

**MANAGING THE NUCLEAR LEGACY IN THE UNITED KINGDOM:
STRATEGIES AND PROGRESS IN THE FORMATION OF A LIABILITIES
MANAGEMENT AUTHORITY**

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ABSTRACT

This presentation describes the status of recent initiatives undertaken by the United Kingdom Government to address the long-standing problems confronting it with regards to discharge of public sector civil nuclear liabilities. It describes the enabling steps taken thus far in the creation of a Liabilities Management Unit (LMU) to prepare the ground for this important work, with specific reference to some of the more technically challenging problems which must be resolved in order to make progress towards cleaning up the UK's nuclear legacy facilities and waste materials. Finally, it addresses some of the approaches proposed by the LMU as it seeks to establish a robust, permanent entity to meet the challenges.

INTRODUCTION

In November 2001, the Secretary of State for Trade and Industry, Patricia Hewitt, announced the intention of the Government to make radical changes to current arrangements for nuclear clean up funded by the taxpayer. In its White Paper on the subject, "Managing the Nuclear Legacy, a strategy for action" (1), the Government outlined its proposed approach in greater detail and sought views on the new arrangements leading up to the creation of a liabilities management authority. This entity would be chartered to create a focussed approach to nuclear cleanup, using the services of a viable, innovative and "fit for purpose" supply chain of Management and Operations (M&O) Contractors. The name of the entity to be created is subject to the enabling legislation due to be drafted this spring, but current thinking is that it will be called the Nuclear Decommissioning Authority (NDA). Thus in this presentation, I will refer to it as the NDA, rather than LMA as used in the White Paper. The White Paper also announced that in the interim, a Liabilities Management Unit (LMU) would be established to prepare the ground for the NDA. And in November 2002, in her annual address before Parliament outlining the Government's programme for the year ahead, Her Majesty The Queen announced that her Government would draft legislation to begin the cleanup of waste materials resulting from the UK's nuclear programmes of the past. Thus, in the course of a little over a year, the UK has embarked on meeting the significant challenges of discharging the legacy of its early nuclear programmes. In preparing the ground for the NDA, the LMU is identifying many of these challenges, and beginning to propose the ways and means to resolve them. In this paper, we will describe some of the more significant of these challenges and the measures being taken to facilitate the success of the NDA.

The challenges which will confront the NDA in its responsibility to discharge public sector civil nuclear liabilities are many, and are characterised by the scale, diversity, complexity and long timescales involved in these tasks.

The scale spans 20 different sites (Fig. 1), in England, Scotland and Wales. They range from a large fully operational chemical reprocessing complex that individually represents the single largest nuclear liability to be discharged, to several smaller, currently non-operational facilities that are already well underway in being decommissioned and undergoing remediation.

