Strategy

Effective from April 2011

Nuclear
Decommissioning
Authority

Strategy

Effective from April 2011

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Strategy presented to Scottish Parliament pursuant to Schedule 2 of the Energy Act 2004.

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Contents

Please note throughout the document the following styles are used:

Glossary terms are italicised -
e.g. 'Care and Maintenance'

References are italicised -
e.g. 'Energy Act (2004) *(ref 2)*

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INVESTOR IN PEOPLE

Dounreay's changing landscapes - Preparations underway to place an underwater explosive charge during the construction of the Seawater Pumphouse at the Dounreay Fast Reactor (DFR) in the 1950s.

Redundant facilities being demolished at Dounreay in 2007.

Preface

The Energy Act 2004 requires the Nuclear Decommissioning Authority (NDA) to review and publish its Strategy at least every five years.

This document presents the outcome of our review of our first Strategy *(ref 1)* published in 2006. This revised Strategy sets out our strategic direction and describes our long-term objectives. It covers the duration of our mission, while summarising the current position at the time of publication.

This Strategy has been approved by the Secretary of State jointly with the Scottish Ministers as required by the Energy Act (2004 *(ref 2)*.

The NDA's Strategy is supplemented by our annual Business Plan, which sets out near term objectives and plans for delivering our priorities over the following three year period. Performance against the activities included in our Business Plan is reported in our Annual Report and Accounts.

The NDA's sponsoring department is the Department of Energy and Climate Change (DECC) and, for matters affecting Scotland, we have additional obligations to the Scottish Ministers. We operate under a Management Statement and Financial Memorandum, which sets out the relationship between DECC, Scottish Government and the NDA. Our budget is set by DECC and comes from a combination of Government funding and income from our commercial activities.

The NDA is a Non-Departmental Public Body created under the Energy Act (2004) *(ref 2)*. Our core objective is to ensure that the historic civil public sector nuclear legacy sites are decommissioned safely, securely, cost effectively and in ways that protect the environment. As part of this, we are required to operate existing commercial activities and meet current contracts, using revenues generated to offset spend on decommissioning. In addition, we are required to scrutinise the site decommissioning plans of EDF Energy for their existing nuclear fleet; and, since October 2006, we have been the UK body responsible for implementing geological disposal of higher activity radioactive waste. We are also responsible for delivering the Low Level Radioactive Waste Strategy *(ref 22)* for the whole of the UK's nuclear industry, which we published in 2010.

Our responsibilities under the Energy Act (2004) *(ref 2)* are unchanged and our review has confirmed that much of our original Strategy remains relevant. However, the background against which we operate has changed significantly since the NDA was established. UK Government policy on nuclear energy has changed and a new reactor programme is now envisaged in England and Wales. This does not change our mission, but it does mean we need to consider the impact of this new reactor programme where potential synergies exist, such as skills and nuclear industry infrastructure. Much of the UK's knowledge relating to spent fuel management and reprocessing, waste management and decommissioning lies within the NDA estate and it is important this expertise is made available to the UK's broader nuclear programme. Where appropriate this is reflected in our Strategy.

We deliver our mission through others, primarily *Site Licence Companies* (SLCs) which are licensed to operate our nuclear sites. Between them the SLCs employ a workforce of around 18,000 and deliver agreed programmes of work against schedule and site funding limits. Through competition we let contracts to winning bidders to contribute the benefits of their proven track record in the management of nuclear decommissioning to improve the performance and delivery of the SLCs. The winning bidders own the SLCs for the period of the contract, and as *Parent Body Organisations (PBOs)* provide additional resource and management expertise.

In order that we can continue to deliver our Strategy within the funds available we must continue to maximise our income, achieve greater efficiencies and prioritise our effort and resources to best effect. The NDA will focus its resources on core tasks and deliver everything else through others, particularly our SLCs and their PBOs.

We are looking to consolidate our position as a world class contract management organisation. We will select, lead, manage and hold to account those who deliver our mission on our behalf, and reward our contractors for delivering excellence. We will set clear strategies, articulate stretching performance targets and introduce appropriate incentives to drive improved delivery from the PBOs and SLCs. We will continually review the way we operate and the capabilities we need to perform these functions.

We will continue to work closely with Government and in partnership with stakeholders to maintain their confidence, inform policy development and support the maintenance of nuclear industry infrastructure such as developing skills and ensuring sufficient Research & Development (R&D) is undertaken to underpin our decommissioning and waste management plans. We will continue to support the sustainable economic development of communities affected by our activities.

The NDA will continue to deliver a step change improvement to programme, project and operational execution, and focus delivery on tangible, medium-term achievements in decommissioning and clean-up. This Strategy supports our aim by making clear our strategic direction in order that the SLCs, PBOs and other stakeholders can understand and drive towards common outcomes, thereby delivering our mission more effectively.

Our top decommissioning and clean-up priority continues to be dealing with the higher hazard facilities at Sellafield and Dounreay – one facility in particular being the Magnox Storage Pond at Sellafield.

1.0 Introduction

1.1 Background

The UK's civil nuclear legacy is a major public liability, and represents the largest, most important environmental restoration programme in Europe.

Our mission is to deliver safe, sustainable and publicly acceptable solutions to this challenge, driving substantial change to improve delivery using competition for contracts to bring in world class expertise to enhance innovation, improve clean-up and deliver value for money.

The nature and scale of the task to decommission the legacy facilities inherited by the NDA was poorly characterised and highly uncertain. An early objective was for the NDA to form a comprehensive understanding of the work to be done and the associated costs. Although uncertainties still remain, the total discounted costs of completing the NDA's mission were estimated in 2009/10 to be £45.1 billion[1].

The high cost of dealing with the historic civil public nuclear liability reflects the emphasis at the time the facilities were built on operations and the lack of awareness or foresight of the importance and need to plan for eventual decommissioning.

In the NDA, the UK now has a single body responsible for an ever improving understanding of the civil public nuclear liabilities, and for developing and implementing an estate-wide strategy and plans to deal with them.

Our sites range from Sellafield, a complex site providing fuel reprocessing, fuel fabrication and storage of nuclear materials and radioactive wastes across two square miles, to smaller sites containing nuclear research facilities, where decommissioning is well underway. Some of our facilities continue to form an essential part of the nation's nuclear infrastructure which means they must continue to be operated safely and effectively until they have fulfilled their purpose.

Our mission is a long-term one and some sites will not reach their planned end state for decades; some wastes will remain hazardous for thousands of years. This is immensely technical and challenging. Much of the plant and assets are in a severely deteriorated condition due to an historic lack of investment, not only in decommissioning but also in the maintenance of the estate. As such, there is an imperative to make progress whilst various plants and facilities remain operational. The alternative brings a significant risk of additional expense as well as compromising the environment and safety.

Plans for decommissioning the sites rely upon the availability of a final disposal solution for waste. For Low Level Waste, the NDA's primary task is to reduce the amount of waste for disposal in order to avoid unnecessary costs. For Higher Activity Wastes, the UK Government's chosen solution is for deep geological disposal and the availability of a repository is the key requirement. The Scottish Government policy is for the long-term management of higher activity radioactive waste in near surface facilities, as defined in its January 2011 Policy Statement *(ref 26)*.

Whilst *decommissioning and clean-up* is the NDA's core objective, in our first six years only a quarter of the budget has been spent directly on site restoration. The balance of expenditure is spent on maintaining the sites in a safe and secure state as well as running the operations associated with fuel and waste management. It is a clear objective of the NDA to increase the proportion of site restoration expenditure.

In our first six years, we have made significant progress on a number of fronts. We have:

- developed a detailed understanding of the legacy, introducing industry-wide procedures across our sites to plan on a consistent basis and completed the re-structuring of our estate to facilitate the programme of competitions
- progressively prioritised funds towards highest hazards
- delivered value for money by driving efficiency and performance across our estate
- successfully completed competitions for the management of the Low Level Waste facility near Drigg; and for Sellafield – one of the largest and most complex procurements in Europe - bringing international capability to the UK with the expectation of significant improvements in operational efficiency, project management and cost control
- made significant headway in realising value from our commercial operations and surplus assets
- invested in skills to build the future capability of the UK's nuclear workforce
- made steady progress on decommissioning and the operations associated with fuel and waste management despite challenges associated with plant reliability.

These and other achievements have provided a secure platform for our next phase of delivery.

[1] The discounted cost is detailed in our published Annual Report and Accounts 2009/2010 *(ref 4)*.

1.2 Our Approach to Strategy

In order to bring a clear focus to our mission we have identified six strategic themes under which we group all our activities. The six themes are:

See p16 Site Restoration defines our approach to decommissioning redundant facilities and how we manage contamination in ground and groundwater. Restoration will drive our sites through a series of Interim States to a Site End State, at which point the NDA is able to release the site for other uses.

See p24 Spent Fuels defines our approach to managing the diverse range of spent nuclear fuels for which we have responsibility, including Magnox, oxide and exotic spent fuels.

See p32 Nuclear Materials defines our approach to dealing with the inventory of uranics and plutonium currently stored on some of our sites.

See p38 Integrated Waste Management considers how we manage all forms of waste arising from operating and decommissioning our sites, including waste retrieved from legacy facilities. It also ties in the wider work of our Radioactive Waste Management Directorate on implementing geological disposal.

See p48 Business Optimisation looks at how we maximise our commercial income, using our assets and capabilities to reduce the net cost of decommissioning and clean-up to the taxpayer.

See p54 Critical Enablers support the overall delivery of our mission and, in some cases, reflect the supplementary duties assigned to the NDA by the Energy Act (2004) *(ref 2)*. In most cases these are not matters in which we have the lead role, but where we need to take a view and ensure that appropriate action is being taken. Critical Enablers apply across the other strategic themes and enable their delivery.

Throughout this document, colour coding is used to indicate the strategic themes, as above.

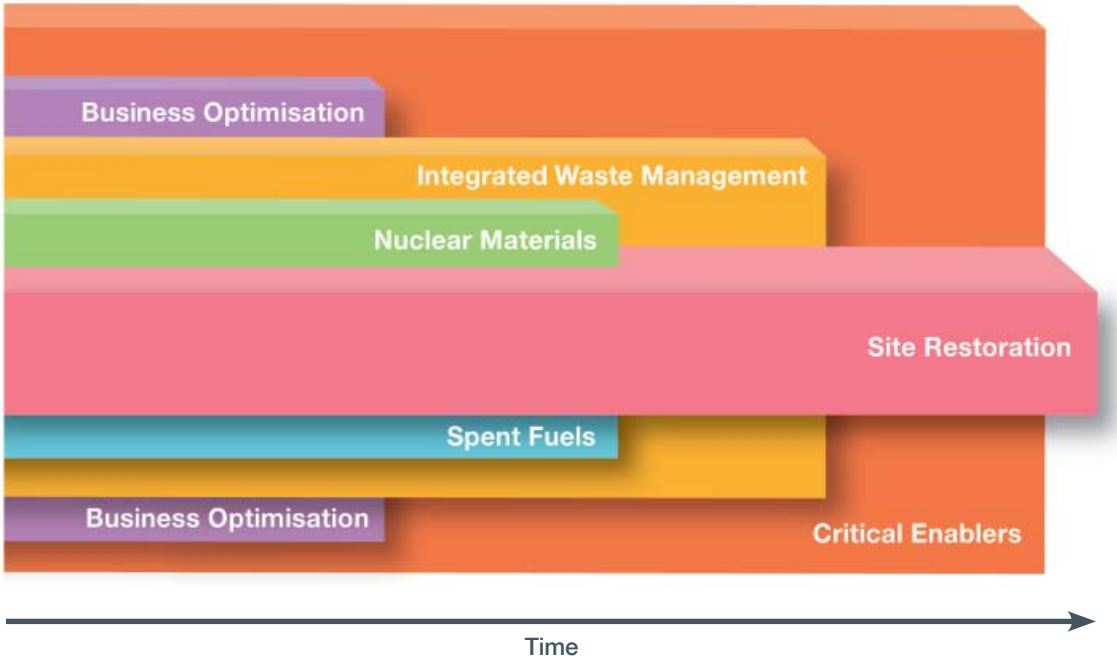

Figure 1 - This illustrates the interaction of the six strategic themes showing Site Restoration as the driving theme supported by Integrated Waste Management; the need to manage Spent Fuels and Nuclear Materials as an early part of Site Restoration; Business Optimisation raising revenues where appropriate; and with the entire mission underpinned by the Critical Enablers. Time passes from left to right.

Our strategic themes are further divided into individual strategies which we develop and maintain to efficiently deliver our mission under the Energy Act (2004) *(ref 2)*. This Strategy is structured to reflect the strategic themes and organising our work in this way has already provided clarity and a consistent basis for communicating with contractors and stakeholders.

Site Restoration is our driving strategic theme and all other strategies support or enable its delivery. We can only restore our sites if we manage spent fuels and nuclear materials efficiently, establish effective waste management solutions and secure sufficient income to continue making progress.

There is a great deal of interdependence between the strategic themes. There is, therefore, limited discretion to stop activities under a particular theme without wider implications. This includes impacting critical national infrastructure that serves the wider nuclear industry such as electricity generation, fuel manufacture, reprocessing and waste treatment, storage and disposal services.

Our published Strategy covers the duration of our mission and summarises the current position and maturity at the time of publication. Strategy review and development is, however, an ongoing process for the NDA and options for delivering the strategy are continually evolving.

To manage the complex interactions between the different parts of our Strategy we have a *Strategy Management System (SMS)* which enables us to:

— develop strategy in a controlled fashion through distinct stages allowing us to engage effectively with Government, nuclear regulators, SLCs and other stakeholders on its development and possible changes in strategic direction

— ensure the strategy is robust and coherent at all times, recognising the numerous interdependencies

— effectively respond to internal and external events that impact our strategy

— ensure compliance with the regulatory framework

— transparently underpin the decisions we make on preferred strategic options.

The SMS is based on HMG Treasury guidance, using a business case approach to build up the underpinning rationale for a strategic decision. In selecting a preferred strategy we consider the options against a wide range of factors, shown in **Figure 2** below.

Safety Impact
Hazard Reduction
Environmental Impact
Cost (Long & Short-Term)
Income
Economic & Social Effects
and
Other Relevant Factors on a case specific basis

Figure 2 - NDA Value Framework

We call this combination of factors our *Value Framework*, which helps us balance our top priority of *risk* and *hazard* reduction alongside socio-political and affordability considerations.

Strategic decisions are made in the light of an informed assessment of the relevant factors and their interplay, through the *Value Framework*, with clarity on where accountability for making the decision lies and with a rationale for the outcome being associated with each decision.

We engage or consult with relevant stakeholders at the appropriate stage in the development of strategy, to ensure their views are considered.

By considering the factors in our *Value Framework*, we incorporate the requirements of Strategic Environmental Assessment (SEA) (*ref 3*) into the heart of our strategy development and decision making. SEA ensures our decisions are informed by an assessment of environmental benefits and drawbacks of alternative options, and where relevant these are set out in this Strategy. An overarching SEA has been carried out for this Strategy, summarised in Appendix B. In addition, as part of strategy development, individual strategies are subjected to an SEA as appropriate.

To secure implementation, our strategic requirements are translated into action by issuing *Site Strategic Specifications* to our SLCs. These specifications detail what our Strategy means for a particular site, which then become embedded in its *Lifetime Plan (ref 5)*. The NDA subsequently monitors and measures the SLC's delivery performance against the agreed *Lifetime Plan (ref 5)*.

For each strategy in this document we have considered four questions under the following headings:

— **Objective** – What is the objective of the strategy?

— **Our Strategy** – What is our current strategy, and any associated risks and opportunities?

— **Development** – What strategy development do we plan to undertake in the future?

— **Delivery** – What have we delivered so far and how do we plan to implement our strategy?

In each **Development** section we make clear if an individual strategy is undergoing development, with input from relevant stakeholders, or is mature and being implemented.

Further information on how we develop strategy is provided in Appendix A.

1.3 Lessons from 2006

Following the publication of our first Strategy *(ref 1)* in 2006, we examined the way we approach the development of strategy, particularly our engagement with stakeholders. We identified a clear need to pre-engage and work with key stakeholders, particularly nuclear regulators, during the development of our strategy and before the consultation, to ensure it contained 'no surprises'.

We recognised that we should not include tactical and operational details in our Strategy. They are more appropriate to our Business Plans. Our first Strategy contained a number of detailed operational targets which were replaced in light of experience by alternative ways of achieving our objectives. It also contained aspirational commitments and targets which, for one reason or another, we were unable to deliver. In future we need to make clear where statements are aspirational and indicate the extent to which we can deliver against them.

We have also learned that we need to make clear the maturity of our individual strategies, stating where preferred options have been approved and adopted or further development or underpinning is still required to make a decision on strategic direction. This helps our stakeholders engage with us and contribute effectively to the development of strategy.

We have reflected on these lessons, and others, to help us prepare this Strategy.

1.4 Public Consultation Response

We consulted on our Draft Strategy *(ref 27)* and the supporting Environmental and Sustainability Report *(ref 3)* between 1 September and 24 November 2010. During the consultation period we issued around 2,600 copies in total and delivered numerous presentations around the UK to interested parties and statutory consultees. These included Site Stakeholder Groups, Trade Unions, Local Authority representatives from England, Wales and Scotland, site staff and management teams, supply chain forums and the NDA National Stakeholder Group.

In response we received 74 sets of comments on the Draft Strategy *(ref 27)* from a wide range of stakeholders. All comments received were considered and assessed to determine their influence and impact on the Strategy. In response to the consultation, the NDA has published two documents on the NDA website **www.nda.gov.uk** First, a report that summarises stakeholder responses to the Draft Strategy, and describes how the comments received informed this final Strategy, and second, a spreadsheet that provides the NDA's response to each individual comment received.

In summary, the responses we received were broadly supportive of our proposed Strategy and considered the *Strategic Environmental Assessment (SEA) (ref 3)* methodology to be sound. Many stakeholders welcomed the clarity provided, particularly our approach using strategic themes supported by critical enablers, which helped them to understand our scope and the challenges we face. Additional detail has been provided in a number of areas for clarity, as suggested by some respondents.

The consultation on our supporting Environmental and Sustainability Report *(ref 3)* resulted in 12 stakeholder responses, none of which affected the original strategic environmental assessment or the proposed Strategy. In response to feedback, the summary provided in Appendix B has been revised to improve clarity of the SEA on the Draft Strategy.

The Post Adoption Statement, which details how the SEA has influenced this final Strategy, can also be found on our website **www.nda.gov.uk**

Workmen remove pipework from one of the reactors at Berkeley.

Removal of redundant buildings surrounding the PLUTO reactor, Harwell 2008.

2.0 Strategy Overview

At the heart of our Strategy is the priority we apply to delivering a reduction in risk and hazard across our estate and to delivering our mission cost-effectively.

Firstly, where risks to people or the environment are *intolerable*[2], making tangible, demonstrable progress on these national priorities is our priority, particularly Sellafield's Legacy Ponds and Silos. Secondly, where the risk is *tolerable* we will pursue hazard and risk reduction. Finally, where risks are *broadly acceptable* and hazards have been reduced, our attention turns to site restoration in line with our Site Interim and End State objectives. These priorities will drive the allocation of resources.

We recognise that to deliver the reduction in risk and hazard that is core to our mission, we may need to accept near term increases in risk. We will work with our SLCs and the Regulators to safely manage this balance.

From the secure platform achieved in our first six years we will extract value from the industry restructuring we have delivered and ensure effective deployment of our capabilities. We will continue to use the NDA contracting model of a Site Licence Company (SLC) contracted to the NDA, with ownership and management of the SLC competed into the market to bring UK and international best practice to bear on our mission. Reflecting the maturity of our plans and the marketplace, we will increasingly use output-based contracts, specifying the outcomes we seek rather than the work to be performed and rewarding cost-effective delivery. This will include an appropriate and progressive transfer of risk to the private sector.

Early planning of site restoration inevitably focused on site by site solutions, supported by only a few generic waste and material management techniques. In future, more sophisticated and diverse approaches will be needed to improve delivery and secure best value. The NDA has a wide range of human resources and physical assets across its estate and we will make better use of these in delivering our mission. For example, this may include encouraging workforce mobility, or moving materials and waste from one site to another where the facilities exist to best manage them. We will balance the benefits of generic techniques and problem specific solutions to ensure that we deliver our mission most effectively.

This particularly applies to waste management and *decommissioning*. Such solutions may challenge historic practices or the current regulatory framework, but could reduce environmental impact and provide greater value for money, so we will continue to evaluate their technical and economic viability. We will ensure that our plans reflect full lifecycle strategies for everything we are accountable for.

By adopting more sophisticated and diverse solutions to the challenges we face, stakeholders and the communities neighbouring our sites will reap benefits in the medium-term, such as visible and tangible restoration progress, reduced risk profiles and the eventual release of land for other uses.

To deliver our plans within the funds available we must continue to maximise our income, achieve greater efficiencies, and prioritise our efforts and resources to best effect. We will reinforce our role as a strategic authority and deliver through others, ensuring that work is placed with those best able to deliver.

We recognise that openness, transparency, and effective public and stakeholder engagement and communications are key to building and maintaining the support, confidence and trust of the public and stakeholders necessary to implement our Strategy. As our Strategy develops we will continue to engage with local communities, local authorities and other relevant stakeholders as appropriate, for example, on matters such as Site End States and defining Interim States, options for oxide fuel management, the possible use of centralised and multi-site waste and material management solutions and the transportation of waste and nuclear materials.

We incorporate the requirements of *Strategic Environmental Assessment (SEA) (ref 3)* into the heart of our strategy development and its implementation. The Post Adoption Statement (found on **www.nda.gov.uk**) describes indicators that we will use to monitor significant environmental and sustainability effects during Strategy implementation.

[2] For definition of *intolerable risk* refer to the Glossary p 92.

Site Restoration

The NDA's end goal is to restore our designated sites to the point where they are released for other uses. In order to prioritise delivery our site restoration strategy focuses on reducing risks to people and the environment while restoring each site as soon as reasonably practicable to a condition suitable for its next planned use.

Due to the unique and varied nature of our facilities and land, restoration is considered on a case-specific basis. We take into account a range of relevant factors, including the need to reflect Government policy and secure value for money.

Our approach is influenced by the level of risk to people or the environment.

Where the risks are *intolerable* we will take urgent action to reduce them.

Where the risk is less significant our approach takes greater account of other factors. However, it is still focused on reducing *risk* and *hazard* as far as is reasonably practicable. We will monitor existing risk levels and act proportionately to ensure that the net level of risk does not increase in the long-term.

We recognise that to deliver the reduction in risk and hazard that is core to our mission, we may need to accept near term increases in risk. We will work with our SLCs and the Regulators to safely manage this balance.

Where risks have been reduced, there is still work to be done. Decisions on further site restoration will balance the broad range of factors in our *Value Framework*.

Our decisions will consider the full lifecycle impacts on people and the environment to ensure that the chosen strategic option does not compromise the needs of future generations. We have agreed Site End States which define our long-term restoration objectives. In addition, we will identify Interim States to focus delivery on nearer term restoration goals. These will be measurable, demonstrable and could align to stepped risk or hazard reduction targets, *decommissioning* phases, contract delivery milestones or opportunities to release land for its next planned use.

We will encourage innovation and, where appropriate, resources such as equipment, skills and experience will be shared between sites to improve site restoration across our estate.

