s and 1960s, and received fuel for some twenty to thirty years before ceasing operations. In many cases, these legacy facilities were built quickly to address the needs of the UK's nuclear deterrent programme and to construction standards in force at the time. When operations ceased, the redundant facilities were backfilled with waste from elsewhere on site. Little thought was given to how the facilities would eventually be decommissioned and record keeping was poor, resulting in a lack of data in the forms of plans, drawings or records of either the plant itself or the inventory stored in it. As new facilities were constructed over the years the site became more and more congested, creating a diverse and highly constrained environment and increasing the challenge for decommissioning today.

The physical degradation of the facilities also means that an extensive asset care programme has had to be implemented to enable decommissioning work to be carried out.

Narrowing the focus to the more specific decommissioning of the Legacy Ponds and Silos facilities, the challenge facing the decommissioning management team is to accelerate Risk and Hazard reduction. To support this mission, a number of significant programmes to accelerate decommissioning have been introduced.

In July 2009 a thorough strategic review of the Legacy Ponds and Silos facilities was undertaken by a team of internationally renowned experts, with the brief of conducting

an independent evaluation of strategies currently in place for Legacy Ponds and Silos (LP&S) hazard and risk reduction.

From that evaluation, the team was able to determine if strategies are optimized for accelerated delivery or if not, to recommend changes in strategies and tactics to accelerate key projects. This indicated that acceleration is warranted and eight initial recommendations were made, ranging from Risk Reduction Policy and Practice to Decision Making and Accountability.

One of the key messages from the Strategic Review Team was that although the site was not in a state of emergency, it was not appropriate to carry on with a 'business as usual' approach. This supported the moves already being made across the site to establish high risk and high hazard work as a site priority, reorganize and optimize performance and achieve a balance of risk approach.

All of their recommendations were supported by a number of suggestions on how they could be implemented on site, and to progress these, a 'Skunk Works' team was established. The 'Skunk works' - a concept originally used by Lockheed Martin - is effectively an Advanced Development Program Team established to act on the recommendations and apply Blue Sky thinking to the issues and challenges faced during the decommissioning process.

The skunk works team remit is to look for alternative technical solutions which can be applied immediately and then further developed according to accelerated business processes. Applying a reach back approach to bring in expertise from the three Nuclear Management Partners parent companies (URS Washington Division, AMEC and AREVA, the team have already identified over 50 significant opportunities to progress the recommendations of the Strategic Review Team, and developed a strategy to support the implementation of any improvements.

PROGRESS MADE

The new management approach is already showing results both company wide and across the Decommissioning Directorate.

The completion of the PAIS team review and the implementation of new Executive structure are key enablers for the delivery of the change to a fully optimized structure, and work streams across site in support of the optimization phase are well underway.

Projectisation was piloted across site in preparation for Phase Three by two pilot areas, who started the process in July 2009. Covering an operational facility (High Level Waste Plants) and a Decommissioning Project (the First Generation Magnox Storage Facility), the two delivery programmes had their structures in place and operational by December 2009. The learning and feedback from these was then used to determine how projectisation was implemented across the remainder of the site from the start of January 2010.

Another key area of progress at Sellafield is the prioritized focus on High Hazard and High Risk reduction. In line with the drive for accelerated decommissioning, the recommendations of the strategic review team and the subsequent work of the

skunkworks team new and innovative ways forward are being identified and implemented. These also support the application of a 'balance of risk' approach, in turn enabling work to progress expeditiously.

Within Decommissioning, significant progress has also been made on a number of areas. The development and endorsement of a new Lead Team structure has transformed the Directorate into a delivery focussed organisation based around six key delivery legs. Each of these then focuses on one of the Highest Hazard facilities, and is underpinned by cross directorate functional support. This places the directorate in a strong position for the roll out of projectisation across the remainder of the directorate.

