



Nuclear decommissioning moves ahead

Seminar 135 held at No.4 Hamilton Place, London
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Summary

Key conclusions

- As always, excellence in project management is fundamental to a successful decommissioning programme. This applies at every level from Government right through to contractors and subcontractors.
- The Nuclear Decommissioning Authority (NDA) believes that competition is an essential ingredient for success. Effective competition itself has certain requirements.
- The NDA must be seen to keep to its procurement schedule.
- The nuclear decommissioning sector must make itself attractive to capable people in the face of growing competition for their services from other sectors. It is well known that UK plc is already suffering a shortage of key skills, which is forecast to get worse in the next five to ten years.
- Investment is required now in training and development for all professional and trade skills including project managers and project controls personnel.
- Decommissioning is seen as a 'distress purchase' for the tax payer. But the American experience has shown that real social benefits can accrue from the safe and efficient restoration of nuclear sites.
- Success, in the form of efficient and safe projects, will win over the confidence of Government, the Regulator and the public.
- The relationship between the NDA and the Regulator is a vital ingredient of a successful decommissioning programme.
- Resourcing the Nuclear Installations Inspectorate (NII) with competent and appropriately recognised expertise is essential.
- Interim solutions can be the way forward. Whilst a repository must be found (and this may take some time) real benefits such as risk reduction, segregation, volume reduction etc can be delivered by achieving intermediate stages.
- Acceleration of the decommissioning programme can only be achieved if the first tranche of projects is completed safely and cost-effectively. If not, successive stages will be characterised by excessive caution from the regulator and a weakening of political and public support.
- Secure, predictable funding is required for the effective delivery of the decommissioning programme. As well as the usual commercial risks and inconveniences that unpredictable funding causes, it must be remembered that many of the sites are in remote parts of the country and the uncertainties of domestic arrangements and career progression can make the sector unattractive to work in. An enlightened approach needs to be taken on the issue of money now versus money later.
- 'Social engineering' is a major part of many of the schemes. Closing a site or changing people's roles while keeping them actively supportive of the decommissioning work is a challenge that needs to be fully integrated into the project scope.
- Government and NDA processes for setting priorities must be sophisticated enough to achieve the intention, as does the definition of 'value for money'.
- The governance structure for decommissioning fixed military installations and other 'assets' such as submarines is currently under separate arrangements.
- The UK's contribution to Russian submarine recovery and disposal is an outstanding example of international cooperation working for the greater good, and does the UK great credit.
- It is (almost) impossible to overstate the magnitude of the job to be done at Sellafield!

Introduction

Set up in April 2005 under the Energy Act 2004, the Nuclear Decommissioning Authority (NDA) has been in operation for just over two years. Its core objective is to ensure that the 20 civil public sector nuclear sites under its ownership are decommissioned and cleaned up safely, securely, cost-effectively and in ways that protect the environment for current and future generations.

The seminar provided the opportunity to reflect on what has been achieved during the NDA's two years of operation, and how the UK's decommissioning strategy is unfolding. It looked at a variety of issues, including the structure of the industry and the role of the key organisations, recent decommissioning projects, how costs are estimated and lessons that could be learned for the future.

There was also an opportunity to compare the decommissioning of civil nuclear installations with the arrangements and issues for the recovery and decommissioning of UK and Russian nuclear-powered submarines.

The role of central government

The presentation from the DTI considered the role of central government in the arena of nuclear decommissioning and clean-up, and how this is achieved.

The aim is for central government to retain responsibility for the policy issues and framework for activities, whilst placing the operational work with delivery partners. Prior to the establishment of the NDA in 2005, organisations such as British Nuclear Fuels (BNFL) and the UK Atomic Energy Authority (UKAEA) were responsible for decommissioning plant and clean-up. These areas of work are now the responsibility of the NDA, a non-departmental public body working in partnership with the DTI.

The NDA can delegate responsibility for its operational role in decommissioning, but it is responsible for how the programme is delivered. However, ministers remain accountable for nuclear waste handling and site clean-up, and are answerable to Parliament and bodies such as the National Audit Office (NAO) and the Public Accounts Committee (PAC).

Some of the key issues in the DTI's decision making and discussions with its delivery partners were outlined, for instance the priority to be given to different areas of the decommissioning work and where this stands in relation to other government funded areas such as regional development. Another category of decision making involves looking at the total economic impact of decommissioning and clean-up, which the NDA is charged with factoring into its planning.

It was explained that whilst the Government has the means and the motivation to take a lead role in decommissioning and clean-up, the blending of commercial, financial, political, ethical, social, technical and legal responsibilities often make it a difficult role. The presentation concluded with a DTI view of progress to date.

Delivering the UK clean-up programme

The NDA presentation outlined the structure and role of the organisation, how it fits with government strategy, its programme of work, how costs are estimated, its assets and liabilities, its achievements and key issues.