Definition of Hazard

Hazard is the potential for harm arising from an intrinsic property or ability of something to cause detriment.

Definition of Risk

Risk is the chance that someone, or something that is valued, will be adversely affected by the hazard.

Spent Fuels

Our strategy is to secure and subsequently implement the most appropriate management approach for Magnox and oxide fuels and, where possible, take advantage of these approaches to manage exotic fuels. Any remaining fuels will continue to be managed on a case-specific basis in a safe and secure manner pending subsequent *disposition*.

The most cost-effective solutions for Magnox and oxide fuels will include continued and extensive use of our existing reprocessing and storage facilities.

We intend to continue using the oxide, Magnox and, where appropriate, exotic fuels management routes in an integrated way to optimise utilisation of facilities at Sellafield and across our estate.

Where appropriate, we will invest in our spent fuel management capability. In particular, we will continue to invest in developing contingency and alternative options in the event that reprocessing or long-term fuel storage management capabilities are not available. This will enable us to make fully informed investment decisions for optimising spent fuel management as required in the near future.

If approached by third parties to provide additional spent fuel management services, we will discuss the options with UK Government.

With UK Government agreement we will, if requested, supply advice and information to utilities involved in the UK's new reactor programme, on a commercial basis.

Nuclear Materials

Our strategy for the management of nuclear materials reflects the current UK Government policy of safe and secure storage. We are developing options which consider alternative lifecycle management solutions.

Some of our nuclear materials have value in today's market. The rest of the inventory may increase in value in the future. Our strategy for these materials is therefore to maximise value and avoid foreclosing any future options unless there is a hazard management priority.

The nuclear materials inventory is stored safely and securely on several sites across the NDA estate. We will consider whether consolidated storage is more appropriate for reasons of security and economy and consider other nuclear material owners in developing our plans.

We will support UK Government as it determines future policy on plutonium and we will subsequently deliver appropriate strategies. This includes R&D work to technically underpin the options.

Our strategy for material owned by third parties is to continue its management in accordance with contractual obligations and UK Government policy.

Integrated Waste Management

Strategic decisions about waste management are informed by the following key principles:

- *risk* reduction is a priority
- centralised and multi-site approaches should be considered where it may be advantageous
- waste should be minimised
- the *Waste Hierarchy* should be used as a framework for waste management decision making and enables an effective balance of priorities including value for money, affordability, technical maturity and the protection of health, safety, security and the environment.

See p63

We will continue to promote the importance of waste characterisation, improved waste information (see **Information and Knowledge Management Strategy**) and waste segregation to facilitate waste management planning and application of the *Waste Hierarchy.*

See p41

Our **Higher Activity Waste Strategy** is to implement the UK Government's policy of deep geological disposal and the Scottish Government policy for long-term management in near surface facilities. For LLW, disposal will be in fit for purpose facilities that reflect the nature of the wastes to be managed.

Within this overall framework our priority is to achieve risk reduction by dealing with waste in ageing storage facilities (for example legacy facilities at Sellafield) and placing it into safer modern storage conditions.

Diverse radioactive waste management and disposal solutions will be pursued where these offer benefits over previous arrangements. We will also investigate opportunities to share waste management infrastructure across the estate and with other waste producers where we can see benefit. New waste management approaches will often require different transport arrangements and will be a matter of great interest to planning authorities and people living close to the sites involved. We will engage with interested parties from an early stage, irrespective of whether such developments represent new investments proposed by us or by other organisations on our behalf. We will work with key organisations, for example local authorities, to build on the feedback we have received on how this engagement should happen and develop a framework for engagement that provides for useful discussion when considering new waste management initiatives.

We believe there are opportunities for a more flexible approach in the management of waste that is close to category boundaries. For example, *decay storage* of ILW may make the use of LLW treatment and disposal routes feasible. We will consider the role that these opportunities can provide.

We will encourage innovation and open market solutions, and sustain R&D matched to the challenges of waste management both by direct investment and indirectly through the programmes of our SLCs.

The NDA intends to take a multi-site and UK-wide view, to include its own sites and the operations of other waste producers, including EDF Energy* and MoD. We recognise that in future the radioactive waste management landscape will change, particularly as a result of the UK's new reactor programme. With UK Government agreement we will supply advice and information to utilities involved in the programme. This will ensure both an integrated approach to radioactive waste management and that our facilities, some of which support both the civil and defence nuclear industries, can plan effectively for the future.

Business Optimisation

To help fund *decommissioning and clean-up* without materially impacting on our core mission, or increasing liabilities, we will develop commercial opportunities to maximise revenue from our existing assets, operations and people. These opportunities may include:

— deploying existing facilities and resources to our commercial advantage

— disposing of surplus assets and reducing liabilities

— working with others to share costs to the benefit of the UK taxpayer.

Some of these opportunities may arise from the UK's new reactor programme. Successful past examples of this approach are the sale of land and the transfer of Springfields Fuels Limited to the private sector.

Critical Enablers

We will continue to develop approaches for the critical enablers required to deliver our strategies effectively. Through engagement with stakeholders we have established our strategic direction and appropriate working arrangements. Notably:

— **Health, Safety, Security, Safeguards, Environment & Quality (HSSSEQ)** – Our strategy is to take account of the health, safety, security, safeguard and environmental implications of different approaches to fulfilling our mission during our development and decision processes. We will select Parent Body Organisations with an excellent track record in health, safety, security, safeguards and environmental management. We will ensure that our SLCs have a clear vision for improving HSSSEQ performance and insist they have high standards of HSSSEQ performance. We will monitor SLC performance and outcomes, and work with Regulators, Government and SLCs to improve and rationalise legislation and its application, where changes would offer significant benefits in the delivery of our mission. We will seek innovative ways to share good practice across our estate and learn lessons from other industries.

— **People** – We recognise that people with appropriate skills and capabilities are essential to the successful delivery of our mission over its lifecycle and aim to ensure that there is a skilled workforce available at all times within our organisation, the SLCs and the supply chain.

— **Research & Development (R&D)** – Our strategy is that, where possible, R&D is undertaken by the SLCs and their supply chain. Where necessary the NDA will maintain a strategic R&D programme, which focuses on targeted, estate-wide R&D needs, risks and opportunities to inform and develop strategy, encourage innovation and support key technical skills.

— **Socio-Economics** – Our strategy is to support the economic development of communities affected by our activities, focusing on employment, education and skills, economic and social infrastructure and diversification.

— **Public and Stakeholder Engagement and Communications** - We regard openness, transparency and effective public and stakeholder engagement and communications as key to building and maintaining the support, confidence and trust necessary for us to deliver our mission.

* Formerly British Energy

3.1 Site Restoration

Objective:

To restore our designated sites and release them for other uses.

The clean-up team at work in the giant sodium storage tank of the Prototype Fast Reactor (PFR), Dounreay.

3.1 Site Restoration

Site restoration is our primary focus and all other strategic themes support or enable its delivery.

We can only restore our sites if we secure final management solutions for spent fuels and nuclear materials and establish effective waste management solutions. Site restoration must take account of non-NDA liabilities located on our sites, such as those owned by the Ministry of Defence (MoD) or EDF Energy.

The restoration of our sites presents a number of major challenges:

- legacy plants in excess of 60 years old containing significant quantities of corroding radioactive material which represent our highest *risk* and some of our largest hazards
- infrastructure which has been deteriorating for several decades
- land contamination resulting from a variety of past uses, including non-nuclear activities.

Our Strategy

The NDA's end goal is to restore our designated sites to the point where they are released for other uses. In order to prioritise delivery our site restoration strategy focuses on reducing risks to people and the environment while restoring each site as soon as reasonably practicable to a condition suitable for its next planned use.

Due to the unique and varied nature of our facilities and land, restoration is considered on a case-specific basis. We take into account a range of relevant factors, including the need to reflect Government policy and secure value for money.

Our approach is influenced by the level of risk to people or the environment, as shown in **Figure 3.**

Where the risks are *intolerable* we will take urgent action to reduce them.

Where the risk is less significant our approach takes greater account of other factors. However, it is still focused on reducing *risk* and *hazard* as far as is reasonably practicable. We will monitor existing risk levels and act proportionately to ensure that the net level of risk does not increase in the long-term.

We recognise that to deliver the reduction in risk and hazard that is core to our mission, we may need to accept near term increases in risk. We will work with our SLCs and the Regulators to safely manage this balance.

Where risks have been reduced, there is still work to be done. Decisions on further site restoration will balance the broad range of factors in our *Value Framework.*

Our decisions will consider the full lifecycle impacts on people and the environment to ensure that the chosen strategic option does not compromise the needs of future generations. We have agreed Site End States which define our long-term restoration objectives. In addition, we will identify Interim States to focus delivery on nearer term restoration goals.

Figure 3 - Summary of our approach to prioritisation and risk

These will be measurable, demonstrable and could align to stepped risk or hazard reduction targets, *decommissioning* phases, contract delivery milestones or opportunities to release land for its next planned use.

We will encourage innovation and, where appropriate, resources such as equipment, skills and experience will be shared between sites to improve site restoration across our estate.

The strategies underpinning Site Restoration are:

Decommissioning: To deliver Site End States as soon as reasonably practicable with a progressive reduction of risk and hazard.

Land Quality Management: To ensure that land quality is managed to protect people and the environment.

Site End States: To define credible objectives for the restoration of each site (or part of a site).

3.1.1 Decommissioning

Objective:

To deliver Site End States as soon as reasonably practicable with a progressive reduction of risk and hazard.

Government policy - The Decommissioning of UK's Nuclear Facilities *(ref 6)* states that 'decommissioning operations should be carried out as soon as reasonably practicable taking all relevant factors into account'. These include safety, risk, security, environmental protection, funding, resources, waste management, stakeholder views, skills, socio-economics and sustainability - noting that these align with our *Value Framework*.

The NDA estate includes reactors, chemical plants, research and development facilities, waste processing and fuel fabrication plants, many of which are redundant and all of which will require decommissioning. Some plants date from the 1940s and 1950s, such as the Legacy Ponds and Silos at Sellafield. These are deteriorating and contain significant quantities of corroding radioactive waste, presenting our highest risk and our greatest decommissioning challenge.

Legacy Ponds and Silos

Legacy Ponds and Silos comprise four main plants at Sellafield which were used historically to prepare fuel for reprocessing or to store waste. Radioactive materials have accumulated and remain since operations ended. Over five decades the plant conditions have deteriorated and there is now increased urgency to reduce the risk they pose. The facilities were not originally designed with decommissioning in mind so innovative technology is being used to retrieve the radioactive material for storage in modern containment facilities. Retrieved waste will be managed in accordance with our Integrated Waste Management Strategy.

The Pile Fuel Storage Pond at Sellafield

Our Strategy

We will decommission our sites as soon as reasonably practicable, but case-specific decisions will be made on when and how this is achieved. Decisions will take account of lifecycle risk to people and the environment, and other relevant factors to determine whether continuous or deferred decommissioning is the most appropriate strategic option:

See p38

- **continuous decommissioning** commences at the end of operations and continues until final demolition of the plant/facility/installation
- **deferred decommissioning** comprises one or more periods when the plant/facility/installation is purposely kept in a state of *Care and Maintenance* as part of the programme for achieving the Site End State.

Both options have been shown by the *Strategic Environmental Assessment (SEA) (ref 3)* to offer long-term environmental benefits with continuous decommissioning potentially providing the greatest benefit. Where risk is the dominant relevant factor our priority will be to continuously decommission until the risk is at least tolerable. This risk management approach applies to Legacy Ponds and Silos at Sellafield which represent an intolerable risk for the estate and are therefore our top decommissioning priority.

See p59

We will manage the condition of our plants and facilities to ensure that currently *tolerable risks* do not increase to become *intolerable* and that all risks are kept *As Low As Reasonably Practicable (ALARP)*.

Beyond the options for deferred or continuous decommissioning there are two strategic sub-options for managing the products of decommissioning: leaving parts of a facility in place and regarding them as having been disposed of (in-situ) or removing them for disposal elsewhere (ex-situ). Further discussion on the in-situ and ex-situ sub-options can be found in the SEA.

Our approach to decommissioning is influenced strongly by the *Waste Hierarchy* and the products of decommissioning will be managed in accordance with our **Integrated Waste Management Strategy**, including the segregation, treatment, conditioning and packaging of wastes. Conversely, the timing and method of decommissioning will influence our waste management requirements such as waste processing, interim storage, waste treatment routes and the need for storage and disposal facilities.The two strategies are highly interdependent.

To reduce risk and hazard we will define and use Interim States. These are natural milestones and decision points in the site restoration programme that lead us towards achieving a Site End State. Decommissioning may give rise to Interim States where risk or hazard has been reduced to achieve a more stable condition.

Our **Asset Management Strategy** is a key enabler, designed to ensure that the long-term net level of risk posed by our estate does not increase.

Development

This strategy is in development. We have engaged with *Site Licence Companies (SLCs)* and Regulators, and explored national and international experience and good practice. We have reviewed our findings against NDA requirements and will work to further underpin the strategic options and sub-options. We will develop a comprehensive and consistent set of relevant factors for consideration during decision-making, and will ensure that the rationale behind any decision is clear. Work is also needed to capture the circumstances and conditions that may trigger the review of a strategic option, which may lead to a change from continuous to deferred decommissioning, or vice versa.

To support the SLCs in implementing this strategy we are developing estate-wide good practice guiding principles. These principles and the relevant factors inform and guide option selection when SLCs are planning their decommissioning activities and preparing *Lifetime Plans (ref 5)*.

Delivery

Our current planned decommissioning strategies are embedded in the *Lifetime Plans (ref 5)* being delivered by our SLCs, for example deferred decommissioning of the Magnox reactors. The assessment of options and sub-options at site level must take account of impacts on the Site End State and potential restrictions on future land use. The decommissioning objectives and Site End State for each site are given in Appendix C.

We will continue to review SLC decommissioning plans to ensure they remain aligned with our strategy, deliver value for money and do not compromise the ability of future generations to meet their own needs, or other liability holders to deliver their plans, such as MoD or EDF Energy. To aid restoration we will ensure that our SLCs characterise their plants or facilities before they commence decommissioning.

We will commence *Post Operational Clean Out* (POCO) on cessation of operations in order to deliver efficient and effective decommissioning, unless exceptional circumstances justify deferral.

3.1.2 Land Quality Management

Objective:

To ensure that land quality is managed to protect people and the environment.

Land quality management involves managing risks to people and the environment from radioactive and non-radioactive contamination in ground and groundwater. Each of our sites has some contamination as a result of various land uses, not all of which are associated with nuclear operations. Sellafield is by far the biggest challenge.

The NDA Strategy (2006) *(ref 1)* focused on accelerating the *characterisation of land* and developing fully costed and robust long-term management plans. That approach has been applied and all SLCs now have an improved model of land quality and have developed or are developing land quality management plans.

Our challenge now is to demonstrate that risks are being managed appropriately and to prevent them from increasing as a consequence of, for example, the migration of contamination. We must also determine the most appropriate way to manage large volumes of lightly contaminated material that represent a significant liability for the NDA. The volume of ground estimated to be radioactively contaminated is around ten times greater than the *Low Level Waste (LLW)* disposal capacity currently planned for the UK.

Our Strategy

See p38

The first principle of the *Waste Hierarchy*, described in the **Integrated Waste Management Strategy**, is to prevent waste creation wherever possible. It follows that the first rule of land quality management is to prevent the contamination of ground and groundwater - prevention is better than cure. This applies throughout the lifetime of a site from facility design, through asset management to decommissioning, by avoiding new land contamination and controlling sources that already exist. However, we recognise that leaks and spills have occurred in the past. It is essential we fully understand the problem through effective characterisation to further reduce uncertainty in site plans for managing land quality and to ensure that remedial action is proportionate to risk, now and in the future.

Risk to people and the environment is our primary and enduring consideration in deciding how to manage land contamination. How we manage this risk depends on the nature, extent and likely behaviour of any contamination and therefore requires a case-specific assessment. Our strategy is to employ early risk-based decision-making.

At higher levels of risk there is less flexibility in the way we manage land quality; the decision is driven by the need to reduce risk. Action will be taken as soon as reasonably practicable to minimise the time at risk.

It is essential to predict if and how risk will change with time. At lower levels of risk, it may be better to intervene promptly to prevent the problem worsening and becoming more difficult and costly to resolve. For some areas of contamination the risk will decrease with time as a consequence of naturally occurring physical, chemical and biological processes. In these cases, it might be appropriate to leave the contamination where it is and make use of a process called *Monitored Natural Attenuation* rather than intervene.

As levels of risk decrease, the *Waste Hierarchy* has greater influence on decisions about how best to manage land quality. In this context, our strategy is to maximise re-use of material and minimise the volume being excavated and disposed of as waste. Furthermore, the SEA identified that detrimental effects of land quality management are mainly associated with ex-situ solutions where the first step is to extract the contaminated material from the ground prior to treatment for re-use or disposal. Therefore, because intervention may do more harm than good, there may be situations where it is preferable to manage contamination in-situ. This could involve controlling contamination or using in-situ remediation techniques including *Monitored Natural Attenuation* to restore the land. We will explore opportunities for managing contamination in-situ while still achieving the level of restoration required for the Site End State and to release land for other uses.

Development

See p57

This strategy is in development. To justify our approach to land quality management and build stakeholder confidence, it is important that we demonstrate our understanding of site conditions and the level of risk posed by land contamination. Consequently, we focus on two key areas of work. Firstly, we are revising our instructions to SLCs on the reporting of land quality and the associated management plan (including an input to the

See p38

Integrated Waste Management Strategy).

Secondly, as part of our strategic R&D programme (see **Research & Development Strategy**), we are working with key stakeholders to develop a consistent approach to risk assessment for radioactive and non-radioactive land contamination. This builds on existing methodologies and incorporates relevant national and international standards. In time, we intend that this development work will be referenced in our instructions to SLCs.

Delivery

See p63

SLCs will deliver the strategy through early appraisal of options for managing land quality on a case-specific basis, referring to established good practice and guidance. Decisions must be fully underpinned by a sound understanding of the problem to ensure action is timely and proportionate to risk. The options appraisal will take account of technical feasibility and lifecycle impacts on people and the environment, including appropriate application of the *Waste Hierarchy*. The resulting site land quality management plans will also accommodate the influence of other strategies and site activities. For example, assessing options for managing land contamination must take account of impacts on the Site End State and potential restrictions on future land use.

While options are being appraised, SLCs will continue to monitor land contamination and maintain fit for purpose records of land quality (see **Information and Knowledge Management Strategy**).

To ensure consistency in strategy delivery we convene regular meetings of land quality management experts from the nuclear industry. These meetings provide an opportunity for the NDA, SLCs and representatives from other nuclear operators such as the MoD, EDF Energy and the Atomic Weapons Establishment (AWE) to share lessons learned. They also explore common research requirements (acting as a subgroup to the *Nuclear Waste Research Forum*), examine potential shared solutions, discuss requirements for skills development and, where appropriate, arrange training workshops.

3.1.3 Site End States

Objective:

To define credible objectives for the restoration of each site (or part of a site).

The NDA owns significant quantities of land, of which around one quarter is *designated*, i.e. land that has been assigned by the Government to us for restoration. As part of our responsibilities to Government, we are required to describe the condition to which designated land and its associated structures and infrastructure need to be restored. This is known as the Site End State, and we must take all steps that we consider appropriate to achieve it. A Site End State defines objectives for ongoing management of structures, infrastructure and land quality as well as having implications for the management of waste, spent fuels and nuclear materials arising from operations and site restoration activities.

See p52

The vast majority of our designated land is also licensed for nuclear use, operating under a *nuclear site licence,* which is one possible form of *institutional control*. Our land holdings that are not designated are considered under the **Land and Property Management Strategy.**

See p52

Our sites are also subject to regulatory control, which requires the protection of people and the environment.

In this context, the Site End State could range from:

- relying on *institutional controls* (rather than site restoration to manage risks to people and the environment) to;
- cleaning up every trace of a site's industrial use.

Once a Site End State has been achieved and the land has ceased to be designated it will then be managed according to our **Land and Property Management Strategy.**

The NDA Strategy (2006) *(ref 1)* introduced our plan to review Site End States via stakeholder consultation. The outcomes of this exercise have been embedded in site *Lifetime Plans (ref 5)* to establish direction of travel and ensure completeness of scope for site restoration.

Although it is helpful to assume an end use when defining a Site End State, we only have responsibility for determining the latter. The end use will be defined by the next land owner in accordance with the planning regime, incorporating consultation with stakeholders as appropriate.

Our Strategy

Our strategy is to employ pragmatic, risk-based restoration objectives that balance the benefits and potential detriments of restoration. Accordingly, our preference is to restore our sites to a condition suitable for their next planned use (in line with relevant planning requirements) or their probable future use(s) where restoration occurs before the next use is planned. This ensures that the level of intervention (taking account of the cost, energy use, risk to workers and disturbance of habitats) and the volume of waste generated are appropriate to meet the requirements of a site's selected end use. This strategy is supported by the findings of the SEA.

Where the next planned use does not need a *nuclear site licence*, it may be appropriate to delicense a site and end the licence holder's period of responsibility under the *Nuclear Installations Act 1965 (ref 7)* in accordance with the regulatory framework in place at that time. This is the aspiration for most of our estate.

Where there is a continuing requirement for a *nuclear site licence*, the Site End State will comprise both radioactive and non-radioactive contamination being restored to a condition suitable for the next planned use. We will release land and property in these cases to another responsible nuclear licensee, subject to regulatory approval.

The Site End State that represents the greatest value to the UK taxpayer will be determined by a case-specific assessment; this may vary between sites (and perhaps also within a site) and will carefully balance local and national requirements. In all cases we will not leave unassigned liability to future generations.

For many NDA sites, the Site End State is not programmed to be achieved for many decades. For these sites, fixing a Site End State now could rule out options currently not envisaged or risk pursuing an unsuitable end state. To mitigate this, our preference is to retain flexible Site End State definitions until planning commences for the final stages of restoration. The definitions will be reviewed, in consultation with stakeholders, as decommissioning progresses.

To maintain clarity our strategy is to define Interim States as natural milestones and decision points in the site restoration programmes. These would typically be marked by a stepped reduction in risk or hazard. To demonstrate our enduring commitment to site restoration, each Interim State definition will include a position on the work still required to achieve the Site End State.

Development

Site End States have been defined for each of our sites and they will remain under review as decommissioning progresses. The strategy for Interim States and a graded approach to site restoration is under development.

We will work with SLCs and other key stakeholders to define Interim States for each of our sites and incorporate these in contracts as appropriate. We will also explore opportunities for early re-use of a site, or part of a site, as advised by our **Land and Property Management Strategy.** This means that part of a site could be released for re-use while other areas of the site continue to be restored.

See p52

Site End States will be reviewed carefully in order to maintain stakeholder confidence and avoid wasting resource and destabilising site *Lifetime Plans (ref 5)*. Preliminary discussions with stakeholders have indicated that full reviews should only take place if and when required. Examples of events that might trigger the review of a Site End State include changes in climate or environment; changes in policy, regulations, health protection advice or regional strategies; advances in technology; debates around industrial heritage; changes in use of neighbouring land; on-site solutions for waste management; changes in the desires of a community through generations; and improved understanding of the end use and current site condition. Some stakeholders are particularly interested in the potential impact of the UK's new reactor programme on Site End States.