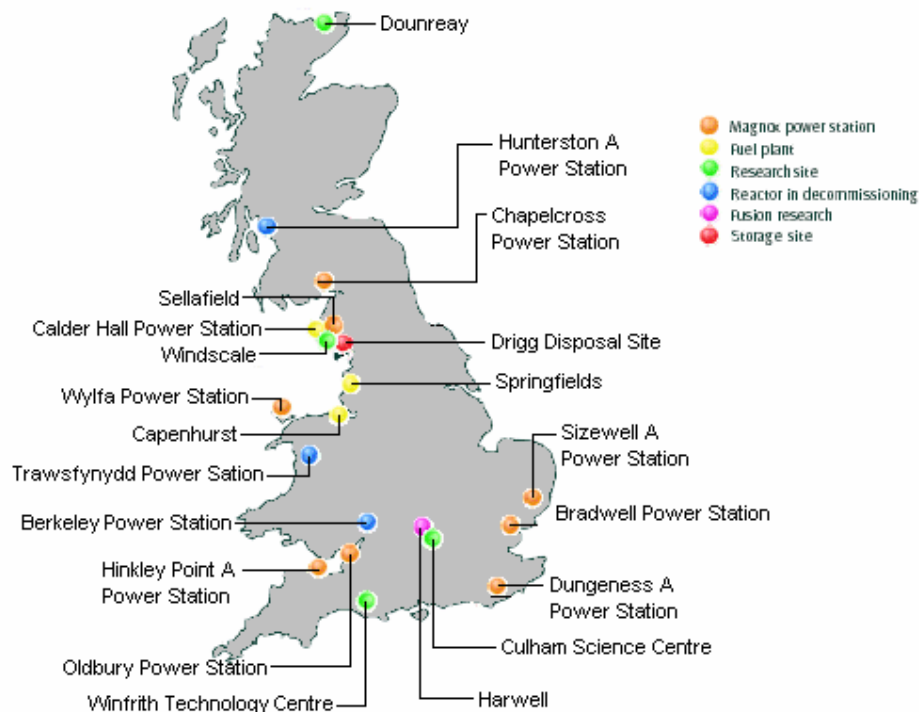


Fig. 1. Legacy Sites in the United Kingdom

The diversity is indicated by noting that most of these facilities are one-offs, with even the fleet of Magnox power generating plants being of vastly different designs and construction methods. The complexity also presents its own challenges, since just as in the US, many of the older facilities that were built during the Cold War period have been neglected over time and will require significant efforts merely to characterise their status before restoring them to a passively safe and secure state. The very nature of the major technical, political and socio-economic issues that must be confronted by the UK Government dictates that these issues will require long timescales to resolve. Current estimates that are being presented to the LMU indicate costs of the order of £50B or more, and a clean-up and remediation lifecycle of over

100 years. In its recent initiatives, the UK Government has accepted the responsibility to take timely actions now to ensure that this work will not become a burden for future generations.

When it is established through legislation (Fig. 2), the NDA will be accountable to the public and to the UK Government to operate in a cost effective and safe manner, and to maintain stakeholder confidence whilst delivering demonstrable progress in clean up. The Government has committed itself to proceed with this responsibility in a spirit of openness and transparency, working through consultative processes involving all of the interested stakeholder communities, as well as to operate in an integrated fashion across Government to provide answers that are truly "joined up". This latter point will require important dialogue by the DTI with regulatory bodies, Her Majesty's Treasury, and with Parliament itself to ensure that well-considered solutions are implemented.

IDENTIFYING THE TECHNICAL ISSUES

The NDA will need to address an array of technical issues, many of which have been debated for some time both within and outside of the international nuclear industry for decades. And indeed many of these issues are the subject of workshops and technical discussions at this conference. As part of its early work, the LMU has been acquiring the requisite information regarding the current state of the nuclear liabilities, and attempting to understand both the nature and significance of the technical challenges confronting the NDA. This level of understanding is essential in order to facilitate the development of early strategies for action, as well as to better inform the Parliament and other elements of Government of the financial and policy implications of such strategic plans.

In resolving the major technical issues, the NDA and its Contractors will need to find ways to apply better solutions to make progress in discharging some of the most challenging projects in the UK. The names and places of the some the challenging scopes of work read like a "who's who" of UK nuclear history: Harwell, Sellafield, the Windscale Piles, the Dounreay Prototype Fast Reactor, the Magnox fleet, the Culham JET experiments, and so on. The types of work include the extremely complex waste retrieval operations of such materials as the Magnox reprocessing sludges and fuels debris in the ponds at Sellafield, the relatively uncharacterised wastes in the Dounreay Shaft, contaminated Na-K and damaged fuel from the Dounreay Fast Reactor, and the conditioning and immobilisation of high activity liquors at several sites.