The overall strategy for the NDA is to work alongside the regulators using common nationwide decommissioning and clean-up systems and baseline plans.

The NDA's portfolio of sites, formed from sites previously owned by BNFL and UKAEA, have been split into seven groups known as site licence companies (SLCs):

- Sellafield Ltd: comprises Sellafield, including Calder Hall; Windscale; Capenhurst
- Magnox North Ltd: comprises Chapelcross; Hunterston A; Trawsfynydd; Wylfa; Oldbury
- Magnox South Ltd: comprising Berkeley; Bradwell; Dungeness A; Hinkley Point A; Sizewell A
- Dounreay Site Restoration Ltd: comprises the Dounreay site only
- Research Sites Restoration Ltd: comprises the Harwell and Winfrith facilities
- Low Level Waste Repository Site Licence Company Ltd (LLWR (SLC) Ltd): comprises the low level waste repository near Drigg in Cumbria
- Springfields Fuels Ltd: comprises the Springfields plant near Preston, Lancashire

In addition, NIREX (Nuclear Industry Radioactive Waste Executive) has been integrated into the NDA to plan and assist the development of a waste strategy and the implementation of a deep repository for 'higher-level' waste.

The work required on each site and the NDA contracting model for the competition process for the management of the sites was outlined. There are a number of contracting principles, including obtaining value for money, the placing of risk where it is best managed, and sharing best practice inside and outside the industry and overseas.

The NDA's achievements to date include a clear national strategy, common systems and real decommissioning progress for all sites, and early cost savings. Key issues include maintaining value for money, whilst managing hazard reduction and prioritisation, and completing the UK nuclear industry restructuring programme in order to promote successful competitions.

The American experience

The presentation from CH2M HILL outlined the similarities between the US and the UK nuclear decommissioning programmes, giving an overview of the US Department of Energy's (DOE) Environmental Management programme and how this is relevant to the NDA's programme.

When the programmes started, both the US and UK governments were projecting that over the next 100 plus years they would be paying upwards of £2–£3 billion per year on redundant facilities which constituted a risk to the employees, the public and the environment. Historical contractual and financial models do not serve the new era of dealing with the nuclear legacy, which focuses on safe, cost-effective, prioritised risk reduction and environmentally friendly decommissioning.

Both governments have decided to use competition as a means to bring in new management teams to accomplish these aims. In addition, the decommissioning programmes need to be efficiently and safely accomplished in order to gain public confidence in any future nuclear new build programme.

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The successful transformation of three major US nuclear sites was described. One is now a nature reserve, another is in the process of being transferred to the US Fish and Wildlife Service as a national reserve, whilst the third has been transferred to the local community, along with nine commercially viable buildings, as a stimulus for redevelopment of the area.

Some of the early challenges faced by the DOE were outlined. For example, the DOE and its contractors initially employed fixed price contracts, a method of contracting which proved unsuccessful: it was difficult to define the scope and extent of the contamination, whilst budget fluctuations impeded progress until Congress provided stable and reliable funding through the setting-up of closure funds.

Factors that contributed to the success of projects were explained in some detail, for instance the importance of defining the roles and responsibilities between the DOE and the contractor; providing an effective workforce transition programme that reflects the characteristics of the region in which it is operating; and maintaining a well defined project life cycle in order to give a realistic baseline for estimating costs. The importance of an integrated approach to safety management that incorporates a rigorous feedback programme and thorough training was discussed.

Feedback

- Rigorous hazard identification and mitigation for each task
- Involved workers actually performing the work to capitalize on skill of the craft and institutional knowledge of the buildings
- Exacting procedures and thorough training
- Technical centers of excellence for oversight, assistance
- Stop work authority
- Comprehensive “lessons learned” feedback mechanisms



UK submarines – decommissioning issues

With 13 UK nuclear submarines in service, 14 decommissioned, 3 in build and further orders in train, there is a need to address the growing legacy issue of submarines which reach the end of their lives. The challenge is not unique – there are approximately 360 nuclear-powered submarines in the world today, of which 60% have been taken out of service.

Devonport Management Ltd (DML) provided an overview of the UK nuclear-powered submarine decommissioning programme, putting it into context against other nations. The life cycle of a UK submarine was described, with a detailed look at the procedure and issues surrounding decommissioning for end-of-life submarines, in particular the facilities required for defuelling and the options for disposal and storage of a submarine and the radioactive waste contained within it.

All the nuclear waste in a submarine's reactor plant is Ministry of Defence (MoD) property. The MoD has been leading the initiative to find a solution to options for the storage or disposal of this waste with its **ISOLUS** project (interim storage of laid-up submarines), which has the following mission statement:

'Project ISOLUS is committed to the timely development and implementation of a solution for the dismantling of the UK's defuelled nuclear-powered submarines which inspires public confidence, is safe, environmentally responsible, secure and cost-effective.'