To delicense a site, the regulatory framework requires proof that radioactive contamination is reduced to a level suitable for any foreseeable future use. We will discuss the implications of this with Government and Regulators as part of ongoing dialogue about proportionate restoration and regulation. This will include looking at the use of institutional controls to manage residual radioactive and non-radioactive contamination. In particular we will look at the role of record keeping and paper-based controls such as those used under the planning regime.

In accordance with our strategy of restoring sites to a condition suitable for their next planned use, site *Lifetime Plans (ref 5)* do not anticipate the preservation of our facilities for the benefit of national industrial heritage. However, the preservation of facilities for this purpose will be subject to a case-specific assessment in line with planning policy.

Delivery

Site End State definitions resulting from stakeholder consultation are embedded in site *Lifetime Plans (ref 5)* and will be delivered through existing contracts with SLCs. To achieve the Site End State we will need to integrate our work with that of our tenants and other liability holders who have assets on our sites. SLCs will advise when a review of the Site End State is required, based on an assessment of risks and opportunities and the opinions of other stakeholders including the NDA.

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See p58

Interim and Site End States have particular potential to affect the local community and local authority development plans, for example in terms of employment and skills retention. This emphasises the need for ongoing stakeholder engagement which is covered in our **Public and Stakeholder Engagement and Communications Strategy** and **People Strategy (incorporating Skills and Capability).**

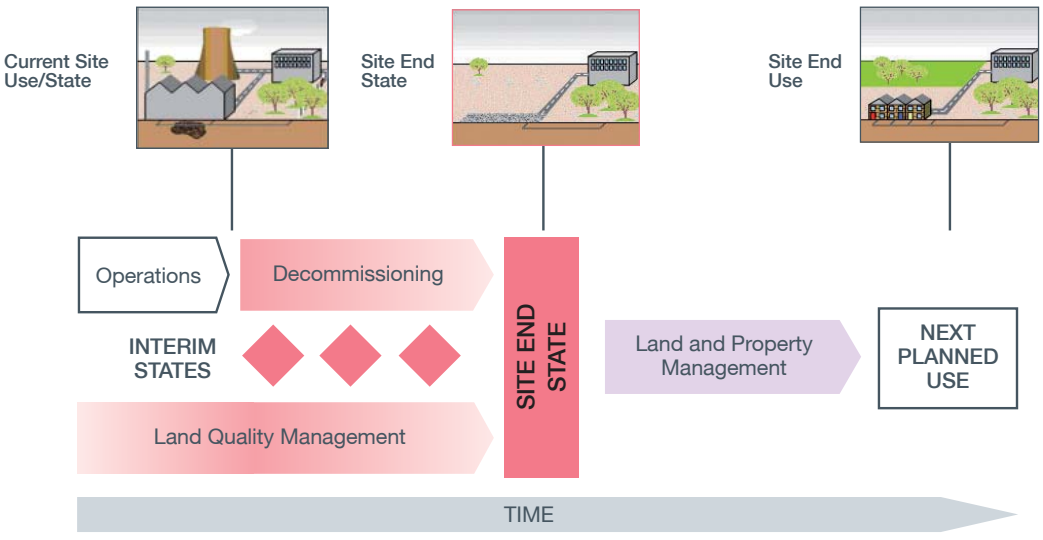
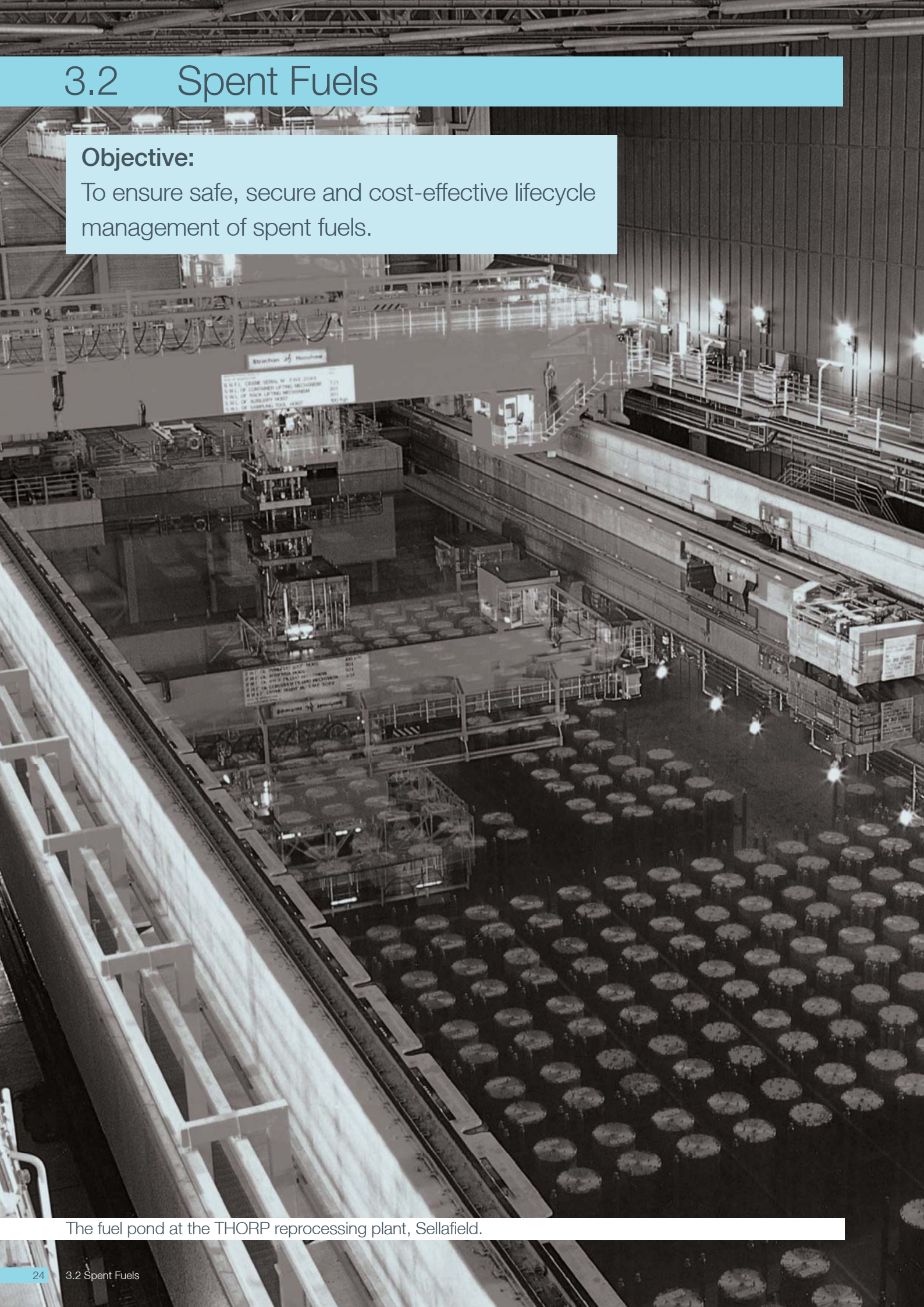


Figure 4 - A representation of a site's progress from current use through site restoration to its next planned use.

3.2 Spent Fuels

Objective:
To ensure safe, secure and cost-effective lifecycle management of spent fuels.



The fuel pond at the THORP reprocessing plant, Sellafield.

3.2 Spent Fuels

The NDA inventory of spent nuclear fuels is diverse and consists of large quantities of Magnox and oxide fuels with smaller quantities of non-standard fuel types which we refer to as 'exotic fuels'.

Historically the UK's approach has been to reprocess spent fuel, but the facilities for this are ageing or, in some cases, shut down. Some of the facilities have been operated on a commercial basis. The majority of the NDA's direct income comes from the provision of spent fuel management services including a number of contractual commitments to reprocess utility customers' spent fuel.

UK Government policy states that spent fuel management is a matter for the commercial judgement of its owners, subject to meeting the necessary regulatory requirements.

We manage spent fuels appropriately to avoid creating legacies for future generations, similar to those we inherited. Managing our spent fuels effectively is essential to enable us to restore our sites and release them for other uses.

Since 2006 we have completed and published a macro-economic study into the options for spent fuel management, and involved stakeholders in its development. We have also set up industry-wide discussion groups to advance strategy development for spent fuels, involving representatives from Government departments and nuclear regulators.

Reprocessing of spent fuels gives rise to authorised liquid and aerial discharges which must be managed in line with the UK discharge strategy commitments (UK Strategy for Radioactive Discharges *(ref 8)*).

Our Strategy

Our strategy is to secure and subsequently implement the most appropriate management approach for Magnox and oxide fuels and, where possible, take advantage of these approaches to manage exotic fuels. Any remaining fuels will continue to be managed on a case-specific basis in a safe and secure manner pending subsequent *disposition.*

All fuels are managed through the following lifecycle phases (see **Figure 5** below) and decision points to secure the optimal management route.

The most cost-effective solutions for Magnox and oxide fuels will include continued and extensive use of our existing reprocessing and storage facilities.

We intend to continue using the oxide, Magnox and, where appropriate, exotic fuels management routes in an integrated way to optimise utilisation of facilities at Sellafield and across our estate.

Where appropriate, we will invest in our spent fuel management capability. In particular, we will continue to invest in developing contingency and alternative options in the event that reprocessing or long-term fuel storage management capabilities are not available. This will enable us to make fully informed investment decisions for optimising spent fuel management as required in the near future.

If approached by third parties to provide additional spent fuel management services, we will discuss the options with UK Government.

With UK Government agreement we will, if requested, supply advice and information to utilities involved in the UK's new reactor programme, on a commercial basis.

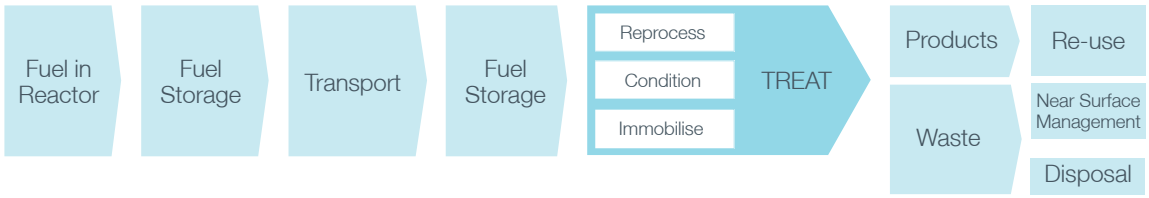


Figure 5 - Value chain for spent fuel management from reactor to final re-use, near surface management or disposal.

The strategies underpinning Spent Fuels are:
Spent Magnox Fuel: To ensure the safe management then ultimate *disposition* of spent Magnox fuel.
Spent Oxide Fuel: To ensure receipt, safe management and ultimate disposition of UK owned oxide fuel and optimise the management of overseas owned oxide fuel held in the UK.
Spent Exotic Fuels: To ensure that all exotic fuels are managed in a safe and secure way for the lifetime of the fuel.

3.2.1 Spent Magnox Fuel

Objective:

To ensure the safe management then ultimate disposition of spent Magnox fuel.

Magnox reactors were the first generation of commercial nuclear power stations to operate in the UK, and responsibility for their decommissioning was transferred to the NDA in April 2005. Of the 26 Magnox reactors owned by the NDA, four are currently operational and 22 are in various stages of decommissioning. Prior to decommissioning, spent fuel is removed from the reactor cores resulting in a significant reduction in radioactivity and hazard at the reactor sites. The spent fuel is dispatched to Sellafield for reprocessing.

Reprocessing of Magnox spent fuel, where the fuel is separated into uranium, plutonium and waste, has taken place for over 50 years. Over 90% of the lifetime arisings of Magnox fuel have already been reprocessed in accordance with UK Government policy.

Our Strategy

Our strategy is to reprocess all spent Magnox fuels in line with the Magnox Operating Programme (MOP) *(ref 9)*. Presently reprocessing is the only accepted technology for managing spent Magnox fuel.

Delivery of the MOP requires consistently high performance of reactor stations, transport infrastructure and the ageing reprocessing facilities at Sellafield. We recognise that there are inherent technical and engineering issues, which may lead to gradual loss of performance or sudden, acute failure. If realised, these risks may result in the MOP extending and additional costs being incurred. This could compromise our ability to reprocess Magnox spent fuels as planned. We therefore aim to complete the MOP as soon as reasonably practicable.

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To minimise the potential impact of these issues we will continue to invest in existing infrastructure and maintain Sellafield's capability to reprocess Magnox fuel, including asset management to optimise performance. We will continue to monitor performance and plant condition closely.

We will also continue to invest in the development of contingency options so that if the completion of reprocessing is not possible we will be able to manage spent Magnox fuel safely.

Extended electricity generation at Magnox stations has very limited impact on total spent fuel quantities (less than 2.5% of total remaining inventory). We will look to utilise the last of the Magnox fuel to generate electricity, as described in the **Business Optimisation** theme.

Development

This strategy is well established. However, we will continue to monitor delivery of the MOP and assess the implications of any gradual or acute loss of performance should it arise. If this analysis indicates that the integrity of the Magnox strategy is challenged we will work with SLCs to make improvements.

Contingency options will continue to be researched and developed. These currently comprise:

– drying of wetted fuel and interim storage, followed by disposal

– interim storage of dry fuel (not previously wetted), followed by disposal

– wet storage of fuel and conditioning, followed by disposal

– reprocessing in existing facilities (following modification)

– reprocessing in new facilities.

We aim to complete an analysis of contingency options by the end of 2012.

Delivery

In the NDA Strategy (2006) *(ref 1)* we included a milestone to complete Magnox reprocessing commitments by 2012. This has not been possible and we are now aiming to complete the MOP *(ref 9)* around 2016. The factors that have contributed to the extension of reprocessing are varied and include technical and operational difficulties at reactor sites and Sellafield.

In the event of an irrecoverable failure it will be necessary to manage the remaining un-reprocessed fuel. Depending on the circumstances leading to failure, possible options include extending the period of fuel storage in nuclear reactor cores and in ponds at Magnox stations and Sellafield. Fuel under water in ponds is susceptible to corrosion, so we will invest in dry storage technologies and continue to explore options to dispose of any spent Magnox fuel not reprocessed. In parallel, we will continue to progress R&D that will improve our knowledge of the feasibility and practicality of interim wet storage of Magnox fuel. By pursuing a variety of interim wet and dry storage approaches for Magnox spent fuel it is our intention to have a diverse range of strategic options to call upon should reprocessing capacity be unavailable.

Magnox fuel flask transportation at Hinkley Point A.

3.2.2 Spent Oxide Fuel

Objective:

To ensure receipt, safe management and ultimate disposition of UK owned oxide fuel and optimise the management of overseas owned oxide fuel held in the UK.

Oxide fuel is used in Advanced Gas-Cooled Reactors (AGR) operated by EDF Energy in the UK, and in Light Water Reactors (LWR) operated by numerous utilities throughout the world. Oxide fuel is reprocessed in the Thermal Oxide Reprocessing Plant (THORP) at Sellafield, which started operation in the 1990s.

When the NDA took over the UK's nuclear liabilities, it inherited from BNFL a range of spent fuel management contracts with domestic and overseas customers.

We are contractually committed to receive and manage all spent fuel arising from the seven EDF Energy AGR power stations in England and Scotland. About half of this fuel is under contract for reprocessing, while it is the NDA's decision to reprocess or directly dispose of the remainder.

We are also contracted to reprocess overseas LWR fuel that has been received and is being stored at Sellafield, returning products and any associated wastes to customers, in line with contractual commitments.

Our Strategy

Our present strategy is to complete the LWR and AGR reprocessing contracts as soon as reasonably practicable and cease reprocessing at THORP.

We plan to place into long-term storage at Sellafield any fuel not reprocessed pending disposal, including future arisings of AGR fuel. We expect storage to be needed for many decades before the fuel can be packaged and sent to a Geological Disposal Facility (GDF), so placing such fuel into long-term storage will not foreclose future options for managing spent fuel, including the option to reprocess.

We believe that pursuing the present strategy is the right approach until the optimal amount of fuel to reprocess can be determined, which is currently being assessed. This aligns with both UK Government policy to honour the overseas fuel contracts and our obligations to be able to regularly receive AGR spent fuel at Sellafield to support continued electricity generation.

There are a number of options for how much spent fuel we reprocess and therefore when we cease reprocessing at THORP. The optimal amount of fuel to reprocess will be influenced by a number of factors including, for example, UK Government policy, our commercial contracts and obligations, the condition of our reprocessing infrastructure and the availability of the options for safe long-term spent fuel management and storage.

When we have completed our study into the most cost-effective lifecycle management option we will then adopt that option.

If we are approached by third parties to provide additional spent oxide fuel management services, we will review and discuss the options with UK Government.

With the agreement of UK Government we will, if requested, supply advice and information to third parties, including utilities involved in the UK's new reactor programme, on a commercial basis.

Development

Our present strategy to reprocess oxide fuel is being implemented. In moving forward, the key objective is to determine how much AGR fuel should be reprocessed and thus the most appropriate time to stop oxide fuel reprocessing.

Through appropriate R&D we will develop spent fuel storage options and continue to evaluate how spent fuel should be safely and cost-effectively stored in the long-term at Sellafield.

Current emphasis is on enabling a transition away from reprocessing to wet storage in due course.

We will complete our credible options study during 2011 and aim to identify the preferred strategic option by the end of 2012.

We plan to engage with stakeholders on the options for the future management of spent oxide fuel due to the importance of this strategy to many stakeholders and its relevance to national policies and the role of the nuclear industry within the UK.

We will develop a business case for continued reprocessing at THORP in the event that long-term storage options such as wet or dry storage of AGR fuel are not viable.

Delivery

In the NDA Strategy (2006) *(ref 1)* we aimed to complete THORP reprocessing commitments in around 2010. This was not possible because of the cumulative effect of several failures at the THORP reprocessing and supporting facilities with the resulting loss of throughput. The latest estimate for completing reprocessing against our existing contracts is significantly later, although this relies on the continued successful operation of the reprocessing infrastructure. As the supporting infrastructure nears the end of its life the completion of THORP reprocessing may continue to extend.

We must maintain the capability of Sellafield to receive and manage spent fuel from EDF Energy and work with them to accommodate their strategy for operating and decommissioning AGR power stations.

Upon arrival at the Sellafield site, fuel flasks are received into the THORP storage area.

3.2.3 Spent Exotic Fuels

Objective:

To ensure that all exotic fuels are managed in a safe and secure way for the lifetime of the fuel.

In addition to bulk Magnox and oxide fuels, the NDA manages a smaller inventory of approximately 500 tonnes of non-standard fuels, commonly referred to as 'exotics'. Although smaller in quantity than our bulk fuels, exotics present their own particular management challenges due to their diverse properties.

These fuels, include metallic, oxide and carbide materials, and are a legacy from earlier nuclear industry activities such as the development of research, experimental or prototype reactors. Although exotics often share the physical characteristics and properties of Magnox and oxide fuel, their composition and enrichment is varied.

Examples of exotic fuel types include:

- Dounreay Fast Reactor (DFR) breeder material
- Dounreay Prototype Fast Reactor (PFR) spent fuel
- DRAGON reactor fuel at Harwell
- Steam Generating Heavy Water Reactor (SGHWR) spent fuel at Sellafield
- carbide fuels
- High Enriched Uranium (HEU) fuels.

A number of facilities exist across the NDA estate that could potentially be used to manage some exotic fuels. There is an additional requirement on us to safely and securely protect MoD fuel stored on our sites.

Our Strategy

We will treat exotic fuels to achieve a final *disposition* form as soon as reasonably practicable. This may entail reprocessing, conditioning or immobilisation, as appropriate. The disposition forms will then be stored prior to re-use or consignment to a disposal facility.

We will ensure the continued safe management of these fuels, maximising opportunities to use existing facilities where value to the UK taxpayer can be secured. This may involve consolidating material at one or more locations for storage and treatment, and storage may be needed for several decades.

Development

This strategy is under development. Since the NDA Strategy (2006) *(ref 1)* we have been looking at the best ways to safely manage exotic fuels. We plan to accelerate our efforts to optimise the management of all exotic fuels consistent with the capability of our estate infrastructure.

Having characterised individual fuel types and arranged them in groupings according to their properties, we are now developing business cases for the management of each fuel group. These business cases will determine our future management strategy for each exotic fuel and our aim is to align the exotic fuel families with other strategies, specifically those for oxides, Magnox, uranics, plutonium and Higher Activity Waste (HAW).

It will not be possible to reprocess many of these exotic fuels using existing facilities, and so alternative management options are being developed. Many of these management options appear to be limited by technical constraints. The challenge for this strategy is the current lack of technical underpinning for the options to manage many of the exotic fuels. For each option we are working to better understand these technical issues (e.g. corrosion resistance and fuel behaviour during reprocessing) alongside the security, safeguards and transport arrangements.

There is a potential benefit to the UK taxpayer if MoD *irradiated fuels* and NDA exotic fuels can be managed together. We will discuss possible synergies with UK Government and investigate implementing an optimised solution.

Delivery

The exotics inventory is being safely and securely stored at NDA sites while strategic management options are being developed.

Once a strategy for each exotic fuel has been developed and underpinned it will be implemented by the appropriate SLC. We will engage and communicate with all relevant stakeholders before finalising our strategic decisions and implementing them.

Inside the Breeder Removal Facility at the Dounreay Fast Reactor.

3.3 Nuclear Materials

Objective:

To ensure safe, secure and cost-effective lifecycle management of our nuclear materials.

Sellafield MOX Plant (SMP) fuel store.

3.3 Nuclear Materials

The UK holds large stocks of civil uranium and plutonium, much of which is managed by the NDA. All of the plutonium and most of the uranium in the UK arises from the reprocessing of spent fuel and some of these nuclear materials are foreign owned.

Foreign owned nuclear materials remain the responsibility of the owners and will be managed in accordance with UK Government policy, contractual obligations and customer requirements.

For UK owned plutonium the current policy is safe and secure storage. UK Government is considering the longer term options for plutonium, the outcome of which will determine our future strategy. We also continue to store our uranics inventory safely and securely. Future management options may be informed by international developments in the secure management of these materials.

Since the NDA Strategy (2006) *(ref 1)* we have completed and published a macro-economic study into the range of options for nuclear materials. We involved stakeholders in its development and also prepared our nuclear materials credible options analyses. We will continue to engage with Regulators, UK Government and Devolved Administrations to discuss and test our strategy development and also work closely with the SLCs to achieve fit for purpose, deliverable solutions.

Our Strategy

Our strategy for the management of nuclear materials reflects the current UK Government policy of safe and secure storage. We are developing options which consider alternative lifecycle management solutions.

Some of our nuclear materials have value in today's market. The rest of the inventory may increase in value in the future. Our strategy for these materials is therefore to maximise value and avoid foreclosing any future options unless there is a hazard management priority.

The nuclear materials inventory is stored safely and securely on several sites across the NDA estate. We will consider whether consolidated storage is more appropriate for reasons of security and economy and consider other nuclear material owners in developing our plans.

We will support UK Government as it determines future policy on plutonium and we will subsequently deliver appropriate strategies. This includes R&D work to technically underpin the options.

Our strategy for material owned by third parties is to continue its management in accordance with contractual obligations and UK Government policy.

The strategies underpinning Nuclear Materials are:
Plutonium: To ensure safe, secure and cost-effective lifecycle management of plutonium stocks.
Uranics: To ensure safe, secure management of our uranics inventory.