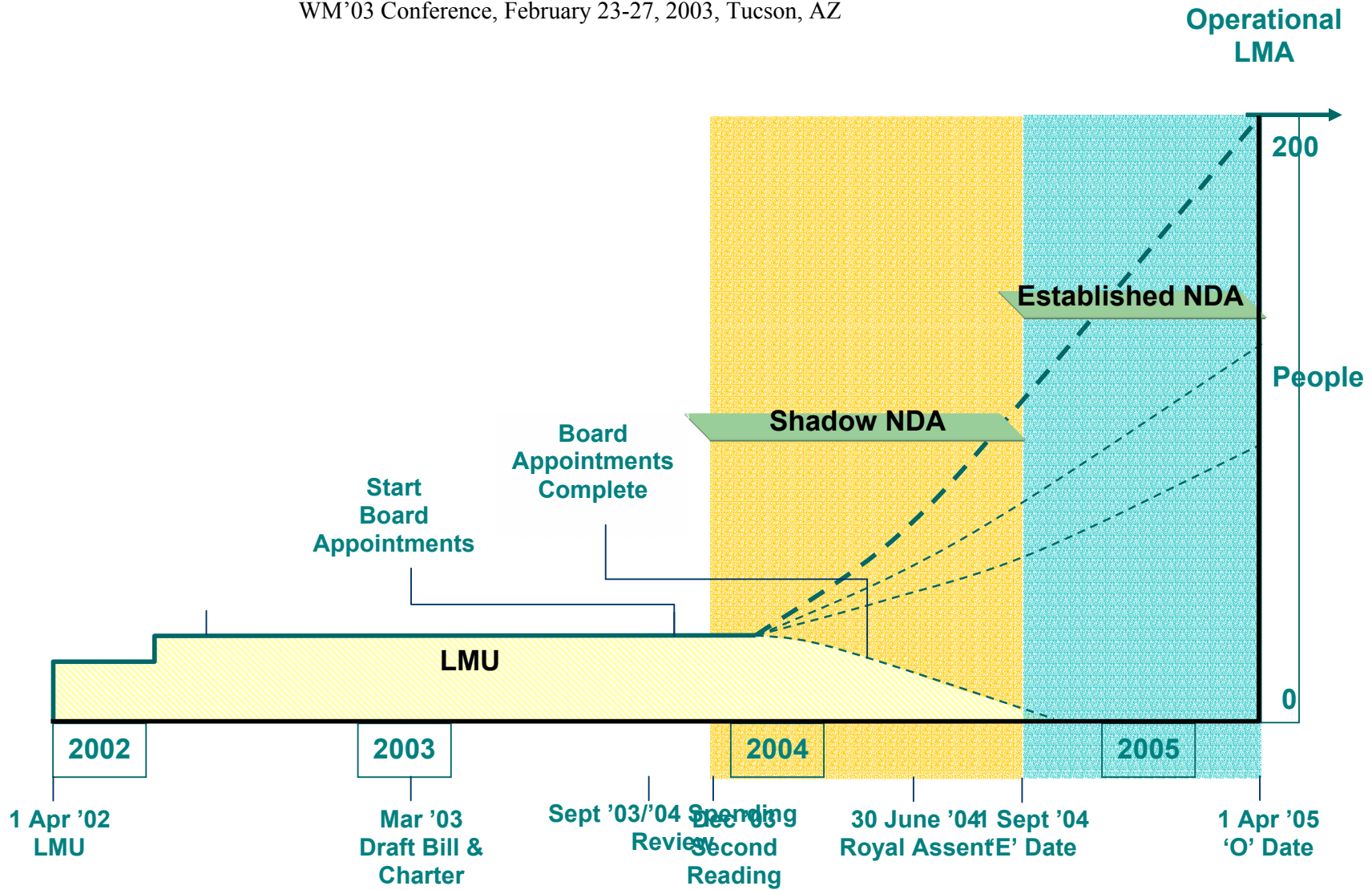


Fig. 2. NDA Timeline

CONFRONTING THE TECHNICAL CHALLENGES

Having identified the more significant technical issues, the LMU has begun to develop proposed approaches to address them. In simple terms, the approach is to:

- Identify and define the scope of the technical issue,
- Determine the relative significance of the issue to NDA strategic decision making,
- Review and evaluate the current state of resolution for the issue from both UK and international perspectives,
- Where appropriate, identify requisite policy or R&D initiatives needed to obtain better solutions, and
- Develop action plans for resolving the technical issue, either now during the LMU phase of activities, or if necessary, when the NDA becomes operational.

In the following paragraphs, we describe a brief listing of the critical near term issues that have been identified thus far by the LMU. While not exhaustive, this short list provides a summary of the major areas of activity by the LMU for the near term in creating the environment for a successful rollout of the NDA.

Obtaining a Detailed Understanding of the Liabilities

Although they are understood in general terms, the UK's public sector civil nuclear liabilities have not been characterised in a commonly accepted and consistent fashion in the past. A major effort is underway to fully catalogue the sites, facilities, waste materials and nuclear materials that comprise the totality of the liabilities scope for the NDA. These efforts will enable the NDA to assist the UK Government in developing national strategies for decommissioning and remediation of the facilities and materials. Fully compliant and effective inventory control systems will be needed to establish baselines and to monitor progress in clean up.