There are a number of stakeholders who have a say in determining the way forward, including the Health and Safety Executive (HSE), the Nuclear Installations Authority (NII), the Environment Agency, the Department of Trade and Industry (DTI) and the NDA. In addition, it was noted that industry has an important role in providing services and coordinating stakeholder engagement, especially with regional and local groups close to where disposal work is carried out.

Russian submarine recovery and disposal – UK involvement

The growth of the nuclear submarine force in the Russian Northern Fleet was a feat of engineering brilliance, bravery and excellent project management, but with the collapse of communism and its impact on military budgets, the condition of much of the fleet and the infrastructure led to a concern, at home and abroad, that ecological and security problems were accumulating. Since then the Russian Government has mobilised its own resources and harnessed international support to drive submarine dismantling and asset clean-up in a decommissioning programme that is now well advanced.

The UK principal of the organisation AMEC (Arctic Military Environmental Cooperation group) formed in 1996 described the background to the decommissioning programme and current and future UK involvement. A series of disasters, such as the explosion of the Kursk submarine in 2000 and the 9/11 terrorist attacks, provided the impetus to international cooperation against the spread of weapons of mass destruction and materials that could be used by terrorists, including nuclear and chemical weapons. The vulnerability of the materials on the sites in North West Russia, coupled with a change in Russia's attitude to clean-up and the West's recognition of their global responsibility, meant Russia was one of the principle recipients of the international money and focus.

The immense scale of the problem was explained – for instance there are 21,000 spent nuclear fuel canisters located in one area of North West Russia, and solid and liquid waste at numerous operating bases waiting for bottlenecks in the processing system to be cleared. The role of the MoD and DTI in submarine dismantling, clean-up and storage facilities was outlined, and it noted that the equipment and techniques used have vastly improved the UK's own capability in submarine dismantling. It was noted that none of this activity would have been feasible without international and political alignment and expert project management.

The submarine dismantlement programme is well organised, effective and has delivered a highly workable solution which will be fully implemented by 2009.

There is still much to be done in North West Russia because the waste is not being disposed of, only stored in a temporary but safe location. The situation has been stabilised and the waste to some degree redistributed to safer repositories, but the security needs remain high.

Managing the legacy at Sellafield

After five decades of large scale nuclear reprocessing and fuel manufacture, Sellafield's activities now centre on decommissioning the historic legacy. British Nuclear Group, which manages and operates the Sellafield site on behalf of its owner, the NDA, described how the site has been restructured in order to manage a programme of change, with assurance and due regard to maximum safety throughout the project life cycle.

Set up in 2006, the Nuclear Decommissioning and Major Projects Group (ND&MPG) manages all the current and future decommissioning work and major build projects on the Sellafield site, supported by the specialist skills of the supply chain. The total projected spend for the decommissioning and major new build projects programme is about £42 billion – the largest and most diverse in the world today.

The challenges in managing the legacy were discussed, with examples of what has been achieved so far. With 170 major nuclear facilities, the scale and extent of the work is vast, with a diverse portfolio of facilities to decommission, including:

- Magnox and pile fuel storage ponds
- Four nuclear reactors
- Solid nuclear waste store
- Sea discharge pipelines
- Legacy reactor exhaust stacks
- Reprocessed product finishing lines
- Medical source production plant
- Research and development labs
- Legacy reprocessing plants
- Contaminated land – with over a million cubic metres below the site

Conclusion

The day's proceedings provided an interesting set of perspectives on a number of decommissioning issues. Final disposal of spent nuclear fuel remains one of the biggest issues, and it is hoped that over the next few years there will be a timescale for a nuclear waste repository, which will enable the NDA to accelerate the decommissioning programme.

Participating organisations

Advance Consultancy Ltd
Amey
Arup
British Energy
British Nuclear Group
CH2M HILL
CMS Cameron McKenna LLP
Costain Ltd
Denton Wilde Sapte
Department of Trade & Industry
Devonport Management Ltd (DML)
EDF Energy
Ernst & Young LLP
Freshfields Bruckhaus Deringer
HMS Naval Base Devonport
IBM Business Consulting Services
Jacobs Group
KBR
KPMG LLP
Linklaters
Major Projects Association
Mott MacDonald Group Ltd
National Audit Office
Nuclear Decommissioning Authority
NUKEM
Office of Government Commerce
PA Consulting Group
Prendo Ltd
PricewaterhouseCoopers
QinetiQ
Risk Solutions
Said Business School
Scott Wilson Kirkpatrick & Co, Ltd
Shadbolt & Co LLP
Simmons & Simmons
UKAEA
Westfield Shoppingtowns
WSP Group