3.3.1 Plutonium

Objective:

To ensure safe, secure and cost-effective lifecycle management of plutonium stocks.

UK stocks of civil plutonium (c.100 tonnes) have arisen from reprocessing of spent nuclear fuel and will continue to grow for as long as we continue to reprocess. Most civil plutonium in the UK is owned by the NDA, with smaller quantities owned by EDF Energy and foreign utilities, and is located at Sellafield and Dounreay.

The current UK policy for plutonium is safe and secure storage. UK Government is considering the longer term options for plutonium, but even if a revised policy emerges in the near future, storage will still be required for many decades.

Our stocks of plutonium are contained in custom-built facilities that ensure safe and secure storage. Some material is held in ageing stores that are approaching the end of their planned life and consequently we have delivered our plan for a new state-of-the-art plutonium storage facility, known as the Sellafield Product and Residue Store (SPRS).

UK Government policy states that foreign owned nuclear materials remain the responsibility of the owners. The purpose of the Sellafield MOX Plant (SMP) is to convert foreign owned plutonium to MOX fuel to facilitate *repatriation*.

In 2008 we published our plutonium credible options study and presented this to the UK Government.

Our Strategy

In line with policy, our strategy is to ensure that plutonium in the UK continues to be safely and securely managed. We have provided assessments to the UK Government on the three credible options for managing plutonium through its lifecycle: re-use in modern nuclear reactors, immobilisation for disposal or long-term storage.

We will respond to any policy decision taken by the UK Government on the future management of UK owned plutonium.

To ensure our plutonium continues to be stored safely and securely in the future we will transfer our plutonium stocks to SPRS or any additional stores which may need to be built.

Development

This strategy is under development. Once UK Government policy on the future management of UK plutonium has been determined, we will work to develop supporting strategies for implementation. In the meantime we are funding R&D to technically underpin the three credible options for managing plutonium through its lifecycle.

We will prepare and evaluate a business case for consolidating storage of plutonium.

Delivery

We have worked with our SLC, Sellafield Limited, to introduce improved management arrangements to reduce costs and complete the new SPRS facility.

Further to our 2010 contract with overseas utilities for its continued use, we will continue to evaluate the performance of the SMP, which has not met original expectations, together with commercial opportunities associated with its role in repatriating foreign owned plutonium.

THORP Product Store

3.3.2 Uranics

Objective:

To ensure safe, secure management of our uranics inventory.

The NDA uranics inventory has arisen largely from UK civil nuclear fuel cycle operations over many decades, and comprises the following groups:

- Magnox Depleted Uranium (MDU), a product of spent Magnox fuel reprocessing
- uranium hexafluoride tails (hex), a by-product of a legacy uranium enrichment process
- THORP Product Uranium (TPU), a product of spent oxide fuel reprocessing
- High Enriched Uranium (HEU) from excess fuel prepared for research reactor development
- a selection of natural and depleted unused uranium as recovered materials from fuel manufacturing processes.

As with plutonium, we are safely and securely storing these materials.

The inventory remains relatively static, although we will add to it for as long as we continue to reprocess oxide and Magnox fuel. A small proportion of the uranics inventory managed by the NDA is owned by EDF Energy, MoD and overseas utilities, and we will manage this material in line with any contractual obligations.

Our Strategy

We will ensure the safe and secure management of UK uranic products while continuing to provide best value for the UK taxpayer.

We will also utilise our existing infrastructure and contract arrangements to manage our uranics in a cost-effective manner.

Owing to the diverse nature of our uranics inventory, the preferred management option will need to be determined on a group-by-group basis. The management options are:

- packaging and continued safe and secure storage
- conditioning to an appropriate waste form for storage, followed by disposal
- re-use e.g. following sale.

We will maximise the value of our uranics by selling them when market conditions are favourable. Whilst there is the option to immobilise any unsold uranics, this would foreclose future options for re-use of this asset and would require large investment in new waste treatment and storage infrastructure. We will therefore consider any unsold inventory as a strategic reserve.

We will reduce the hazard associated with continued hex storage. Subject to NDA estate-wide funding and hazard reduction priorities, we intend to start conversion to a more stable form by 2020 or sooner if practicable.

We will continue to manage third party customers' material in line with contractual obligations and UK Government policy.

Development

This strategy is under development. To further develop our strategic options we will improve our knowledge of the UK owned uranics inventory and carry out focused research and development. This will help us understand its potential for re-use in modern nuclear reactors to secure maximum value from our inventory. In addition, we will establish the disposal requirements for uranic waste forms and develop storage and conditioning technologies for bulk uranics.

In parallel to our strategy to convert hex to a more stable form, we are also exploring other options for the safe management of hex, including long-term storage or sale for re-use.

We are nearing completion of our credible options study for NDA uranics and aim to identify our preferred management options by the end of 2011.

Delivery

To support our strategy of maintaining the uranics inventory as a strategic reserve we are reviewing and, where necessary, improving storage arrangements. For example, we have emptied an ageing uranics store at Chapelcross and placed the contents into more suitable storage at Capenhurst.

We continue to actively pursue a range of commercial opportunities to realise the asset value of our uranics inventory, either separately or as part of broader contract arrangements.

We will also increase our investment in the technical underpinning of long-term uranics management to ensure that any change in scope or acceleration to the *geological disposal* programme can be accommodated.

Our main challenge is to reduce the hazard potential of long-term storage of any remaining hex, in line with stakeholder expectations.

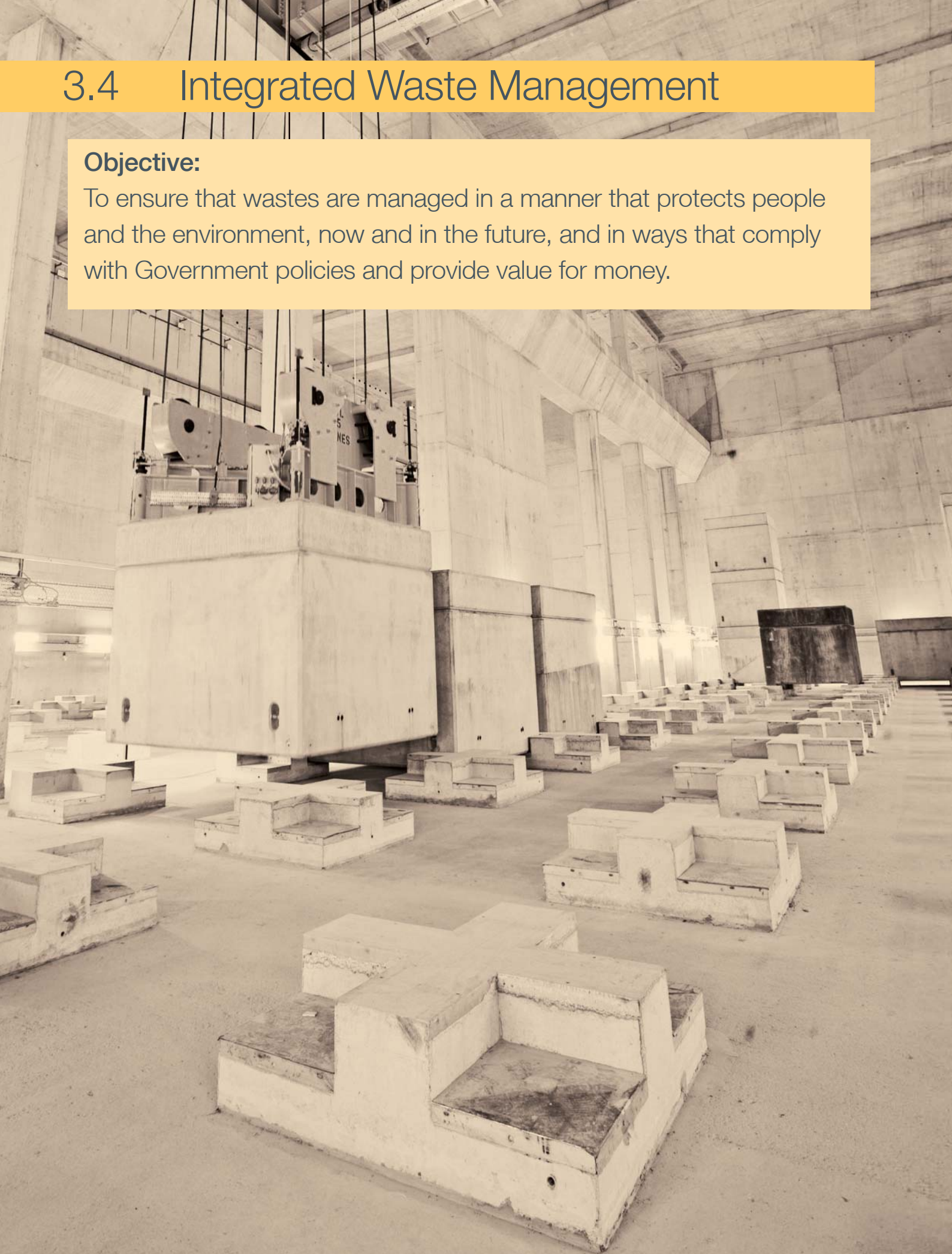
We will continue to manage uranic materials owned by third parties in accordance with contractual obligations and UK Government policy.

Uranic material stored at Capenhurst.

3.4 Integrated Waste Management

Objective:

To ensure that wastes are managed in a manner that protects people and the environment, now and in the future, and in ways that comply with Government policies and provide value for money.



Inside the Intermediate Level Waste store at Trawsfynydd.

3.4 Integrated Waste Management

Nuclear site operations and successful site restoration depend on the availability of suitable waste management routes and facilities. Effective management of both radioactive and non-radioactive waste is essential to the delivery of our mission and is a significant part of our programme.

Waste management is not a straightforward process of retrieval and disposal. It requires a series of steps: pursuing opportunities for waste minimisation, re-use and recycling, waste treatment, packaging, storage, transport and then final disposal where required.

Since publishing our first Strategy our remit on waste has been extended substantially. Government has made us responsible for implementing geological disposal for HAW, except in Scotland where the policy is for long-term management in near surface facilities. In 2010 we delivered the Low Level Radioactive Waste Strategy *(ref 22)* for the whole of the UK's nuclear industry, as required by the Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom, published jointly by the UK, Scottish, Welsh and Northern Ireland Governments in March 2007.

We take a UK-wide view of waste management opportunities, risks and practical developments and have published an overview of Integrated Waste Management on our website *(ref 10)*. We need to ensure that appropriate waste plans are being implemented across our estate. To help with this process we require our sites to deliver an Integrated Waste Strategy setting out their approaches to managing the full range of waste they generate. We also track international developments as a benchmark and collaborate with other countries on waste management opportunities to share good practice.

Background information on quantities and the nature of radioactive waste is available from the UK Radioactive Waste Inventory *(ref 11)*. A UK Radioactive Higher Activity Waste Storage Review has also been published *(ref 12)*.

The strategies underpinning Integrated Waste Management are:

Higher Activity Waste: To treat and package HAW and place it in safe, secure and suitable storage facilities until it can be disposed of, or be held in long-term storage in the case of a proportion of HAW in Scotland.

Low Activity Waste: (Solid Low Level Waste) - To provide capability and capacity for managing solid low level radioactive waste to support our decommissioning and operations and make facilities available to other LLW producers.
(Liquid and Gaseous Discharges) - To reduce the environmental impact of radioactive liquid and gaseous discharges in accordance with the UK Strategy for Radioactive Discharges *(ref 8)*.

Non-Radioactive and Hazardous Waste: To reduce waste generation and optimise management practices for non-radioactive and hazardous wastes at NDA sites.

3.4 Integrated Waste Management contd

Our Strategy

Strategic decisions about waste management are informed by the following key principles:

— *risk* reduction is a priority

— centralised and multi-site approaches should be considered where it may be advantageous

— waste should be minimised

— the *Waste Hierarchy* should be used as a framework for waste management decision making and enables an effective balance of priorities including value for money, affordability, technical maturity and the protection of health, safety, security and the environment.

See p63

We will continue to promote the importance of waste characterisation, improved waste information (see **Information and Knowledge Management Strategy)** and waste segregation to facilitate waste management planning and application of the *Waste Hierarchy*.

See p41

Our **Higher Activity Waste Strategy** is to implement the UK Government's policy of deep geological disposal and the Scottish Government policy for long-term management in near surface facilities. For LLW, disposal will be in fit for purpose facilities that reflect the nature of the wastes to be managed.

Within this overall framework our priority is to achieve risk reduction by dealing with waste in ageing storage facilities (for example legacy facilities at Sellafield) and placing it into safer modern storage conditions.

Diverse radioactive waste management and disposal solutions will be pursued where these offer benefits over previous arrangements. We will also investigate opportunities to share waste management infrastructure across the estate and with other waste producers where we can see benefit. New waste management approaches will often require different transport arrangements and will be a matter of great interest to planning authorities and people living close to the sites involved. We will engage with interested parties from an early stage, irrespective of whether such developments represent new investments proposed by us or by other organisations on our behalf. We will work with key organisations, for example local authorities, to build on the feedback we have received on how this engagement should happen and develop a framework for engagement that provides for useful discussion when considering new waste management initiatives.

We believe there are opportunities for a more flexible approach in the management of waste that is close to category boundaries. For example, *decay storage* of ILW may make the use of LLW treatment and disposal routes feasible. We will consider the role that these opportunities can provide.

We will encourage innovation and open market solutions, and sustain R&D matched to the challenges of waste management both by direct investment and indirectly through the programmes of our SLCs.

The NDA intends to take a multi-site and UK-wide view, to include its own sites and the operations of other waste producers, including EDF Energy* and MoD. We recognise that in future the radioactive waste management landscape will change, particularly as a result of the UK's new reactor programme. With UK Government agreement we will supply advice and information to utilities involved in the programme. This will ensure both an integrated approach to radioactive waste management and that our facilities, some of which support both the civil and defence nuclear industries, can plan effectively for the future.

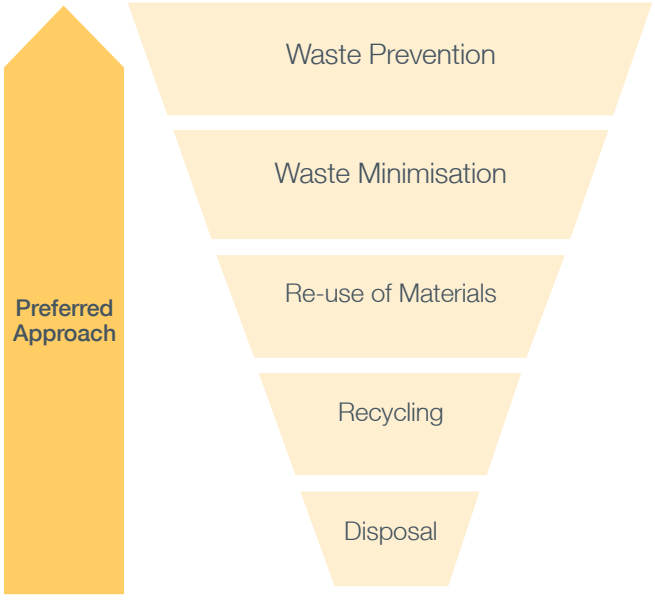


Figure 6 - Summary of the *Waste Hierarchy*

* Formerly British Energy

3.4.1 Higher Activity Waste

Objective:

To treat and package retrieved HAW and place it in safe, secure and suitable storage facilities until it can be disposed of, or be held in long-term storage in the case of a proportion of HAW in Scotland.

HAW includes *High Level Waste (HLW)*, *Intermediate Level Waste (ILW)* and a relatively small amount of LLW that is unsuitable for disposal in the current LLW facility.

HAW arises from a number of activities:

- historical waste storage practices (a significant proportion of HAW inventory is held in legacy facilities at Dounreay and Sellafield)
- management of spent nuclear fuel
- decommissioning (including the production of large quantities of graphite waste)
- research facilities
- reactor operations.

The Government's independent Committee on Radioactive Waste Management (CoRWM) considered a broad range of options for the long-term management of HAW and in 2006 recommended geological disposal supported by safe and secure waste storage arrangements and a programme of underpinning research. The Scottish Government published its Policy Statement and Post-Adoption Strategic Environmental Assessment Statement for higher activity radioactive waste in January 2011. The policy is for the long-term management of higher activity radioactive waste in near-surface facilities.

Since the NDA Strategy (2006) *(ref 1)*, Government has made us responsible for implementing geological disposal for HAW - as set out in Managing Radioactive Waste Safely: a framework for implementing geological disposal *(ref 13).* The waste destined for the GDF arises from a number of waste producers, not just NDA sites.

Our Strategy

Our overarching strategy is to convert the HAW inventory into a form that can be safely and securely stored for many decades. At the appropriate time the stored waste in England and Wales will be transported to and disposed of in the Geological Disposal Facility (GDF). Overseas owned HLW products will be returned to foreign customers under existing contracts.

We will continue to work with the Scottish Government to implement its policy for the long-term management of HAW at our sites in Scotland and expect to have a leading role in the development of the strategy.

Our current priority is to expedite the retrieval of HAW held in ageing facilities and provide safe storage solutions without foreclosing long-term management options.

Development of the GDF is an important part of our strategy for managing HAW in England and Wales. The availability of a GDF is significant for site restoration schedules, although it should be noted that the strategy is supported by a programme of safe and secure interim storage that is capable of accommodating changes to the delivery timescale of the GDF. We are also considering alternative options for some HAW, such as near surface disposal for Reactor Decommissioning Wastes.

Development

Our strategy is mature. However, as we move forward our efforts will focus on realising strategic opportunities, addressing key delivery risks and improving the baseline delivery programme by considering the *Waste Hierarchy* and undertaking supporting R&D activities. We will continue to develop an estate-wide integrated approach to waste management in the following areas of early investigation:

Waste Treatment

We are exploring the possibility of developing alternative waste treatment capabilities that will help to provide a more flexible and cost-effective approach to the management of HAW. The work will help to determine how and where the main opportunities exist and will need to take account of: time of arising, waste volumes, location, storage, transport requirements and disposal. For example, this includes *thermal treatment,* which could lead to benefits such as waste volume reduction. A business case analysis is required to assess the benefits of thermal and other treatment options, which will consider multi-site opportunities.

Waste Storage Consolidation

Until now the approach has been to keep HAW at its site of origin pending geological disposal. Building on the findings reported within the UK HAW Storage

Development contd

Review *(ref 12)*, for some of the inventory we will explore opportunities to share current and planned storage assets to improve value for money, reduce the environmental impact of new store build and impact on decommissioning timescales. Subject to the consideration of transport needs, value for money being demonstrated and detailed engagement with interested parties (especially communities neighbouring the sites where waste could be received), various approaches to waste storage could be adopted across the NDA estate. As part of this programme we will also examine the opportunity for storing some HAW until it becomes LLW by radioactive decay.

Reactor Decommissioning Wastes
Decommissioning of the UK reactor fleet will generate substantial amounts of radioactive waste. A significant proportion of these "reactor decommissioning wastes" will be graphite, other waste includes metal and concrete. We have an ongoing commitment to consider the best way to manage these wastes, as recognised by CoRWM's recommendation 8 and Government's response *(ref 23)*. We are undertaking a programme of work considering the options for the management of reactor graphite. This includes improvements to the current strategy of geological disposal, treatment of graphite waste and alternative disposal options. Our Hunterston A site is currently considering the feasibility of disposal of some graphite wastes that require management in the near term. In addition to addressing a specific requirement at the site, their findings will also inform the NDA's wider strategy for managing reactor graphite. For more information on the Reactor Decommissioning Waste project see our website *(ref 24)*.

Delivery

Our SLCs will continue to package HAW into a form that is suitable for storage and disposal. New storage facilities are being built across the estate to store HAW until the disposal routes become available. Our plans for new and existing stores need to include maintenance programmes, refurbishment and if required, store replacement for the older stores. To support this planning process we are developing industry guidance for longer term storage HAW. The current approach is to immobilise waste and store it in purpose-built facilities. We will continue to support innovation that optimises waste treatment, packaging and storage.

At facilities where our immediate priority is near term risk reduction we are prepared to retrieve wastes and provide containerisation knowing that further waste treatment steps will be necessary prior to disposal. This is in line with our **Decommissioning Strategy.** Our Radioactive Waste Management Directorate (RWMD) will continue to work with SLCs to deliver improvements to this important risk reduction programme.

See p18

We will continue to use vitrification technology to reduce the hazard posed by liquid HLW created by spent fuel reprocessing at Sellafield and repatriation of overseas owned HLW commenced in 2010.

Our Radioactive Waste Management Directorate (RWMD) is responsible for managing the delivery of geological disposal for HAW. It is envisaged that RWMD will evolve into a separate legal entity that will hold a nuclear site licence. Although it is probably many years before a site is selected for the GDF, RWMD is carrying out preparatory work to support our approach to nuclear safety and environmental management. As part of this evolution RWMD has been working with the Regulators to become a prospective Site Licence Company (SLC). RWMD has published the approach to delivery in Geological Disposal: Steps towards implementation *(ref 25)*.

Geological Disposal

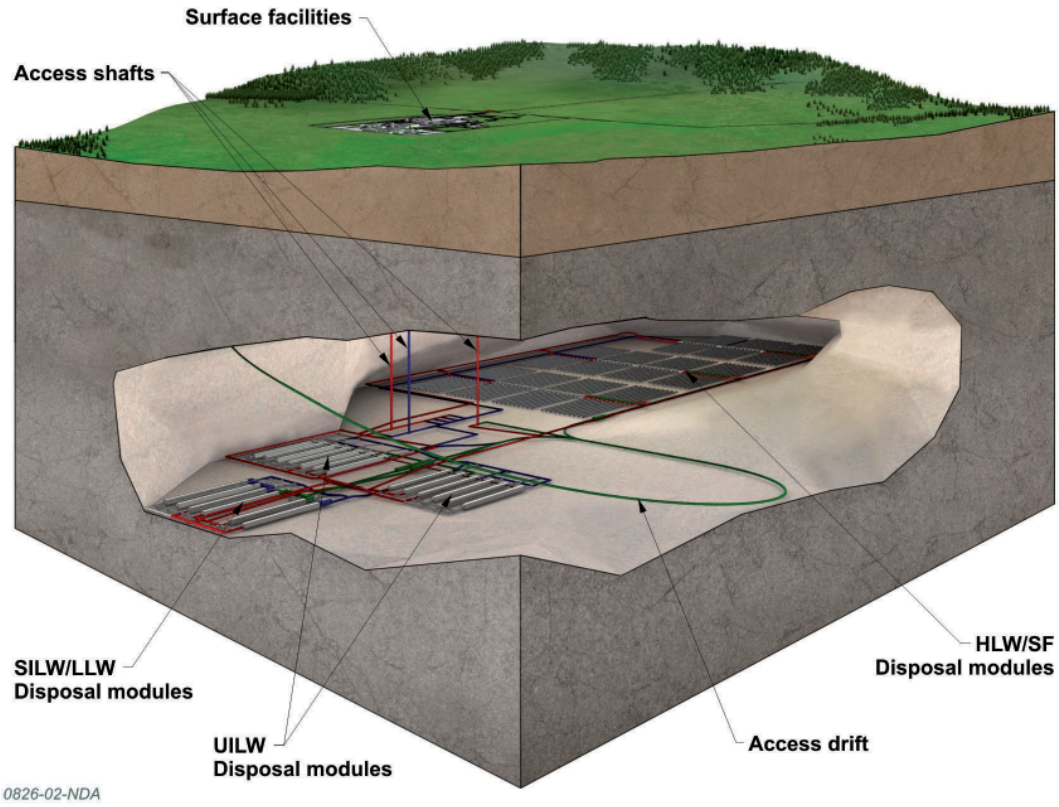


Figure 7 - Illustration of a geological disposal facilty

After working with the public and stakeholders the Committee on Radioactive Waste Management (CoRWM) recommended that the most appropriate approach for the long-term management of higher activity wastes (HAW) is geological disposal. Following further consultation the UK Government and Devolved Administrations for Wales and Northern Ireland set out a framework for delivering geological disposal in the Managing Radioactive Waste Safely (MRWS) White Paper *(ref 13)* covering England and Wales. Delivery will proceed with a voluntarism and partnership approach.