Clearly Defined End Points for Sites

As has been the situation in other countries, the UK is undergoing evaluations of how its regulatory framework and environmental policies should address the question of remediation options for nuclear sites. The UK Nuclear Installations Inspectorate is actively engaged in addressing the "no danger" criterion with which it assesses the allowable end state conditions for sites currently licensed under the Nuclear Installations Act of 1965. The LMU is undertaking assessments to assist this activity with regards to de-licensing prerequisites, land use criteria, surface and subsurface

remediation options, and the appropriate regimes for institutional control of sites not ready for unrestricted access and use, e.g. "green field" status.

Ultimate Disposal Paths for Nuclear Waste Materials

The UK, like many other countries, has identified neither the means nor the locations for the ultimate disposal of intermediate level waste (ILW) or for high level waste (HLW). The UK Government, through its Department of the Environment Food and Rural Affairs, has undertaken a national consultative process to seek the widest range of stakeholder opinions regarding the policies for managing all of its solid radioactive wastes (2). Furthermore, it has to confront the eventual shortage of identified disposal routes for low level waste (LLW), as well as for large volumes of so-called very low level radioactive materials (VLRM) that are likely to result from the dismantling of nuclear facilities and the remediation of nuclear sites. As this issue is addressed, the LMU will assist in the determination of potential impacts from decisions regarding approved packaging criteria, monitoring and retrievability requirements, and possible *in situ* disposal options for low activity materials.

With respect to packaging arrangements, discussions are taking place with the Regulators, the NDA, Nirex (as ultimate receiver of the package for potential disposal) and others in the industry on improved regulation of this aspect; further details are given in the Nirex paper presented in Session 7 at this conference (3).

Spent Nuclear Fuel Strategies

The UK currently has a mixed strategy for the potential treatment of spent nuclear fuel elements dependent on the type of fuel involved. These range from full reprocessing for Magnox fuels, to an indeterminate reprocessing commitment for light water reactor fuels from Sizewell B. Since the eventual strategy elected by the NDA has significant implications to the lifecycles for the UK's reprocessing facilities, and to the quantities and disposal paths for alternative waste form options. The LMU would like to facilitate the resolution of these issues in order to enable the NDA to establish clear end states for this form of waste materials and to develop better operational plans for the reprocessing facilities under its purview.

Passive Safe Storage

In the past, the UK has operated under an informal policy that proposes to defer waste retrievals, conditioning and packaging until final waste end states are clearly defined. While approach has merit from the perspective of avoiding unnecessary exposure to and rework of hazardous materials, it can only be sustained as a policy as long as the wastes can be maintained in a reasonably safe and stable configuration unless treatment processes begin. For many portions of the UK nuclear legacy, the continued maintenance of certain waste materials cannot reasonably be ensured for long periods of time. Thus, interim measures for the conversion of these waste forms into more passively safe configurations will be required. Clearly, the magnitude of this problem will depend on the resolution of ultimate end states for all waste streams, since the lack of such definition will complicate the decision-making regarding acceptable interim packaging and storage conditions.

Contaminated Lands

Similar to situations in the US and elsewhere, the actual and potential contamination of the subsurface soils and groundwater surrounding nuclear facilities presents special difficulties. These special circumstances must be dealt with, and will include consideration of complex mixtures of radioactive and other non-radioactive hazardous materials (so-called mixed wastes), advanced remediation technologies, subsurface transport modelling, and appropriate application of land use criteria.

Summary and Conclusions

The NDA fully anticipates that the broad international nuclear community at large will play a significant role in helping to determine the way forward, in bringing expertise and innovation to bear on the problems, and in executing the actual work of discharging these liabilities. We in the LMU are convinced that the answers to these problems will be found, and that companies such as those represented here today will help foster the solutions needed, and play a role in putting those solutions into practise.

The LMU will be working over the course of the next year to acquire the basic knowledge needed to better understand the liabilities for which it will be responsible, to create an environment of technical curiosity and challenge, and to seek out the best practises existing in the nuclear industry. We ask you to join with us in meeting this challenge.

REFERENCES

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3. “Update on Radioactive Waste Management in the UK”, John Dalton, UK Nirex Ltd, WM'03, Feb. 22-27, 2003, Tucson, AZ