On the Programme delivery side there have already been tremendous steps forward in the delivery of High Hazard and High Risk reduction work. Some of the more recent milestones achieved include -

- The start of desludging activities in the Pile Fuel Storage Pond, using water jet technology to transfer sludge from the withdrawal bays into the main pond. This makes it ready for collection and transfer into a recently installed in pond sludge corral, pending completion of the sludge treatment facilities currently under construction.
- The installation of three bulk storage tanks in our new Local Sludge Treatment Plant, and significant progress on the civil construction phase of a new Sludge Packing Plant.
- The first export of a redundant fuel skip from the First Generation Magnox Fuel Pond, a key milestone in the retrievals programme, and a continuing programme of subsequent redundant fuel skip exports in the future
- Replacement of the obsolete Beta in Air Monitors in the Magnox Swarf Storage Facility, which also saw one of its cooler systems operational after 20 years
- An emergency pumping system installed for the Redundant Effluent and Sludge Pipe work System providing capacity to pump liquor back into the pond in the event of a failure of the legacy pipe work, as well as the sealing of three Redundant Effluent and Sludge Pipelines connecting the main storage pond with its associated settling tanks.
- Removal of over 350 tonnes of redundant equipment from the Magnox Swarf Storage Facility operations floor, creating space for the installation of three new Silo Emptying Plants
- The boring and filling of 133 seven and a half meter deep piles to support the foundations for a new Waste Treatment Plant that will support the Pile Fuel Cladding Silo Retrievals Project, construction of the base slab and the start of civil construction.

At the same time, we've demonstrated our commitment to doing work safely -

- The Legacy Ponds and Silos Maintenance team have completed 7 years without any Lost Time Accidents - 1,577,812 man hours
- Silos Direct Encapsulation Plant have achieved million man hours (6 years) without a lost time accident, and
- The Sludge Packing Plant 1 team has also achieved 5 years without any Lost Time Accidents

NEXT STEPS FOR DECOMMISSIONING AT SELLAFIELD

The priority for decommissioning at Sellafield is High Risk and High Hazard reduction.

This is supported by the deferral of lower risk and hazard work, which focuses on work priorities and sequencing. This is primarily to determine the appropriate work stream priorities to support these, ensure that the directorate is optimised to deliver them effectively and to prioritise risk based asset care, ensuring both that the integrity of assets is maintained as far as practicably possible, and that enabling maintenance, such as the refurbishment or replacement of plant and machinery, is carried out.

In order to achieve this, the optimisation of work stream strategies will become increasingly more important. The use of existing or temporary facilities as opposed to the construction of new plant, and combining facilities and maximising their ability to serve a dual role in the decommissioning process will play a large role in the acceleration of decommissioning, enabling money and resource to be diverted elsewhere in the decommissioning portfolio.

At the same time, many of the specific recommendations of the Strategic Review Team will be implemented, for example the clean-up of pond water, or Zeolite processing and disposal, both of which can also be extended to other facilities at Sellafield in the future. As before, these recommendations will also be supported by the implementation of the Skunk Works Strategy.

Many Decommissioning Challenges have arisen as a result of poor Post Operative Clean Out planning historically, and this lack of planning in the past has resulted in possibly the greatest challenge of all for the decommissioning teams: the unknown! In order to avoid this situation arising on future decommissioning projects, there will be far more focus in the future on planning during last 5 years of operations, including

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- Identification of key decommissioning equipment
- Maximising skills of operational workforce
- Methods to reduce surveillance and maintenance costs to near zero where possible
- Minimisation of health and safety hazards to decommissioning workforce

Finally, Sellafield Ltd will continue to build and maintain collaborative and productive relationships with our customer, the Nuclear Decommissioning Authority, and our regulators, including the Nuclear Installations Inspectorate, Environment Agency and Office for Civil Nuclear Security, to ensure the proper control and containment of nuclear materials, to prevent any release of radioactivity that could

threaten the public, our workforce or the environment and to support the UK nuclear Industry in the future.

CONCLUSION

Since the arrival of Nuclear Management Partners the Sellafield site has undergone an extensive transformation, radically restructuring and adopting a new approach to the successful delivery of work.

Although Sellafield is still going through the transformation process, the ability to draw on the experience and resources of the three parent companies, URS Washington Division, AMEC and AREVA and introduce new management techniques that are already proven in the international nuclear arena has already demonstrated a major benefit both to the decommissioning portfolio and to operations on site.

By bringing this fresh perspective to the management processes, implementing the significant programme of changes and transforming all directorates to a fully optimised and integrated organisation, the new executive team will be able to deliver a measurable acceleration of High Risk and High Hazard reduction as they decommission the legacy facilities at Sellafield.