The MRWS White Paper also makes it clear that geological disposal will be coupled with safe and secure interim storage and ongoing research and development to support its optimised implementation. This is because it will take several decades before such a facility will be available to accept waste.

Development of a Geological Disposal Facility requires both a willing local community and a suitable geology.

For more information about the geological disposal facility visit our website: **http://www.nda.gov.uk/stakeholders/newsletter/underground-disposal-plans-outlined.cfm**

3.4.2 Lower Activity Waste

This strategy covers the management of solid LLW and liquid and gaseous discharges from NDA owned sites. The majority of UK LLW is generated by the nuclear industry, with the largest proportion arising at our sites. We also own the UK Low Level Waste Repository (LLWR), a key asset for the management of LLW in the UK.

Solid Low Level Waste

Objective for Solid Low Level Waste:

To provide capability and capacity for managing solid low level radioactive waste to support our decommissioning and operations and make facilities available to other LLW producers.

Solid Low Level Waste
LLW from the nuclear industry is divided into operational and decommissioning waste. Operational LLW arises from routine monitoring and maintenance activities and includes wastes such as plastic, paper, clothing, wood and metallic items. LLW from decommissioning mostly comprises building rubble, soil and various metal, plant and equipment.

In March 2007 the UK Government and Devolved Administrations published their policy for the management of solid low level radioactive waste. This tasked the NDA with producing a strategy for managing solid LLW from the UK nuclear industry, to establish treatment and disposal routes to:

— support past, present and future site restoration activities

— manage the operational LLW that continues to be created by the nuclear industry.

At present the UK's main disposal route for some LLW, and the only facility that can accept a wide range of LLW from the NDA estate and other waste producers, is the LLWR in Cumbria.

Despite the ongoing development of alternatives, such as the new LLW disposal facility at Dounreay, most LLW continues to be consigned to LLWR for disposal. The UK is predicted to generate significantly more LLW than the planned disposal capacity at the LLWR. We believe that the LLWR should be used in the most effective way in order to defer or avoid the need for a replacement. This means there is a need for other effective ways to manage LLW, including better application of the *Waste Hierarchy* and fit for purpose management of Very Low Level Waste (VLLW).

Our Strategy

Our strategy for managing solid LLW, which includes VLLW, is consistent with the UK Nuclear Industry LLW Strategy *(ref 22)*. We believe that implementation of this strategy will provide capability and capacity to manage LLW for many decades. The following provides a brief overview and highlights key aspects of the strategy:

We will ensure the UK's capability and capacity for solid LLW management by applying the *Waste Hierarchy* informed by relevant factors such as safety, the environment, transport, security, sustainability and value for money. By applying the *Waste Hierarchy* we will:

— prevent waste creation

— minimise the amount of LLW we have to manage in order to maximise resource, cost, safety and environmental benefits

— promote re-use to extend the life of resources and defer waste production

— recycle metallic LLW as our preferred way forward

— size reduce waste to ensure best use of disposal capacity

— use disposal capacity sparingly, and as a last resort.

The LLWR is central to our strategy and it is important that we make best use of this facility's remaining capacity. We will reduce disposal volumes by waste prevention, reusing materials and recycling wherever possible. In part, we will achieve this by building on work already underway to improve waste characterisation and inventory data. The availability of better information supports effective waste management decisions and will also enable decisions to be made in a transparent manner. Following application of the *Waste Hierarchy*, for waste that has to be disposed of we will seek use of the most appropriate (and proportionate) disposal option, including diverting waste away from LLWR (more discussion on alternative disposal options is included in the UK Nuclear Industry LLW Strategy *(ref 22)*). We will continually review available and projected capacity for the management of LLW in the UK.

Liquid and Gaseous Discharges

Objective for Liquid and Gaseous Discharges:

To reduce the environmental impact of radioactive liquid and gaseous discharges in accordance with the UK Strategy for Radioactive Discharges *(ref 8).*

Liquid and Gaseous Discharges
Liquid and gaseous discharges are generated by NDA sites during operations and decommissioning. Such discharges are generated at all stages of the nuclear fuel cycle. However, at our sites, discharges are primarily associated with fuel fabrication, spent fuel storage, decommissioning and most significantly spent fuel reprocessing.

In June 2009 the Government published its revised UK Strategy for Radioactive Discharges *(ref 8)* to inform decision making by industry and regulators. This sets out how the UK will implement its obligations, in respect of the OSPAR Radioactive Substances Strategy 2020 intermediate objective[3] *(ref 14)*. We have a significant role in its implementation and consequently do not believe that a separate strategy for the NDA estate is required.

Our Strategy

Liquid and Gaseous Discharges
We require our SLCs to implement the UK Strategy for Radioactive Discharges *(ref 8)* and comply with relevant UK legal requirements. These are driven by the following general principles:

- unnecessary introduction of radioactivity into the environment is undesirable
- sustainable development
- use of Best Available Technique (BAT) in England and Wales and Best Practicable Environmental Option (BPEO) and Best Practicable Means (BPM) in Scotland
- the 'precautionary principle' which allows for decisions to be made in situations where there is evidence of potential harm in the absence of complete scientific proof
- the 'polluter pays' principle where those responsible for producing the waste bear the costs of prevention, control and reduction measures
- the preferred use of 'concentrate and contain' in the management of radioactive waste over 'dilute and disperse' in cases where there would be a definite benefit in reducing environmental pollution.

The UK Strategy for Radioactive Discharges *(ref 8)* includes the anticipated arisings from UK sites in the strategy. The NDA contributed to the development of the strategy including responding to the public consultation. Spent fuel reprocessing is a significant factor in the delivery of the UK Strategy for Radioactive Discharges *(ref 8)*. It is important that we monitor our ability to achieve this delivery in the light of developing strategy and operational performance. Should issues arise that threaten our ability to deliver, we will need to engage with Government and other stakeholders early to determine the appropriate way forward.

[3] By the year 2020, the OSPAR Commission will ensure that discharges, emissions and losses of radioactive substances are reduced to levels where the additional concentrations in the marine environment above historic levels, resulting from such discharges, emissions and losses, are close to zero.

3.4.2 Lower Activity Waste contd

Solid Low Level Waste and Liquid and Gaseous Discharges

Development

The strategy for LAW is mature. In future, the focus of our efforts will be on implementing this strategy and monitoring its integrity.

LLW Repository Limited is undertaking a detailed assessment of the full potential of the site. This work will determine whether the planned capacity can be expanded to take operations well beyond the current 2080 projected end date.

Delivery

Since the NDA Strategy (2006) *(ref 1)* we have successfully competed the management of the LLWR. In doing this we introduced a broader remit to support the development and implementation of the Lower Activity Waste Strategy. We are now working closely with LLW Repository Limited as our strategic delivery partner to enhance its UK-wide LLW management role.

See p20

LLW Repository Limited will play a central role in the implementation of this strategy. It is also expanding its services to include metal decontamination and recycling, incineration and alternative disposal routes for VLLW. A team has been established to help consignors make best use of these additional services, and extra storage capacity has been constructed at the repository site (Vault 9). These initiatives will help us manage LLW in a more sustainable way and reduce reliance on disposal.

Solid LLW and liquid and gaseous discharges must be managed alongside other radioactive wastes and *Directive wastes* on a nuclear site. We also need to recognise the potential for significant waste volumes to arise from managing contaminated ground and groundwater (see **Land Quality Management Strategy**).

Waste management decisions remain the responsibility of the SLCs, in accordance with the regulatory framework. This requires robust decision making based on a wide range of criteria, informed by UK policy and strategy. Outcomes of such decisions will be captured in site level Integrated Waste Strategies, developed by the SLCs.

Scrap reinforcing bars from demolition available for recycling.

3.4.3 Non-Radioactive and Hazardous Waste

Objective

To reduce waste generation and optimise management practices for non-radioactive and hazardous wastes at NDA sites.

NDA sites generate *non-radioactive waste* including demolition rubble, packaging, paper and food waste. Some non-radioactive waste from nuclear sites is hazardous, such as asbestos, process chemicals, oil and other general waste. Collectively these wastes are referred to as *Directive waste*. The nuclear industry's contribution to total UK wastes is very small compared to that of UK households and industry (0.2 % of hazardous waste and 0.04% of other Directive waste).

This strategy also covers waste that is radioactive, but of such low level that it is exempt from regulation under the Radioactive Substances Act 1993 *(ref 20)* in Scotland or the relevant parts of the Environmental Protection Regulations 2010 *(ref 21)* in England and Wales. Such waste is managed, in practical terms, as Directive waste.

Our Strategy

The UK has a well established, comprehensive and prescriptive regulatory regime for the management of waste. Waste management strategies have also been developed at UK, regional and local level by UK Government and Devolved Administrations, local and regional authorities. We have collated the established practices and principles that underpin these strategies, which we will implement across our estate:

- adopt and implement the *Waste Hierarchy* for non-radioactive hazardous and non hazardous waste management
- adopt, where appropriate, suitable decision making criteria (e.g. Best Available Technique (BAT)) to ensure effective application of the *Waste Hierarchy*
- apply a rigorous approach to waste characterisation and segregation
- identify and use appropriate waste treatment routes
- consider the Proximity Principle which aims to manage waste in the nearest appropriate facilities
- consider incentivising desirable waste management activities.

We believe that these practices and principles set out the appropriate strategic context to ensure effective management of these wastes from our sites. We require our SLCs to follow these principles and industry practices to ensure full regulatory compliance.

Development

This strategy is established and no further strategy development work is anticipated. However, we will explore opportunities for an estate-wide response to the waste challenge. There may be areas where greater cooperation between our sites could yield benefits and we expect sites to work with other waste producers and local authorities to engage with local waste management planning activities.

We will continue to work with SLCs, stakeholders and regulators to monitor and review implementation.

Delivery

We require our SLCs to manage their waste in accordance with the principles set out above. In doing this, they will continue to use the well established capability that exists in the wider waste industry as well as within their own sites. Plans for how waste will be managed are set out by the SLCs in their Integrated Waste Strategies.

3.5 Business Optimisation

Objective:

To create an environment where existing revenue can be secured, and opportunities can be developed against criteria agreed with Government.

Containers of solid HAW being returned to Japan from Sellafield.

3.5 Business Optimisation

The NDA is partly funded by Government and also derives income from land, property and commercial activities.

Future income is not guaranteed, as much of it depends on the operation of ageing facilities and infrastructure.

Income significantly reduces in the short-term, primarily due to the end of Magnox electricity generation.

Accordingly, executing our core mission at the same rate will require an increase in Government funding, unless additional revenue can be generated.

Our Strategy

To help fund *decommissioning and clean-up* without materially impacting on our core mission, or increasing liabilities, we will develop commercial opportunities to maximise revenue from our existing assets, operations and people. These opportunities may include:

— deploying existing facilities and resources to our commercial advantage

— disposing of surplus assets and reducing liabilities

— working with others to share costs to the benefit of the UK taxpayer.

Some of these opportunities may arise from the UK's new reactor programme.

Successful past examples of this approach are the sale of land and the transfer of Springfields Fuels Limited to the private sector.

The strategies underpinning Business Optimisation are:
Revenue Optimisation: To maximise the value provided by our commercial revenue generating activities and operations.
Land and Property Management: To ensure we manage our land and property to support our site restoration activities, and make it available for alternative uses that optimise commercial or socio-economic benefit.

3.5.1 Revenue Optimisation

Objective

To maximise the value provided by our commercial revenue generating activities and operations.

The NDA inherited responsibility for the commercial contracts between British Nuclear Fuels Limited (BNFL), United Kingdom Atomic Energy Authority (UKAEA) and external customers. Our subsidiary organisations International Nuclear Services (INS), Direct Rail Services (DRS) and Pacific Nuclear Transport Limited (PNTL) also have contracts which they manage on our behalf.

We receive commercial revenue from:

- selling electricity produced by our Magnox nuclear power stations
- managing spent oxide fuels for domestic and overseas utilities
- returning wastes and products, such as Mixed Oxide Fuel (MOX), to overseas customers
- transporting nuclear fuels and materials.

Some of this income depends on the performance and operational life of ageing facilities, such as Sellafield's reprocessing infrastructure and the operational Magnox reactors.

In 2009/10 more than 50% of our budget funding came from commercial activities. However, in the near future our income from electricity generation will cease as the Magnox power stations close.

Our Strategy

Our revenue strategies include:

Electricity Generation
From the original 26 Magnox reactors only four reactors (at Oldbury and Wylfa) continue to generate electricity. These are due to close in the near future. However we will engage with nuclear Regulators and UK Government to secure short-term life extensions, subject to business and *safety case* approval. We will ensure that any extensions do not compromise the Spent Magnox Fuel Strategy.

See p34
See p26

Spent Fuel Management
The NDA has contracts for the reprocessing and storage of AGR fuel for EDF Energy and reprocessing other fuels for overseas customers. If we are approached by third parties to provide additional spent fuel management services we will review and discuss the options with UK Government, in accordance with our Spent Oxide Fuel Strategy.

See p28

Production of MOX Fuel
The performance of the SMP will be monitored against current contractual commitments. Its longer term future requires a sustained production rate and further commercial contracts (see Plutonium Strategy).

MoD Services
We provide storage facilities for MoD used fuels and nuclear materials.

Marine Transportation Services
INS and PNTL undertake international shipments of nuclear materials and will continue to provide safe and secure sea transportation services for spent fuel, MOX fuel and radioactive waste products.

Rail Transportation Services
DRS provide safe and secure rail transportation services for nuclear and non-nuclear materials within the UK. DRS will continue to explore profitable opportunities in commercial markets.

Development

The strategy for each revenue stream is being implemented, although asset performance and condition remains a key risk to contract delivery and influences the consideration of potential new business opportunities.

We will periodically evaluate the opportunities to dispose of assets depending primarily on their potential value and alignment with our overall mission.

We will continue to discuss other options for additional commercial revenue with UK Government. The UK's new reactor programme may offer commercial opportunities relating to the future ownership and management of UK nuclear infrastructure.

Delivery

Strategic delivery on commercial projects since the publication of NDA Strategy (2006) *(ref 1)* has included initiatives at both Springfields and Capenhurst.

In 2010, the NDA concluded an agreement with Westinghouse Electric Company transferring the commercial fuel manufacturing business from the public to the private sector. The new arrangements will encourage new investment at the site and security for current employees.

At Capenhurst we will seek to secure a future which maximises return from our asset holding through modified contractual arrangements for managing the site and the uranic materials stored there. The intention is for the new arrangements to lead to future development at the site.

Because of its dynamic nature, this strategy needs to be responsive and requires constant review and adjustment. We will manage our assets to ensure their performance and condition is maintained to maximise revenues from our commercial activities.

One of the fleet of DRS trains transporting spent fuel flasks.

3.5.2 Land and Property Management

Objective

To ensure we manage our land and property to support our site restoration activities, and make it available for alternative uses that optimise commercial or socio-economic benefit.

The NDA has a corporate social responsibility for its land and property assets. We currently own some 2,900 hectares of land across the UK, a quarter of which is designated under the Energy Act (2004) *(ref 2)* and almost entirely licensed for nuclear use. The remainder of our land and property assets range from offices to fields and woodland.

See p22

Significant revenue has already been raised by the disposal of some land. Other land will be needed for nuclear operations and to support our mission. We will not dispose of our designated assets until the Site End State has been secured and Government has accepted our recommendation to withdraw the NDA *designation* (see **Site End States Strategy).**

Our Strategy

Our strategy is to retain the minimum land and property assets required to complete our site restoration mission. Where land or property is no longer required by the NDA, it will be sold if a commercially viable sale can be achieved.

We will continue to follow best practice guidance set out by such bodies as the Office of Government Commerce (OGC) and the National Audit Office (NAO).

Development

This strategy is mature and is being implemented across our estate.

Delivery

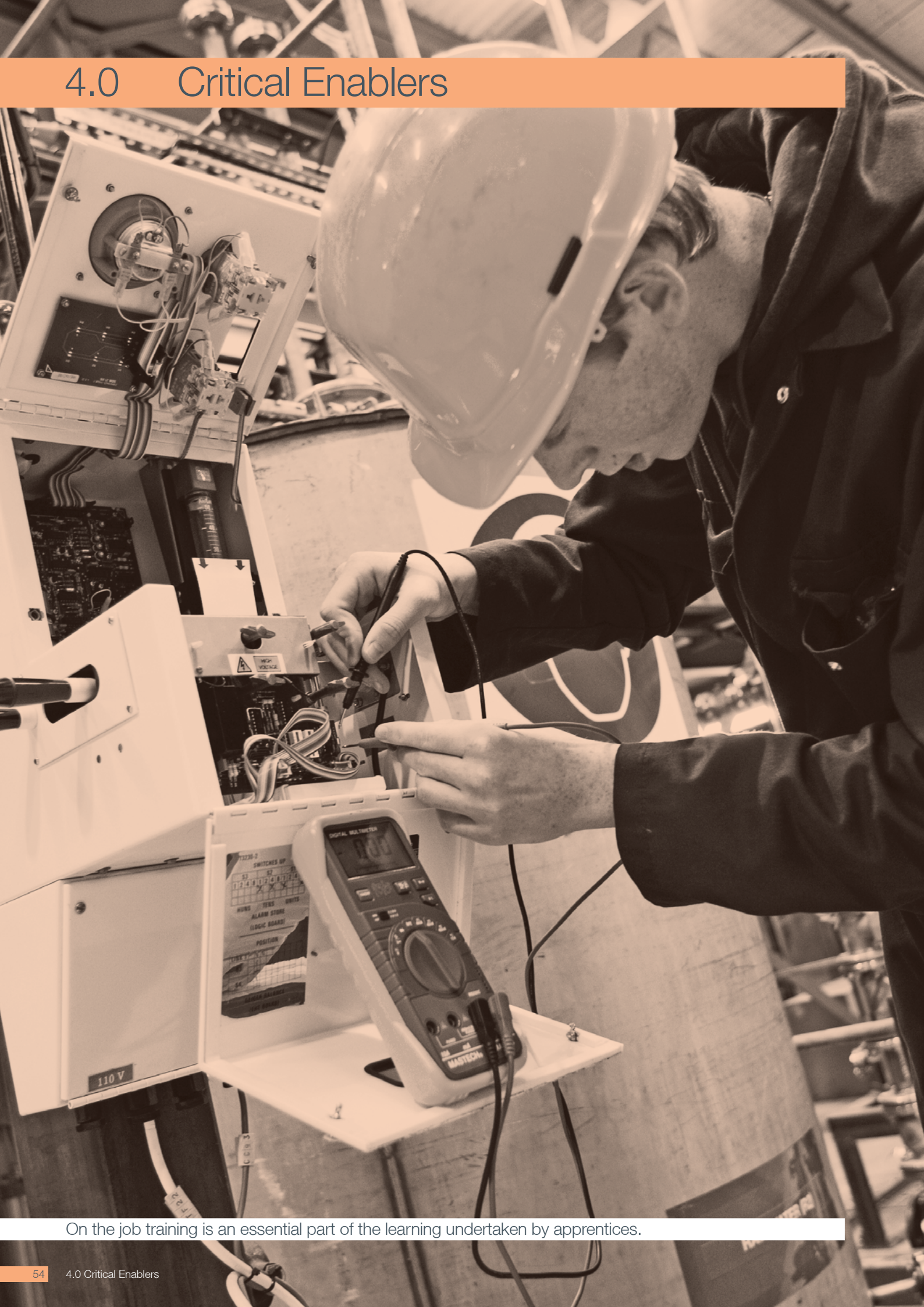
In collaboration with SLCs we have reviewed precisely what land and property they require. This review identified a number of options for managing our assets and provided us with opportunities to reduce overheads and further enhance value.

So far about one-sixth of our portfolio has been sold or is under offer. As we continue to explore further land and property sales we will communicate regularly with key stakeholders.

A separate company, NDA Properties Limited, has been formed to own real estate which is not designated. This company will facilitate the management of these property assets.

Significant income has been realised from land and property asset disposals adjacent to sites such as Wylfa.

4.0 Critical Enablers



On the job training is an essential part of the learning undertaken by apprentices.

4.0 Critical Enablers

Introduction

Delivery of our strategy is only possible if a stable and effective implementation framework exists. This framework must ensure that once the 'right thing' has been identified it can be delivered effectively and efficiently.

The Energy Act (2004) *(ref 2)* recognised this and gave the NDA responsibility to deliver skills, R&D and supply chain development and to operate with due regard to socio-economics. In addition to these specific responsibilities, it is important that we define our approach to a number of other subjects.

These responsibilities and strategies are known as Critical Enablers and are listed in the table below.

Critical Enablers apply across our other strategic themes and enable their delivery. They differ in maturity of strategy, and the future pace of development will be driven by the needs and influences of our strategic themes. For example, the development of the Transport and Logistics Strategy will be driven by the implementation requirements of the Integrated Waste Management Strategies and Spent Fuels Strategies.

Where appropriate, the development and implementation of Critical Enablers follow the *Strategy Management System (SMS)*, as described in Appendix A.

Section	Critical Enabler
4.1	Health, Safety, Security, Safeguards, Environment and Quality
4.2	Research & Development
4.3	People (incorporating Skills and Capability)
4.4	Asset Management
4.5	Contracting and Incentivisation
4.6	Competition
4.7	Supply Chain Development
4.8	Information and Knowledge Management
4.9	Socio-Economics
4.10	Public and Stakeholder Engagement and Communications
4.11	Transport and Logistics
4.12	Funding
4.13	International Relations

4.1 Health, Safety, Security, Safeguards, Environment and Quality

Objective

To reduce the inherent health, safety, security, safeguards and environmental risks associated with the nuclear legacy, and encourage high standards in operational health, safety, security, safeguards, environmental and quality performance.

The NDA's mission is founded on ensuring safe operations, whilst remediating hazards, reducing risks and restoring the environment at each of our sites.

Operational responsibility for health, safety, security, safeguards and protection of the environment during delivery of the mission and for compliance with appropriate regulations lies with our contractors, the individual SLCs, and with our subsidiaries. Our role is to provide leadership and drive risk and hazard reduction by requiring high HSSSEQ standards in our contracts and monitoring performance.

Our Strategy

Our strategy is to:

- take account of the health, safety, security, safeguard and environmental implications of different approaches to fulfilling our mission during our development and decision processes
- select Parent Body Organisations and other suppliers with an excellent track record in health, safety, security, safeguards and environmental management, who have demonstrable ability to deliver improvements in performance
- require high standards of HSSSEQ performance in our contracts
- ensure that our SLCs and our subsidiaries have a clear vision for improving their control processes to optimise outcomes and improve HSSSEQ performance
- monitor performance and outcomes to ensure they meet the NDA's obligations and HSSSEQ expectations as enduring owners of the sites, facilities and nuclear materials, and to report on this regularly
- work with Regulators, Government and SLCs to improve and rationalise policy and legislation, and its application, where changes would offer significant benefits in the delivery of our mission
- seek and implement innovative ways to improve safety culture, share good practice across our estate and learn lessons from others.

Development

Our underpinning HSSSEQ principles are mature but we continue to develop and review implementation with stakeholders, especially Regulators.

We recognise that in addressing risks and hazards associated with the nuclear legacy, we may need to accept short-term increases in risk and we will continue to work with SLCs and Regulators to carefully manage this balance.

Delivery

Delivery of our HSSSEQ strategy and principles is achieved through NDA's approach to:

- developing our overall Strategy
- selecting our PBOs and other suppliers
- articulating our expectations for SLC performance and that of our subsidiary organisations
- incentivising long-term improvements in HSSSEQ management arrangements
- monitoring SLC performance and adjusting fee payments accordingly
- incorporating HSSSEQ performance indicators in our contracts with SLCs
- working with the SLCs to support the Regulators in achieving a framework of proportionate regulations that facilitates implementation of our Strategy
- reporting annually on the HSSSEQ performance of the NDA including its subsidiary organisations and contractors in delivering its mission.

4.2 Research & Development

Objective

To ensure that the delivery of the NDA's mission is technically underpinned by sufficient and appropriate R&D.

Under the Energy Act (2004) *(ref 2)* the NDA is required to promote and, where necessary, carry out research in relation to its primary function of *decommissioning and clean-up*. There are close links to other Energy Act requirements such as sharing of good practice, enabling innovation and developing skills.

This strategy defines our approach to ensuring sufficient and appropriate Research & Development (R&D) is carried out to deliver our mission. The R&D Strategy covers technical underpinning work carried out by the SLCs and R&D sponsored directly by the NDA.

Technology and the underpinning R&D are fundamental to ensuring the safe, cost-effective delivery of our mission. Together with innovation and the sharing of good practice both nationally and internationally, the intelligent application of R&D can reduce costs and timescales.

Our Strategy

Our strategy is that, where possible, R&D is undertaken by the SLCs and their supply chain. Where necessary the NDA will directly maintain a strategic R&D programme. Overall strategic coordination is provided by us.

Using an integrated and transparent approach, and working closely with SLCs, we will ensure that R&D is identified and prioritised in order to underpin strategic decision making and implementation.

Our NDA strategic R&D programme focuses on targeted, estate-wide R&D needs, risks and opportunities to inform and develop strategy, encourage innovation and support key technical skills.

We will also work with other organisations such as research councils and universities to encourage and leverage investment in R&D, taking advantage of collaborative programmes and match funding opportunities. In particular we will identify synergies with other organisations such as EDF Energy and MoD in order to promote sharing of experience and avoid duplication.

Development

This strategy is mature. Ongoing development will focus on:

- ensuring decommissioning plans are based on sound technical approaches
- strategic coordination of estate-wide R&D needs, risks and opportunities
- maximising opportunities for timely innovation and sharing good practice
- continuing to seek opportunities for collaboration in the UK and internationally to reduce costs and create innovation.

We will work with Government to identify opportunities for strategic coordination of R&D for *decommissioning and clean-up* across the industry, focusing on effective spending of UK R&D funds and removing duplication of effort.

Delivery

R&D across the estate, including our strategic R&D programme, demonstrates a commitment to innovation and technical underpinning and has brought significant benefits, including:

- improvements to safety by developing remote characterisation techniques
- targeted support to skills and policy development in plutonium management by investigating enduring plutonium storage techniques
- introducing technical underpinning and technical maturity into SLC decommissioning plans
- conducting supply chain competitions for innovative concept and technology demonstration projects.

We have also established governing bodies to co-ordinate R&D and share national and international good practice, including the *Research Board* and the *Nuclear Waste Research Forum*. Through them we will strengthen our coordination and assurance of R&D activities and build on established good practice to underpin our key strategic decisions. In particular, we will appoint an independent Chair for the *Research Board*.

4.3 People (incorporating Skills and Capability)

Objective

To ensure our estate has the skills and capability to carry out the mission efficiently and effectively.

Successful delivery of our mission demands people with appropriate skills and capabilities to be available to the NDA, SLCs and the supply chain. Our People Strategy addresses barriers to workforce mobility, the sharing of good practice and introduces a collaborative approach on human resource issues between the NDA and SLCs. This effects a broadening of our Skills and Capability Strategy, published in 2008 following stakeholder consultation, to encompass resource planning across the estate.

Our Strategy

Our People Strategy has been developed and agreed with our strategic partners - the PBOs, SLCs, National Skills Academy for Nuclear (NSAN) and *Cogent*. The responsibility for its implementation is shared between us all. Our approach is to:

- **understand the need** by identifying current resources and future requirements across the estate
- **deliver skills and training programmes** to address the skills gap through appropriate training and development
- **provide a robust infrastructure** through facilities to support training and skills development
- **attract and retain the necessary skills** to encourage and support the replenishment and maintenance of people resources
- **develop and maintain networks** to identify and share good practice across our estate
- **set standards and benchmarks** to demonstrate that we continue to work to the highest standards
- **maintain estate-wide pension arrangements** that support the NDA's competition programme and deliver Energy Act pension requirements.

Development

This strategy is mature and is being progressively implemented by the NDA and our strategic partners.

In collaboration with our strategic partners we continue to work with all sectors of the nuclear industry to raise the skill levels of the UK's nuclear workforce. Retention of the skills and resources needed to deliver our mission is a particular challenge in the light of the UK's new reactor programme, but this programme may also provide opportunities for the mobility and transition of the workforce between our site restoration programmes and the UK's new reactor programme, and in providing a larger pool of nuclear skills from which we can draw.

Delivery

Since the NDA Strategy (2006) *(ref 1)* our Skills and Capability Strategy has delivered:

See p64

- Energus in West Cumbria, a vocational centre of excellence for nuclear engineering
- the nucleargraduates™ programme, recognised in The Times Top 100 Graduate Employer schemes
- support for the National Skills Academy for Nuclear
- establishment of the new Dalton Cumbria Facility, a joint investment with the University of Manchester for specialist technical skills
- the Engineering Skills Centre at North Highlands College.

Building on these successes our strategy will lead to a competent, skilled and capable workforce. It will also identify and share good practice and provide a future proof training infrastructure, to ensure we have the right people in the right place at the right time.

A strong link exists between our **People** and **Socio-Economic Strategies**, to ensure that opportunities, such as job creation, are maximised. For example, Bridgwater College and Coleg Menai have both received socio-economic funding from the NDA to support the development of skills in these communities.

Our People Strategy makes a significant contribution to the wider nuclear industry agenda and the skills policies of the UK Government and Devolved Administrations.

We have created the Combined Nuclear Pension Plan, which provides final salary and money purchase pensions for 13,000 people across the NDA estate.

4.4 Asset Management

Objective

To secure NDA asset performance to enable effective delivery of our mission.

Our assets range from facilities built in the 1940s and 1950s to new plants built to modern standards. Some facilities have degraded and their performance is affected. Throughout our mission we must ensure that our assets are maintained in an appropriate condition to deliver their objective, whether operational facilities or plants undergoing decommissioning.

We have a duty to secure what we consider to be good industry practice from those who control our sites and facilities. The SLCs are bound through their site licences to operate their facilities to an agreed standard of public and employee safety, security and environmental protection. We have contracts with the SLCs to meet these asset management requirements.

Our Strategy

We will require our SLCs to implement good asset management practices at least equivalent to the internationally recognised standard, Publically Available Specification – 55 (PAS-55) *(ref 15)*, a risk-based management framework that considers the lifecycle of an asset.

Development

This strategy is mature. Good practice management of NDA assets is essential to our mission.

Development of this strategy will focus on overseeing SLC performance and intervening where necessary.

We will work in partnership with SLCs and regulators to gain a common understanding of asset management, estate-wide issues and the improvements required.

Delivery

To improve and sustain the management and performance of our assets we will:

- benchmark the NDA and SLC asset management against PAS-55 *(ref 15)*
- require our SLCs to identify, categorise and mitigate asset risk, targeting and optimising asset investments critical to strategy delivery
- require our SLCs to put in place appropriate implementation plans.

Achieving and sustaining an acceptable level of asset management maturity involves not just procedural but cultural change. This typically takes a number of years, so it will be some time before we realise the benefits of our strategic approach.

We will continuously improve asset management by setting objectives for our SLCs to achieve progressive asset performance. We will draw on external expertise from the private sector, UK utilities and the Rail and Energy sectors to inform implementation planning. Critical assets have been identified with further work necessary to underpin critical asset management plans, *Lifetime Plans (ref 5)* and supporting funding requirements.

An asset management working group has been set up involving all the SLCs and NDA to share good practice.

4.5 Contracting and Incentivisation

Objective

To secure and manage effective and efficient procurement contracts which are affordable, provide value for money and deliver the NDA's mission through appropriate incentivisation.

Contracts for the procurement of goods and services currently account for more than 95% of the NDA's annual expenditure.

In addition to our contracts with SLCs, we contract with the supply chain in our own right. The wide variation in contracting requirements for the NDA necessitates a diverse range of contract types, from procuring office stationery to multi-billion pound PBO contracts.

The NDA is obliged to place contracts via free, open and non-discriminatory competition in accordance with UK Public Contracts Regulations and OGC best practice.

Our Strategy

Our strategy provides the framework, policies and principles to select the most appropriate contract, rather than being based on a single solution. For any new requirement, the initial assessment considers whether the task can be delivered using our own in-house resources, external suppliers or a combination of the two.

Where we have identified a requirement to procure goods or services, we will select the appropriate contracting model, such as several individual contracts, a single integrated contract or a bespoke model. If the procurement is for goods or services which are common across the wider NDA estate and/or Government, then we will collaborate with these parties to share services and deliver savings.

To assist selection of the appropriate contract, we categorise procurements into four groupings based on assessed value and risk.

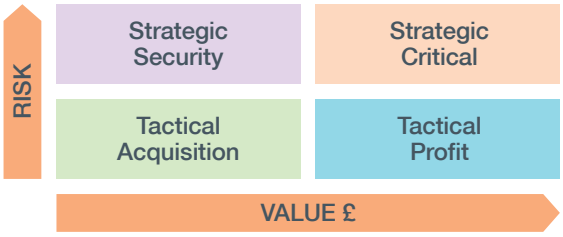
Strategic Critical (typically high value, high risk contracts). These require complex, innovative and bespoke contracts with intensive lifecycle contract management. All our PBO contracts are of this type.

Strategic Security (typically low value, high risk contracts). May require innovative and bespoke contracts with robust lifecycle contract management.

Tactical Profit (typically high value, low risk contracts). Generally utilises standard contracts and appropriate contract management.

Tactical Acquisition (typically low value, low risk contracts). Utilises simple contracts to deliver lowest price fit for purpose deliverables.

As value and risk increase, securing affordable best value solutions for the UK taxpayer throughout the whole lifecycle becomes increasingly important.



Development

This strategy is mature, has been consulted on with stakeholders and is being progressively implemented across our estate.

Delivery

In 2005 we inherited a range of contracts. These have been progressively amended, through competition, towards more appropriate risk sharing and incentivisation, including the use of longer term partnering arrangements. In addition, the NDA estate has established a collaborative procurement programme for Tactical Acquisitions, and potentially strategic acquisitions in the future.

4.6 Competition

Objective

To bring the best capabilities the market has to offer, at the best price, to deliver our mission.

We deliver our remit through others by employing PBOs to manage the SLCs on our behalf.

Competitions for PBOs to deliver new ownership of our SLCs are Strategic Critical (refer to section 4.5) procurements for the NDA (refer to **Contracting and Incentivisation Strategy**). We also conduct competitions to procure the services of the supply chain directly to support our activities.

See p60

The NDA is obliged to place contracts via free, open and non-discriminatory competition in accordance with UK Public Contracts Regulations and OGC best practice.

Our Strategy

If the risk or value of a procurement is significant, we will produce an acquisition strategy for individual competitions. These will address the management of key risks including available funding, affordability, innovation, scope for acceleration and other market factors. The PBO competition strategy comprises the following key elements:

- a staggered competition programme which recognises the resource pressures on the NDA, regulators, potential bidders and other stakeholders
- an SLC contract model which protects and develops the capability and independence of the SLC but allows a PBO to provide direction, leadership and management through ownership
- an open competition process which actively seeks to offer equality of opportunity and information to all potential bidders
- competitions and contracts designed to attract suppliers who will work in partnership with the NDA and develop sustainable solutions which benefit all parties
- an appropriate and progressive transfer of risk to the private sector.

Development

This strategy is mature. The initial competition programme and model has been reviewed at key points, particularly at the initial stage of each PBO competition. The following areas provide opportunities to:

- continue to develop and improve our competition processes
- continue to develop a competitive market for our business
- develop commercial and pricing arrangements that balance commercial risk with value for money, and reflect the level of uncertainty around the scope of work
- move to outcome driven contracts, where appropriate
- continue to develop performance standards and obligations which reflect our needs and those of our stakeholders.

Delivery

Since 2006 we have reviewed, revised and accelerated our competition programme. We have successfully delivered the LLWR and Sellafield competitions, and the Dounreay competition is under way. The competition for Sellafield (which represents more than 60% of our estate) was successfully delivered in 2009, four years ahead of the original plan, allowing us to introduce world class contractors to manage the SLC.

Remaining SLC competitions are programmed to start by the end of 2012.

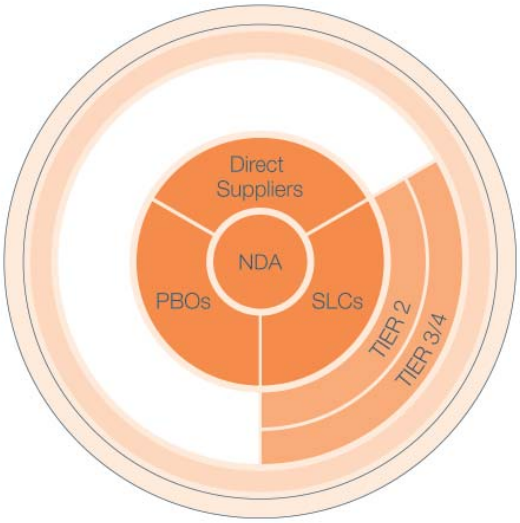
4.7 Supply Chain Development

Objective

To optimise the NDA supply chain to develop an affordable, cost-effective, innovative and dynamic market to deliver our mission.

The NDA supply chain comprises those companies and organisations that provide goods or services to the NDA, our subsidiaries and SLCs. Given the scale of NDA spend, a vibrant supply chain is vital to secure value for money, reduce risk and optimise delivery of our mission. This depends on having effective procurement processes and clear alignment between the aims of the client and supply chain companies. As a key player in the nuclear supply chain, we are in a strong position to link with other nuclear clients and support Government supply chain initiatives.

The success of this strategy depends on the NDA working together with the SLCs and the supply chain to enhance performance and value across the estate. In some cases we have direct relationships with the supply chain, and can influence others, while we seek links with the wider supply chain.



Key

- Direct
- Influence
- Nuclear Industry Supply Chain
- Supply Chains Supporting Other Industries

Our Strategy

Our Supply Chain Development Strategy comprises four key areas, each supported by a set of principles:

- open, transparent, timely and consistent communications at all levels in the supply chain, including those that assist Tier 3 and 4 and Small and Medium Enterprises
- optimised supply chain procurement processes
- optimised supply chain relationships
- exploring synergies and opportunities with other nuclear clients and industries.

Development

This strategy is mature and has been developed in consultation with external stakeholders to ensure that it meets the needs of the NDA, SLCs, the wider supply chain and organisations who support them, such as trade associations and enterprise support agencies.

Delivery

Whilst some of the principles are aspirational in nature, a number are already being implemented, and others may lead to programmes of work, aiming to build on existing supply chain development initiatives, such as:

- NDA/SLC collaborative procurements
- NDA use of Government contracts
- use of Nuclear Industry Association (NIA) as a key body for engagement
- supply chain mapping to identify critical suppliers
- lead a workshop with key members of the supply chain to jointly develop approaches to assist Tier 3 and 4 and SMEs.

4.8 Information and Knowledge Management

Objective

To ensure the NDA, the SLCs and our subsidiaries are compliant with relevant legislation and regulations, follow good practice and maintain a fit for purpose infrastructure for information and knowledge management.

Our people and the organisations we engage with need to use information and knowledge every day. The information held in records and documents must be managed, re-used and shared effectively, while ensuring they are adequately protected and destroyed when no longer required. Effective knowledge capture and subsequent record management allows people to share current knowledge, experience and expertise, safeguarding its integrity and accuracy for use by others.

This strategy aims to provide a framework for managing our information and knowledge assets throughout their lifecycle, to maintain consistency in their application and processing and ensure compliance with regulatory and statutory obligations. It also supports other strategies by ensuring that capabilities are developed and maintained. For example, long-term and effective records management is a fundamental discipline that will enable the future management of radioactive waste and land quality. It is also vital in efficiently managing the Intellectual Property (IP) created through the NDA's Research & Development Programme. Equally, an effective Knowledge Management Strategy not only ensures that tried and tested techniques are employed to capture tacit and contextual information but also to facilitate the skills retention and capabilities of the workforce dealt with under Section 4.3.

Our Strategy

We will encourage the rationalisation and simplification of the information infrastructure, systems and technologies across our estate in order to facilitate compliance and where this adds benefit and/or value. We aim to improve service, reduce baseline costs, and increase our ability to share, collaborate and communicate. We will encourage learning and the preservation and sharing of knowledge across our estate. Whilst recognising that each organisation develops and maintains its own practices, we will promote greater collaboration by establishing estate-wide communities who share business processes, procedures and policies and adopt common technologies. To avoid duplication of effort we will support the identification and sharing of good practice and lessons learned, and raise awareness of similar work elsewhere.

We will also apply appropriate, risk-based controls and restrictions on our information to ensure that we safeguard security whilst minimising the impact of these restrictions to the business.

We will ensure compliance with regulatory requirements.

Development

This strategy is mature and has been developed through groups comprising the NDA, SLCs and Regulators, in consultation with other nuclear industry companies and government departments and organisations.

These arrangements will be further developed as our overall Information and Knowledge Management Strategy evolves.

Delivery

We will develop an Information Management Compliance Programme to ensure the route to compliance is clear, achievable and affordable. Knowledge Management techniques and processes will be incorporated into the plan and subsequently used to capture and share information which is not currently recorded and represents a risk to the industry if lost. In addition, a long-term records storage solution will be developed to manage regulatory and statutory obligations with respect to public records. Implementation will then be prioritised to maximise short-term benefits, recognising the relevant constraints and expectations of Regulators, Government and other stakeholders.

4.9 Socio-Economics

Objective

To support the creation of dynamic, sustainable local economies for communities living near our sites.

The NDA is a major stakeholder in the communities in which it operates, and its activities can have a significant social and economic impact. We are obliged to take account of these impacts which we do by actively supporting these communities, and those organisations formally accountable for economic development.

Our attention and resources are focused on driving forward our activities in four *Priority Areas* - West Cumbria, Caithness and North Sutherland, Anglesey and Meirionnydd, the Gretna-Lockerbie-Annan corridor in Dumfries and Galloway - for which we have published Priority Area Plans. These bring a greater focus to the goals we are working towards and the relationships we are developing with our key stakeholders.

Our Strategy

Our strategy is to support the economic development of communities affected by our activities, focusing on employment, education and skills, economic and social infrastructure and diversification. We will:

- engage with the organisations responsible for driving economic development, (including Local Authorities), providing resources to support them in developing strategies and plans that take account of our site restoration activities
- work with our stakeholders to define the long-term socio-economic framework, encouraging activities that deliver sustainable, transformational outcomes in areas where need is greatest
- consider funding socio-economic projects, generating funding leverage from public and private sector organisations
- align our resources and those provided through the SLCs and their PBOs to optimise deployment of the NDA, SLC and PBO resources
- identify and encourage learning across our estate, supporting opportunities for sharing best practice and for collaboration in areas where the NDA has a responsibility for socio-economic activities.

We recognise that site restoration affects the socio-economic conditions of local communities: for example, disruption caused by increased traffic movements, fluctuations in demand for local public services, challenges to the viability of supply chain organisations, in addition to the reduction in employment as our mission progresses. We therefore see socio-economic issues as an integral part of our decision-making process, closely linked to skills development, R&D and the need to stimulate innovation.

Development

The strategy is mature. We will continue to monitor the socio-economic impact of our site restoration activities on local communities. This may include studies to ensure we respond to positive and negative developments resulting from our activities. We will also consider the impact on local supply chains, opportunities for skills development and new business activities.

We will keep the four Priority Areas under review, ensuring that our focus and resources are concentrated where the need for support is greatest. We will explore with the SLCs our approach to delivering our socio-economic agenda.

Delivery

We have made significant progress since 2006. Following public consultation we issued our Socio-Economic Policy *(ref 16)* in 2008, which defines the scope of our socio-economic activities. To ensure that NDA support is focused in areas where need is greatest, we have published four Priority Area Plans that define how the NDA will work with the relevant organisations to facilitate the delivery of economic development in each area.

We are also looking at infrastructure to deliver skills and training opportunities.

4.10 Public and Stakeholder Engagement and Communications

Objective

To build and maintain the support, confidence and trust of the public and stakeholders.

It is important that NDA decision-making is informed by a diverse range of views and that the rationale for major decisions and the processes by which they are reached is clear. We therefore regard openness, transparency and effective public and stakeholder engagement and communications as key to building the support, confidence and trust necessary for us to deliver our mission.

Our Strategy

The NDA's public and stakeholder engagement and communications will:

- be planned to enable influence
- be clear and transparent
- be accessible
- respect and value the public and stakeholders
- give feedback
- build the competence of staff in delivering public and stakeholder engagement and communications
- be evaluated
- be proportionate
- comply with legal duties and appropriate codes and guidance.

Development

This strategy is mature. Since the NDA Strategy (2006) *(ref 1)* we have conducted two reviews of our national engagement processes; a review of our local engagement processes, and a desktop study on the experience (including international) of other organisations who engage with stakeholders.

We have also hosted many discussions at our National Stakeholder Group (NSG) meetings. The output from these reviews and discussions has been published on our website and has been used to develop the above approach. The latest review carried out by The Environment Council recommended an approach to stakeholder engagement driven by the NDA and stakeholder needs rather than fixed calendar dates.

Delivery

This strategy has been extensively consulted on with stakeholders and has now replaced our earlier Stakeholder Charter *(ref 17)*. It is being progressively rolled out across the NDA and shared with our SLCs. We will continue to monitor the effectiveness of our public and stakeholder engagement and communication activities, specifically regarding the Site Stakeholder Groups (SSGs) and the evolving national engagement framework.

As a critical enabler, this strategy sets out the approach that we will adopt when engaging and communicating with the public and stakeholders on all aspects of our business.

In delivering an approach to stakeholder engagement driven by need, a timeline of activities will be published annually that identifies the issues to be discussed and the appropriate channels to be used. We will discuss this with stakeholders before final approval.

4.11 Transport and Logistics

Objective

To ensure the efficient transportation of radioactive and bulk materials is carried out safely and securely.

Efficient delivery of the NDA mission relies heavily on the ability to transport radioactive materials (nuclear fuel, radioactive waste, contaminated items, etc) and bulk materials (spoil, concrete, new raw materials, etc) to, from, and between sites during construction, operation and decommissioning activities. The modes of transport covered include transport by rail, road, air, sea and waterways.

The transportation of radioactive materials and waste is governed by statutory regulations and compliance is the responsibility of our SLCs and transporters.

Our Strategy

We have defined a set of principles under which the SLCs work with each other, the supply chain and NDA subsidiaries to coordinate transport to maximise its effectiveness across the NDA estate. SLCs will be required to consider the following principles in delivering the strategy:

- ensure the safety and security of material movements, protect people and the environment and consider the impact on the resulting carbon footprint
- optimise movements between sites whilst enabling other strategic themes
- seek to reduce the adverse impact of all transport modes throughout the transport routes
- find common and reliable packaging and coordinate transport arrangements to support movement and disposal requirements
- use rail over road where practicable
- maximise the use and optimise the performance of existing assets rather than develop new ones.

Development

Our current strategy, and the principles above, meet our current needs and is being implemented across the estate. It has been developed with the Department for Transport, the Maritime and Coastguard Agency, the Office for Civil Nuclear Security and rail regulators, and reviewed by safety and environmental nuclear regulators.

We recognise, however, that we will have to further develop this strategy as the requirements of other strategic themes become clear, such as the co-location of materials, treatment or storage facilities.

Delivery

A working group has been established comprising the NDA, its subsidiaries and SLCs to take a strategic view of transport issues across the estate, encouraging consistency, coordination, identification of NDA estate risks, opportunities and best practice. This group will monitor and develop implementation of this strategy and ensure the principles remain relevant.

The contracts between the NDA, its subsidiaries and SLCs have efficiency incentives and place responsibility for delivery on the SLCs.

The working group and contractual arrangements together will enable us to develop optimal transport and logistic management plans, focusing on cost reduction, utilising our existing assets, minimising environmental impact and reducing disturbance along the transport route.

4.12 Funding

Objective

To provide appropriate funding for the NDA's work from direct Government funding and commercial income, ensuring that income volatility is managed through adequate contingency arrangements.

The NDA is partly funded by the Government and also derives income from land, property and commercial activities, especially spent fuel management services. As a Non-Departmental Public Body (NDPB) we are bound by the same budgeting and financial reporting framework that applies to central government departments.

We participate in the Government's spending review process via the Department of Energy and Climate Change (DECC).

Our Strategy

Our Funding Strategy comprises the following key elements which govern our approach:

- we explore all available options within Government rules to secure funding for our mission
- we articulate the costs, benefits and consequences of different levels of funding
- we seek to optimise the net returns from commercial income generating activities.

Development

This strategy has been developed in conjunction with Government departments to ensure we comply fully with the spending review process.

Delivery

Our Funding Strategy is delivered by means of annual budget allocation by Government to the NDA itself, and by the NDA to each of our SLCs who deliver our decommissioning programmes.

4.13 International Relations

Objective

To gain access to international good practice from our relationships with counterpart organisations in other countries; to influence technical and legislative developments; to maintain good relations with overseas communities and to support Government policy.

The NDA has a number of duties and responsibilities which are relevant in an international context. These include undertaking R&D, securing value for money, maintaining and developing a skilled workforce and the adoption of good practice by our sites. In addition we have obligations under European and international legislation, and also for transporting radioactive materials worldwide.

Many overseas organisations have faced challenges similar to our own. Learning from shared experiences therefore enables us all to avoid duplication of effort and 'reinventing the wheel'.

We also act in support of Government policy and work on their behalf when requested to do so.

Our Strategy

We will continue to develop relationships with counterpart organisations overseas in order to:

- provide access to international good practice and learn from their experience
- facilitate targeted joint research and technology development
- seek advancements in technology and processes
- provide benchmarking opportunities
- maintain our international reputation and communicate our messages internationally.

We will use bilateral agreements to facilitate this and prioritise interactions with counterpart organisations based on our business needs.

We will engage at an appropriate level with overseas governments and communities in order to maintain good relations. We will engage with the International Atomic Energy Agency (IAEA), the Organisation for Economic Co-operation and Development (OECD), Nuclear Energy Agency (NEA) and the European Commission (EC). We will contribute to internationally coordinated research projects to derive benefit from joint activities and participate in targeted international conferences as a means of gaining further access to good practice and to review our activities.

We will continue to support DECC in activities associated with the International Framework for Nuclear Energy Cooperation (IFNEC).

Development

This strategy is mature. We will monitor the effectiveness of our bilateral agreements and international activities through an International Liaison Group. Any further bilateral agreements or renewals will be subject to a business case to ensure they provide value.

We will continue to pass on the benefits of our international relationships to the SLCs and will fully involve them where appropriate, while maintaining oversight of direct relationships between SLCs and international bodies.

We will work with Government and other bodies such as the National Nuclear Centre of Excellence to help ensure that the UK's engagement with international organisations is efficient.

Delivery

Since 2006, the NDA has built on its historical overseas relationships and we currently manage 12 agreements with organisations in the US, Europe and Japan and plan to develop more. In broad terms these agreements cover decommissioning, waste management, geological disposal, socio-economic activities and commercial/contracting practices. Collaboration includes staff secondments, technical visits, specialist topic meetings, other joint discussions and information exchanges.

The outcome of these interactions has led us to modify some of our practices and has provided significant actual and potential cost savings on our programmes.

We represent the UK on a number of influential technical committees of the IAEA, OECD/NEA, EC and other international organisations.

5.0 Non NDA Liabilities

Objective:

To ensure that the NDA identifies, assesses the impact of and decides how to address third party nuclear liabilities within the current roles and accountabilities of all the organisations involved.

The NDA Strategy only covers liabilities for which we have formal accountability, either because we own them or because we are contracted to provide a service.

We are aware of some third party liabilities for which we have no formal responsibility and are not covered by contracts, but which may affect the delivery of our mission. We may be unaware of the owner's liability management plans and consequently how these will affect us.

This strategy is focused on ensuring that the NDA can reduce the *risk* to its mission from the impact of other liability holders' programmes. However, the Government may extend our remit in order to achieve greater value for money. Our current effort is primarily directed towards the two major third party liability holders, MoD and EDF Energy's* existing nuclear operations.

Our Strategy

We have developed a Non NDA Liability Management Strategy to ensure that third party liability plans do not adversely affect our ability to achieve the agreed end states for our sites.

Our approach is as follows:

Stage 1: Identify all major third party liability holders and complete a third party liability information database by discussion within the NDA, our SLCs and with the owner of the liability. This will determine what impact these liabilities are likely to have on us.

Stage 2: We will use the information from Stage 1 to determine whether we are able to manage the risks of these impacting liabilities. If not, we discuss the liability with Government and its potential risks and consequences to identify a possible way forward. The Government's response may be to empower the NDA to address the impact or provide an alternative direction.

Stage 3: If directed by the Government, we will update the scope of the relevant strategy to include the additional third party liability. This may result in a revision of the strategy. We will work with the Government and relevant third parties to consider the most appropriate means of ensuring that we receive funding to offset the impact of taking on this liability.

Stage 4: Implementation of the revised strategy would be achieved using established procedures.

* Formerly British Energy

Appendix A

Introduction to the Strategy Management System (SMS)

As a strategic body, we work on strategic issues all the time, so the periodic publication of our NDA Strategy document can only be a snapshot of the status of development at the time of publication.

The Strategy Management System

The SMS is designed to ensure the development of a coherent and robust strategy for the delivery of our mission. The SMS has been used to develop the strategies covered in this document.

The key outputs from the SMS are:

- the NDA Strategy (2006) *(ref 1)* which is subject to periodic review, formal public consultation and approval by Ministers prior to publication (this document)
- individual strategies which define the NDA's strategic position on a particular subject
- *Site Strategic Specifications* that are issued to our *Site Licence Companies (SLCs)* to ensure our strategic requirements are incorporated into our SLCs' *Lifetime Plans (ref 5)* and delivered.

Individual strategy documents are developed and owned by subject matter specialists ('Strategic Authorities') in the NDA.

Our strategic approach consists of 27 individual strategies. These are described in this Strategy, with further detail available on our website **www.nda.gov.uk** To provide a clear and integrated focus, individual strategies are organised into six strategic themes and these are linked into our strategic objectives, as set out in our Business Plan published annually.

This structured approach allows us to identify and manage risk.

Orderly Development of Strategy

For each strategy, the SMS progressively manages its development in distinct stages to ensure that the ultimate strategy is robust and underpinned by rigorous business case analysis and the visibility of our rationale for decision making is clear. We give great weight to stakeholder views and work closely with SLCs, who will ultimately implement the strategies.

Stage 0 – Research
The step wise process begins with research to define scope, confirm the overall objective and test how well the current strategy achieves that objective. The aim is to identify whether there are any issues or problems arising from the present strategy that might be overcome by a change in direction. In essence this stage sets out the strategic case for carrying out any strategic work and indicates the potential scope of the programme and key interfaces and boundaries.

Stage A – Credible options
Work carried out in the next stage identifies all the potential options that could achieve the stated objective along with screening criteria that are applied to develop a list of credible options for taking forward for further analysis and consideration.

Stage B – Preferred option
The purpose of the next stage is to assess and select the preferred strategic option. In selecting a preferred option we consider a wide range of relevant factors including health, safety and the environment, technical, financial, economic and social effects, including the impact on local communities. We call this combination of factors our *Value Framework* and in this way we inherently build the requirements of *Strategic Environmental Assessment (SEA) (ref 3)* into the heart of our strategy development and strategic decision-making. As appropriate, individual strategic decisions are accompanied by their own SEA (however, it should be noted that an overarching SEA supports this Strategy).

Stage C – Approvals
The preferred option is taken forward for approval where funding and delivery mechanisms are considered.

Stage D – Implementation
The final stage is implementation where our requirements are translated into action by means of specifications issued to the SLCs detailing what our strategy means for each site. Our strategic requirements are then translated into delivery plans by our SLCs, who are monitored and held to account for their performance against incentivised delivery milestones. We continuously monitor the health of our strategy delivery and will review the continued appropriateness of the preferred option using strategic tolerances.

There is a great deal of interdependence between the strategic themes and we manage these complex interactions using SMS and an active community of Strategic Authorities to ensure the solution for one strategic issue complements the solution to another, considering cumulative effects and thereby maintaining a coherent strategy at all times. The SMS allows us to respond to and manage the effects of internal and external influences.

Strategic decisions are made in the light of an informed assessment of the relevant factors in our *Value Framework,* and their interplay, with clarity on where accountability for making the decision lies and with a rationale for the outcome being associated with each decision.

Strategy development has entailed extensive engagement with stakeholders since 2005 with a number of targeted and focused strategy groups and interactions in operation. These groups consist of representatives from the full range of organisations including Government, Regulators, our SLCs and broader industry and the public. We believe we are now well placed to continue effective strategy development and delivery over the coming years.

The construction of Evaporator D, Sellafield

Appendix B

Summary of the Strategic Environmental Assessment (SEA)

Overall, and independent of the options selected, the implementation of our Strategy is likely to result in a positive effect in the long-term following completion of decommissioning. This is due to the fact that the UK's civil nuclear liability will have been dealt with, hazards will have been reduced and the quality of natural environmental assets improved.

An Environmental and Sustainability Report *(ref 3)* was prepared as part of the Strategic Environmental Assessment (SEA) for our Strategy. It was produced in accordance with the SEA Directive (2001/42/EC) and transposing regulations (Statutory Instrument 1633, 2004). The Environmental and Sustainability Report was subject to public consultation, alongside our Draft Strategy and is summarised here.

Details of how the consultation responses were addressed are included in a separate Post Adoption Statement (PAS). The purpose of the PAS is to document how environmental considerations, the views of consultees and the recommendations of the Environmental and Sustainability Report have been taken into account in our final Strategy.

The aim of the SEA was to highlight the environmental and sustainability benefits and drawbacks of the alternative options in our Strategy, and to ensure strategic decisions are informed by the SEA. The assessment considers 15 SEA objectives derived as follows:

i) Objectives specified by Annex I of the European SEA Directive – Table Column 1

ii) Objectives derived from the NDA's supplementary Energy Act (2004) obligations - Table Column 2

iii) Objectives identified through the review of baseline evidence and relevant plans and programmes, and engagement and consultation with stakeholders on a Scoping Report (2008) *(ref 18)* and the SEA of the LLW Strategy Consultation (2009) *(ref 19)* – Table Column 3.

Column 4 below details the SEA Objectives applied to the NDA Strategy, derived from considering columns 1, 2 and 3.

	Column 1 **Objectives derived from Annex 1 of the SEA Directive**	**Column 2** **Objectives derived from Energy Act (2004) Obligations**	**Column 3** **Objectives derived from NDA Consultation/ Scoping Report**	**Column 4** **SEA Objectives applied to NDA Strategy**
1	Air	-	-	**Air Quality**
2	Climatic Factors	-	-	**Global Climate Change and Energy**
3	Biodiversity Fauna Flora	-	-	**Biodiversity** **Fauna** **Flora**
4	Landscape	-	-	**Landscape and Visual**
5	Cultural Heritage	-	-	**Cultural Heritage**
6	Soil	-	-	**Geology, Ground and Groundwater Quality**
7	Water	-	Marine sediments	**Surface Water Resources and Quality**
8	-	-	Waste	**Waste**
9	Population	Social or economic life, maintenance and development of skilled workforce	-	**Economy, Society and Skills**
10	-	-	Traffic and Transport	**Traffic and Transport**
11	Material Assets	-	-	**Land Use, Natural and Material Assets**
12	Noise and Vibration	-	-	**Noise and Vibration**
13	Human Health	-	-	**Health and Safety**
14	-	Hazard Reduction	-	**Hazard Reduction**
15	-	Secure Value for Money	-	**Value for Money and Affordability**

We develop strategies through our SMS, described in Appendix A. In selecting a preferred strategic option we consider a wide range of factors including health, safety and environmental protection, technical, financial, economic and social effects, including the impact on local communities. We call this combination of factors our *Value Framework* and in this way we incorporate the requirements of SEA into the heart of strategy development and strategic decision making.

Individual strategic option decisions are accompanied, where appropriate, by their own dedicated SEA. However, an overarching SEA has been prepared to accompany this Strategy, which is summarised in this Appendix (also see the Non Technical Summary of the SEA available at **www.nda.gov.uk**).

As previously described, we group our activities into six strategic themes. The SEA and this Strategy are structured to reflect these:

Site Restoration

Spent Fuels

Nuclear Materials

Integrated Waste Management

Business Optimisation

Critical Enablers

As Critical Enablers support the delivery of all strategic themes, they have not been considered as part of the SEA that accompanies this Strategy.

Three other individual strategies have been excluded from the SEA which accompanies this Strategy for the reasons below:

Lower Activity Waste Strategy

— Solid Low Level Waste – a separate SEA has already been prepared for this, which accompanies the UK Nuclear Industry LLW Strategy *(ref 22)*

— Liquids and Gaseous Discharges – Government has published its revised UK Strategy for Radioactive Discharges *(ref 8)* which removes the need for the NDA to undertake an SEA.

Non-Radioactive and Hazardous Waste

The UK has a well established, comprehensive and prescriptive regulatory regime for the management of waste. Waste management strategies have also been developed at UK, regional and local level by Government and/or Devolved Administrations, local and regional authorities. Under the SEA regulations the NDA is not required to undertake an environmental and sustainability assessment where they are covered by previously developed waste management strategies.

Land and Property Management

Due to the scope of this strategy, an environmental and sustainability assessment was deemed inappropriate.

An SEA for *geological disposal* is under development separately by our Radioactive Waste Management Directorate (RWMD).

Each strategic theme contains a number of strategic options. The potential effects of each option have been identified, characterised and assessed against the 15 SEA objectives using a qualitative scale:

— major positive effect

— minor positive effect

— negligible/neutral effect

— minor negative effect

— major negative effect

— uncertain effect.

Consideration has also been given to the timing of the potential effects:

— short-term (present to 2020)

— medium-term (2020 to 2100)

— long-term (2100 onwards).

The following information has been recorded in the assessments:

— the SEA objective

— a score indicating the nature of the effect

— the timing of potential effects

— a commentary on the likely effects

— recommendations as to how the benefits may be achieved and detriments mitigated.

The level of the assessment of the strategy options was performed at a strategic level and an appropriate degree for the level of maturity of the individual strategies. Where strategy themes were in early stages of development or required more underpinning the environmental and sustainability assessments were broader in style than definitive, detailed project assessments. Where appropriate environmental assessments or sustainability appraisals will be undertaken at the site or specific project level. However this will be established by SLCs on a case by case basis.

In undertaking the assessments, cumulative effects that may occur as a result of implementing multiple options in combination have been considered in the Environmental and Sustainability Report *(ref 3)*.

Furthermore, the assessment has considered the interactions between individual SEA objectives, including indirect and secondary effects. For example, the traffic and transport objective has a number of indirect and secondary effects on air quality and global climate change and energy. Such interactions are highlighted where they are likely to affect an objective's outcome.

This Appendix presents an overview of the SEA in two ways:

1) a high-level summary of the assessment for each strategic theme

2) a summary assessment of those objectives for which the strategy results in significant effects, identified as Waste, Hazard Reduction and Global Climate Change and Energy.

The remaining 12 SEA objectives, and their effects, are described in the Environmental and Sustainability Report. This can be found on our website **www.nda.gov.uk**

Site Restoration

Decommissioning

Our Decommissioning Strategy focuses on how a site is decommissioned. It proposes five options, two of which relate to the timing of decommissioning, two relate to how clean-up is undertaken (in-situ or ex-situ) and one is non proactive i.e. 'do nothing'. The SEA anticipates that any short and medium-term detrimental effects will come predominantly as a result of energy consumption and traffic and transport movements. There are likely to be a number of positive effects in the long-term, notably for geology, ground and groundwater, surface water and *hazard* reduction. The SEA assessment indicates that this strategy's Credible Option of continuous decommissioning potentially provides the greatest environmental benefit (where appropriate disposal routes are available).

Land Quality Management

The Land Quality Management Strategy focuses on the management of land contamination (contaminated ground and groundwater). It groups options for managing land according to whether it will be managed in-situ or ex-situ, and whether the land will be re-used (with or without prior remediation) or put under long-term *institutional control.* In the short and medium-term a number of effects are anticipated. As highlighted in the strategy, the majority of detrimental effects are associated with ex-situ options due to increased levels of disturbance, energy consumption and transportation associated with the need to excavate and remove contaminated materials. The other main detrimental effect is the potential for generating significant quantities of waste. In the long-term there is likely to be a positive effect on ground and groundwater and surface water as a result of removing contamination.

Site End States

The Site End States Strategy focuses on the level of decommissioning and land quality management undertaken. It proposes four options that relate to differing levels of remediation. As with the other strategies in the Site Restoration theme, the majority of detrimental effects are anticipated to occur in the short and medium-term. SEA objectives in which detrimental effects are anticipated to occur include air quality, global climate change and energy, traffic and transport and waste. The greater the level of activity, the greater the detrimental effect on these SEA objectives to achieve the Site End State. In the long-term, it is anticipated that there will be a number of positive effects from remediation at a site. The SEA objectives most likely to be positively affected include ground and groundwater, surface water, hazard reduction, land use and natural and material assets, and landscape and visual. The SEA has helped us to select the preferred strategic option of returning a site (or part of a site) to a condition suitable for its next planned use because this balances the positive and detrimental effects of restoration activities.

Spent Fuels

Magnox Fuel, Oxide Fuel, Exotic Fuels

The Spent Fuels Strategy covers the long-term management of Magnox, oxide and exotic fuels. Alongside the current policy, three illustrative alternatives were proposed. The assessments for these illustrative alternatives highlight issues that will be considered and incorporated in the strategy development process. In the short-term global climate change and energy is likely to be adversely affected due to the energy required for storing spent fuel, through reprocessing activities and the provision of new plant. There may be a positive effect against the economy, society and skills objective as a result of support required for employment and retention of skills associated with reprocessing and storage activities. In the medium-term it is anticipated that there will be a number of detrimental effects due to the potential extended period of storage and the need for periodic refurbishment or replacement of stores. This may include affecting air quality, energy consumption, traffic and transport and land use and natural and material assets. However, if reprocessed materials are re-used within the nuclear fuel cycle there is a significant benefit under the global climate change and energy use SEA objective by offsetting emissions that would have resulted from the extraction of ore. This issue is covered within the Nuclear Materials Management Strategy. In the long-term there is likely to be a positive effect as spent fuel will be managed such that the hazard will be reduced by either disposing of or reprocessing the spent fuel.

Nuclear Materials

Plutonium

The Plutonium Strategy addresses how plutonium materials can be managed. In addition to current policy, the strategy proposes two illustrative alternatives that ultimately result in disposal (as a waste) or re-use (as an asset). There are relatively limited effects in the short-term as plutonium is kept in existing storage facilities. The majority of effects are anticipated to occur in the medium-term as storage facilities are required to be refurbished or replaced periodically and processing activities require the consumption of energy. Land use, natural and material assets are likely to be particularly detrimentally affected due to increased activities, while there is likely to be a positive effect in terms of hazard reduction associated with storage and disposal or storage and re-use options. In the long-term, the main effects are anticipated to be associated with extended storage. The SEA assessments for these illustrative alternatives will be incorporated in the strategy development and implementation process once UK Government policy has been determined.

Uranics

The Uranics Strategy focuses on the long-term management of uranium material. In addition to the current policy of extended storage, three illustrative alternatives are proposed relating to disposal, early sale or deferred sale. Some effects are anticipated in the short-term. However, the majority of effects are anticipated to occur in the medium-term. Detrimental effects are likely to arise from a majority of SEA objectives. This is due to the activities associated with continued storage, such as the refurbishment or replacement of stores periodically required. However a beneficial effect may arise from re-using material instead of extracting ore. The strategy development will seek to minimise environmental detriments identified by the SEA especially associated with storage arrangements. In the long-term, significantly positive effects are likely to occur in relation to hazard reduction, particularly with the disposal or sale options.

Integrated Waste Management

Higher Activity Waste

Waste Conditioning: The waste conditioning strategy focuses on the timing of waste treatment and packaging prior to disposal. It proposes two options which are early waste conditioning and packaging into a disposable form or a staged approach where the waste is initially containerised to support major risk reduction initiatives and further waste treatment and conditioning is deferred. The most significant SEA objectives throughout the short, medium and long-term are health and safety and hazard reduction. This is because the conditioning of waste makes it passively safe and reduces the risks to people handling it for further disposal or treatment. It also applies when waste is contained in a safe medium, reducing the risks it poses to people or the environment.

Storage: The storage strategy proposes three options for wastes; in-situ (i.e. where they arise), interim (until a disposal route becomes available), or long-term storage (storage of waste packages within a purpose-built facility, which aims to maximise the lifetime of waste packages where there is no planned transfer to a disposal facility. The planned storage period will be for at least 100 years). The effects are largely uncertain against many SEA objectives as they depend on the specific location of waste storage, or are considered negligible as the facilities will all be constructed to minimise any potential adverse effects. However, detrimental effects may occur against land use, natural and material assets, while positive effects are anticipated to occur for health and safety and hazard reduction. The assessment indicates that longer term waste storage arrangements have a greater environmental detriment. This has informed the strategy development of actively pursuing waste management and disposal solutions.

Treatment and Disposal: The treatment and disposal strategy proposes options for disposal or treatment of wastes. Treatment refers to activities such as volume reduction, or *decay storage* to LLW. Disposal relates to geological or near surface disposal options. While the effects differ depending on the option considered, a number of SEA objectives are significantly affected by the majority of options. Global climate change and energy is detrimentally affected by a number of options in the short-term, but is both positively and negatively affected in the medium-term due to the consumption of energy during treatment and the need to provide facilities for disposal. There are both significant detrimental and positive effects due to the volume of waste produced during the construction of suitable disposal facilities. Economy, society and skills and land use, natural and material assets are also affected as a result of increased activity associated with managing wastes and developing facilities, such as geological disposal. In the medium to long-term there is also likely to be a positive effect in relation to hazard reduction as wastes are disposed of or treated. A separate SEA will be prepared that examines the implications of geological disposal in more detail. It will become available on the NDA website when complete **(www.nda.gov.uk)**. It should also be noted that the IWM strategy only covers Higher Activity Wastes because the LLW SEA was completed for the UK Nuclear Industry LLW Strategy *(ref 22)*.

Higher Activity Waste contd

Location: The location strategy focuses on where waste will be treated or disposed of (except in the case of international location where only treatment will occur). The majority of effects are considered to be uncertain, as they depend on the specific location where wastes will be treated and disposed of. It is anticipated that the most significant effect would be global climate change and energy depending on the size and location of the facility. There may also be effects against waste and land use, natural and material objectives, again reflecting differences in the ability of facilities to treat wastes. These would occur predominantly in the medium-term. The SEA findings will be included in the decision-making process, leading to a multi-site and UK-wide strategy.

Business Optimisation

Revenue Optimisation

The business optimisation assessment focuses on the operating life of our sites at Wylfa and Oldbury. It confirms that the effects are limited to the short-term because by the medium-term power generation will have ceased. Consequently, the medium and long-term effects are related to decommissioning options implemented by other strategies. In the short-term, the main positive benefits relate to the global climate change and energy objective (due to the potential offsetting of CO_2 emissions as a result of extended generation) and the value for money and affordability objective (due to potential ongoing revenue generation). The main detrimental effect is on the surface water objective due to the potential ongoing requirement for cooling water usage. The limited extra radioactive waste and spent fuel is not significant. The assessments substantiate the strategy in that benefits outweigh the detrimental effects.

SEA Objectives Most Affected

The anticipated effects of the NDA Strategy are considered to be most significant for the following three SEA objectives:

Global Climate Change and Energy

The actions required to achieve the NDA's mission will all require significant amounts of energy and lead to CO_2 emissions. Energy will be required for the maintenance of existing facilities for storing and conditioning wastes, the maintenance of workplace settings and the remediation of land to achieve the required Site End States.

The key effects arising from the NDA Strategy on energy use focus on the level and timing of decommissioning activities. In the longer term, an increasing amount of energy may be required for transport of materials, waste and machinery to and from sites to support decommissioning. However, if decommissioning is delayed, the need for the maintenance of facilities to store nuclear legacy materials and wastes will increase energy usage. Conversely, extensive early decommissioning and consignment of wastes to appropriate disposal facilities is likely to consume more energy in the short-term. Early decommissioning or more extensive remediation of sites will require more energy as the natural process of radioactive decay will not have taken place. Consequently, the NDA Strategy is anticipated to consume a relatively significant amount of energy during the short, medium and long-term, although individual options and timings will have varying effects.

Our strategy will have a long-term positive effect on the climate change SEA objective by managing the UK's civil nuclear liabilities. In this way the risk to people and the environment as a result of contaminants becoming mobilised by coastal erosion, rising sea levels or increased rainfall will be minimised.

The nature, magnitude and timing of the effects are all subject to variation depending on the implementation of our Strategy in a local context.

Waste

Decommissioning activities will generate a significant volume of radioactive and non-radioactive waste. Actual volumes will vary depending on the management and decommissioning options implemented at particular sites, the outcomes of policy decisions by Government and the timing of implementation of the options. For example, spent fuels and nuclear materials have the potential to be reprocessed and re-cycled. However, such materials will require continued storage until a policy or strategy decision is made on their long-term future. Storage facilities have finite lifetimes and may need to be refurbished or replaced and this will generate additional waste. Similarly, a higher level of remediation in the short and medium-term is likely to generate more waste than a lower level of remediation that capitalises on the potential of natural attenuation over the long-term.

Hazard Reduction

Our strategy will have a significant effect on hazard reduction. There is likely to be a significantly positive effect with the processing and disposal of wastes and remediation of sites to agreed end states. The reduction in hazard may be delayed depending on the techniques implemented, the timing of policy decisions, and the availability of specialist infrastructure (such as a GDF).There is expected to be a significant decrease in hazards following legacy ponds and silo retrieval, treatment and decommissioning in the medium-term.

The anticipated effects of our strategy for the remaining SEA objectives are assessed as having other potential (non-significant) effects, neutral or uncertain effects. However, certain SEA objectives may have significant effects at the local or tactical level rather than at a strategic level. Details of the SEA assessments are given in the main Environmental and Sustainability Report.

Conclusion

Overall, and independent of the options selected, the implementation of our Strategy is likely to result in a positive effect in the long-term following completion of decommissioning. This is due to the fact that the UK's civil nuclear liability will have been dealt with, hazards will have been reduced and the quality of natural environmental assets improved.

The key significant effects arising from the implementation of our Strategy are anticipated to be in relation to energy consumption, waste generation, and hazard reduction. Waste and hazard reduction are particularly interrelated as more waste may be generated to achieve a higher degree of hazard reduction, particularly in the short to medium-term. However, delaying hazard reduction may result in less waste due to natural attenuation, radioactive decay and the development of techniques to manage and reduce waste volumes.

There are likely to be a number of lesser effects in relation to other SEA objectives such as surface water resources and quality, traffic and transport, and geology, ground and groundwater quality. However, these are not currently considered to be key differentiating factors affected by our Strategy.

A number of effects are likely to vary in magnitude depending on the sensitivity of receptors at specific sites (such as biodiversity, cultural heritage, landscape and visual, and noise and vibration). The magnitude of the effects will become apparent when more detailed consideration is given to the combination of options to be implemented at individual sites rather than considered at the strategic (non site specific level). Better understanding of the magnitude of the effects will be captured by further assessment work at the local level, including Environmental Impact Assessments (EIA) and Habitats Regulations Assessments.

The effects of our Strategy are largely dependent upon what options are implemented and the outcome of policy decisions. Whilst the NDA can make informed decisions on strategic options, certain strategic policy decisions have to be made by UK Government and/or the Devolved Administrations. These can then affect the range of strategic options and their effects.

The environmental and sustainability issues identified will be considered as strategies are further developed by the Strategic Authorities and implemented. Mitigation measures will be enacted as appropriate and optimised at the site or project level. Measures will be taken to monitor the significant environmental effects of the implementation of the Strategy. Monitoring will focus on significant effects that may give rise to irreversible damage, with a view to identifying trends before such damage is caused. Monitoring will also aim to identify significant effects where there was uncertainty in the Strategy and identify preventative or mitigation measures to be applied.

The NDA's Strategy's requirements are implemented through specifications issued to SLCs which set out what the strategy means for each site. These requirements are then translated into delivery plans by the SLCs who will be evaluated and held to account for their performance against delivery milestones.

Finalising our Strategy

The Environmental and Sustainability Report was published alongside this Strategy. Feedback received from consultees in relation to the SEA was documented and considered. The NDA Strategy was amended. A Post Adoption Statement has been produced to highlight how recommendations of the SEA and issues identified in the consultation were incorporated in our Strategy.

A collation of the SEA consultation responses and how they have been dealt with in developing the final strategy is included with the Post Adoption Statement. This document also describes indicators that will be used to monitor for significant environmental and sustainability effects during Strategy implementation.

The Environmental and Sustainability Report, its Non-Technical Summary *(ref 3)* and the Post Adoption Statement are available on **www.nda.gov.uk**

Appendix C

Information on our Designated Sites and Installations

This section provides context, the current Site End State and key milestones for each of the sites for which we are responsible.

Following the outcome of the NDA's funding settlement for the period 2011/12 to 2014/15, we will work to establish what can be achieved in future years. As such, while the following dates are provided using the best available information at the time of publication, they are subject to change, once SLC plans are finalised in due course.

A Site End State describes the condition to which *designated* land needs to be restored. The output of the Site End State consultation has been used as base input to the NDA Strategy.

In line with the Site End States Strategy, Site End State definitions will remain flexible until planning commences for the final stages of restoration. Where appropriate, a Site End State will be achieved incrementally through one or more Interim States. This could include part of a site being released for re-use while other areas of the site continue to be restored.

During the next 10 years we expect:

— all Magnox stations to have been defuelled and spent fuel reprocessed to a long-term stable form

— three of the Magnox sites to have entered the Care and Maintenance phase in readiness for Final Site Clearance

— significant progress to have been made on high hazard reduction programmes, this includes the retrieval of materials from Legacy Ponds and Silos at Sellafield

— the management of all NDA sites to have been competed

— all NDA's non core assets to have been disposed of

— to commence Surface-Based Investigations Phase for the Geological Disposal Facility (GDF).

During the next 20 years we expect:

— all other Magnox sites to have entered Care and Maintenance

— decommissioning to have been completed at Harwell and Winfrith

— at Dounreay, all ILW to have been removed from the shaft and all residues from the Dounreay Fast Reactor (DFR)

— at LLWR, the Plutonium Contaminated Material (PCM) facilities to have been removed

— confirmation of a site's suitability to host a Geological Disposal Facility that complies with safety and environmental regulatory requirements, and commence the Construction and Underground Investigations Phase.

For more information regarding the phases of the Geological Disposal Facility please visit our website:
http://www.nda.gov.uk/stakeholders/newsletter/underground-disposal-plans-outlined.cfm

Defuelling at Chapelcross. We expect all Magnox stations to have defuelled within the next 10 years.

Sellafield Ltd

Sellafield (including Calder Hall and Windscale)

Sellafield is a large and complex nuclear chemical facility located in West Cumbria. The site has played a pivotal role within the nuclear industry since the 1940s. Site operations include fuel reprocessing, fuel fabrication and storage of nuclear materials and radioactive wastes. Calder Hall, located on the site, was the world's first commercial nuclear power station. Generation started in 1956 and ceased in 2003. Windscale, also located on the site, comprises three reactors. Two of the reactors were shut down in 1957 and the third one was closed in 1981.

Site End State

The *designated* land at Sellafield has been divided into two discrete zones for the purpose of defining the Site End State; the 'Inner Zone' and the 'Outer Zone'. The boundary of the Inner Zone is currently assumed to include the Separation Area and the Windscale Piles. It is envisaged that any new disposal facilities or long-term storage activities will be located within the Inner Zone. The Site End State to be secured by the NDA for the Inner Zone comprises the following:

- the Inner Zone will be subject to *institutional controls* to manage risks to people and the environment
- remediation infrastructure will be used as necessary to ensure groundwater quality is consistent with the requirements of the relevant regulatory regime
- structures and infrastructure will be made safe or removed where necessary.

The Site End State to be secured by the NDA for the Outer Zone comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a *nuclear site licence*, radioactive contamination will be reduced to meet the criteria for *delicensing*, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2013	— Complete Active commissioning of Sellafield Product and Residue Store (SPRS)
2014	— Completion of defuelling at Calder Hall#
2015	— Highly Active Liquor (HAL) stocks reduced to 'steady state' volume
2016	— First generation Magnox storage pond – start of sludge retrievals
	— Magnox reprocessing completed#
2017	— Pile Fuel Storage Pond – start of metal fuel retrieval
2018	— First generation Magnox storage pond – start of fuel retrieval
	— Magnox Swarf Storage Silos – start of waste retrievals
2019	— Pile Fuel Cladding Silo – start of waste retrievals
	— Complete return of overseas customers HLW
2020	— THORP reprocessing completed
2024	— Calder Hall site enters *Care and Maintenance* phase
2026	— Vitrification of liquid HLW complete
2030	— Windscale Pile 1 and 2 in Care and Maintenance with fuel and isotopes removed
2040	— Commencement of transfer of stored ILW to Geological Disposal Facility (GDF)
2046	— All ILW from the Legacy Ponds and Silos retrieved, conditioned and stored
2075	— Commencement of transfer of stored HLW to HLW repository
2105	— Calder Hall final site clearance commences
2115	— Calder Hall final site clearance achieved
2120	— Final site clearance achieved

Milestone dates reflect current Magnox Operating Programme - MOP 8 Revision 2 – Addendum 2 to MOP 8 (ME/P/001)

Sellafield and Calder Hall costs

DCU £23,537 m
Ops £5,842 m

DCU: Decommissioning & Clean-Up. Ops: Operations, separately reported in accordance with Energy Act requirements).

Sellafield Ltd

Sellafield Limited

Capenhurst

Capenhurst is located near Ellesmere Port in Cheshire. It was home to a uranium enrichment plant and associated facilities that ceased operation in 1982.

Site End State

The Site End State to be secured by the NDA for *designated* land at Capenhurst comprises the following:

— radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for continued use as a nuclear licensed site under the control of another *nuclear site licence* holder

— the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2020	— Commencement of hex deconversion
2120	— Uranium storage operations cease
	— Final site clearance achieved

Capenhurst costs

DCU	£645 m
Ops	£0 m

Magnox

Magnox Limited

Berkeley

Berkeley site is located in Gloucestershire and was one of the UK's earliest nuclear power stations. Generation started in 1962 and ceased in 1989 with defuelling completed in 1992. Work continues to prepare the site for entry into *Care and Maintenance*.

Site End State

The Site End State to be secured by the NDA for *designated land* at Berkeley comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a *nuclear site licence*, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2021	— Site enters Care and Maintenance phase
2070	— Final site clearance commences
2079	— Final site clearance achieved

Berkeley costs

DCU	£608 m
Ops	£0 m

Bradwell

Bradwell is another of the UK's earliest power stations and is located in Essex. Electricity generation started in 1962 and ceased in 2002 with defuelling completed in 2006. Work continues to prepare the site for entry into Care and Maintenance.

Site End State

The Site End State to be secured by the NDA for designated land at Bradwell comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2015	— Site enters Care and Maintenance phase
2083	— Final site clearance commences
2092	— Final site clearance achieved

Bradwell costs

DCU	£724 m
Ops	£0 m

DCU: Decommissioning & Clean-Up. Ops: Operations, separately reported in accordance with Energy Act requirements).

Chapelcross

Chapelcross site is located near Dumfries in South West Scotland. It was the first Scottish nuclear power station, with generation starting in 1959. Generation ceased in June 2004 and in 2007 the familiar landmark cooling towers were demolished. Defuelling commenced in 2009.

Site End State

The Site End State to be secured by the NDA for designated land at Chapelcross comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2011	— Completion of defuelling
2027	— Site enters Care and Maintenance phase
2085	— Final site clearance commences
2095	— Final site clearance achieved

Chapelcross costs

DCU	£804 m
Ops	£34 m

Dungeness A

Dungeness A site is located in Kent. Electricity generating started in 1965 and ceased in December 2006. Reactor defuelling commenced in 2007.

Site End State

The Site End State to be secured by the NDA for designated land at Dungeness A comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2011	— Completion of defuelling
2029	— Site enters Care and Maintenance phase
2087	— Final site clearance commences
2097	— Final site clearance achieved

Dungeness A costs

DCU	£879 m
Ops	£17 m

Magnox

Magnox Limited

Hinkley Point A

Hinkley Point A site is located in Somerset. Electricity generation started in 1965 and ceased in 2000, with defuelling completed in 2004. Work continues to prepare the site for entry into Care and Maintenance.

Site End State

The Site End State to be secured by the NDA for designated land at Hinkley Point A comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2025	— Site enters Care and Maintenance phase
2080	— Final site clearance commences
2090	— Final site clearance achieved

Hinkley Point A costs

DCU	£890 m
Ops	£0 m

Hunterston A

Hunterston A site is located in Ayrshire in South West Scotland. Electricity generation started in 1964 and ceased in 1989. Work continues to prepare the site for entry into Care and Maintenance.

Site End State

The Site End State to be secured by the NDA for designated land at Hunterston A comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned used no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2022	— Site enters Care and Maintenance phase
2070	— Final site clearance commences
2080	— Final site clearance achieved

Hunterston A costs

DCU	£671 m
Ops	£0 m

DCU: Decommissioning & Clean-Up. Ops: Operations, separately reported in accordance with Energy Act requirements).

Oldbury

Oldbury power station is located in South Gloucestershire. Electricity generation started in 1967 and approval has been secured to extend its operational life to mid-2011. It is the oldest operating nuclear power reactor in the world.

Site End State

The Site End State to be secured by the NDA for designated land at Oldbury comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2011	— Cease generation
2013	— Completion of defuelling
2027	— Site enters Care and Maintenance phase
2092	— Final site clearance commences
2101	— Final site clearance achieved

Oldbury costs

DCU	£954 m
Ops	£126 m

Sizewell A

Sizewell A site is located in Suffolk. Electricity generation started in 1966 and ceased in December 2006. Defuelling commenced in 2007.

Site End State

The Site End State to be secured by the NDA for designated land at Sizewell A comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2013	— Completion of defuelling
2034	— Site enters Care and Maintenance phase
2088	— Final site clearance commences
2098	— Final site clearance achieved

Sizewell A costs

DCU	£916 m
Ops	£52 m

Magnox

Trawsfynydd

Trawsfynydd site is located at Trawsfynydd in Gwynedd, North Wales. Electricity generation started in 1965 and ceased in 1991. Reactor defuelling was completed in 1995. The site continues to prepare for entry into Care and Maintenance.

Site End State

The Site End State to be secured by the NDA for designated land at Trawsfynydd comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use
- the asbestos disposal facility will remain in place consistent with current planning consent for the site.

Year	Current Key Milestones
2016	— Site enters Care and Maintenance phase
2073	— Final site clearance commences
2083	— Final site clearance achieved

Wylfa

Wylfa power station is located on Anglesey in North Wales. It was the last and largest power station of its type to be built in the UK. Electricity generation started in 1971.

The NDA also has designated powers to manage and operate the Maentwrog hydro-electric power station, which was opened in 1928 and is situated near the Trawsfynydd site.

Site End State

The Site End State to be secured by the NDA for designated land at Wylfa comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use

Year	Current Key Milestones
2012	— Cease generation
2015	— Completion of defuelling
2025	— Site enters Care and Maintenance phase
2091	— Final site clearance commences
2101	— Final site clearance achieved

Trawsfynydd costs

DCU	£796 m
Ops	£0 m

Wylfa costs

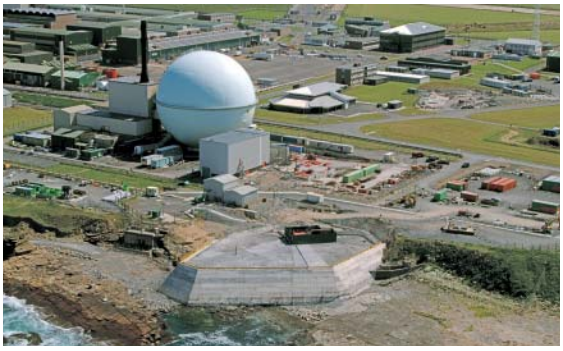
DCU	£964 m
Ops	£297 m

DCU: Decommissioning & Clean-Up. Ops: Operations, separately reported in accordance with Energy Act requirements).

Dounreay Site Restoration Ltd

Dounreay Site Restoration Limited

Dounreay



Dounreay is located in Caithness on the north coast of Scotland. It was established as a research site in the mid-1950s with fuel production and processing facilities. There were three reactors, the last of which ceased operation in 1994.

Site End State

The Site End State to be secured by the NDA for designated land at Dounreay comprises the following:

- Radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land.
- Where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime.
- The physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.
- Existing waste disposal facilities will either be emptied or engineered for closure, as determined by the relevant *Environmental Safety Case.*

Year	Current Key Milestones
2014	— LLW facilities commence operations
2029	— All NaK residues removed from DFR
2032	— All ILW removed from shaft
2034	— PFR facility decommissioning complete
2039	— Interim State achieved

Dounreay costs

DCU	£2,396 m
Ops	£0 m

Research Sites Restoration Limited

Harwell

Harwell is located in Oxfordshire and was established in 1946 as the UK's first atomic energy research establishment. The majority of the facilities ceased operation in the early 1990s and decommissioning has been ongoing since then, with over 100 buildings and facilities removed from the site.

Site End State

The Site End State to be secured by the NDA for designated land at Harwell comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2023	— Primary facilities decommissioning complete
2031	— Reactor decommissioning complete
2064	— Final site clearance achieved

Winfrith

Winfrith is located near Poole in Dorset. It was established by UKAEA in 1957 as an experimental reactor research and development site. Decommissioning activities began in the early 1990s and the last reactor was shut down in 1995. All the nuclear fuel and the majority of hazards have now been removed from the site.

Site End State

The Site End State to be secured by the NDA for designated land at Winfrith comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Year	Current Key Milestones
2032	— DRAGON reactor complex decommissioning complete
2038	— Steam Generating Heavy Water Reactor (SGHWR) complex decommissioning complete
2048	— Final site clearance achieved

Harwell and Winfrith costs

DCU	£1,203 m
Ops	£0 m

DCU: Decommissioning & Clean-Up. Ops: Operations, separately reported in accordance with Energy Act requirements).

Low Level Waste Repository Limited

LLW Repository near Drigg

The Low Level Waste Repository (LLWR) is located near Drigg in West Cumbria. The site has operated as a disposal facility since 1959 and is of strategic importance to most producers of low level nuclear waste (including hospitals and research laboratories) across the UK. Wastes are compacted and placed in containers before being transferred to the facility.

Site End State

The Site End State to be secured by the NDA for designated land at Low Level Waste Repository comprises the following:

- the disposed waste will remain in-situ as determined by the site's *Environmental Safety Case*
- the physical state of the repository will reflect the optimised closure engineering described in the site's *Environmental Safety Case*
- access to the site will be managed in accordance with institutional controls
- the repository will remain subject to institutional controls for as long as required by the relevant regulatory regime to manage risks to people and the environment.

Year	Current Key Milestones
2023	— PCM facilities removal complete
2007 to 2060	— Engineered vaults construction
2080	— Final site clearance achieved

LLW Repository near Drigg

DCU	£290 m
Ops	£180 m

Springfields Fuels Limited

Springfields

Since the 1940s, Springfields has manufactured fuel products for the UK's nuclear power stations and for international customers. In addition to fuel manufacture it is also undertaking various decommissioning activities.

In March 2010, an agreement was reached between NDA and Westinghouse to transfer the commercial operations and workforce of Springfields Fuels Limited to Westinghouse, who have been managing the site successfully for five years under contract to the NDA. Under the agreement, the NDA retains responsibility for the historic nuclear liabilities whilst Westinghouse will have the commercial freedom to pursue new fuel manufacturing business.

Site End State

The Site End State to be secured by the NDA for designated land at Springfields comprises the following:

- radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land
- where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime
- the physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.

Springfields

DCU	£687 m
Ops	£0 m

Appendix D

Summary of Expected Expenditure and Income

		£m****				
		Decom & Clean-up Costs*	Total Operations Costs**	Commerical Revenue	Net Running Cost	Govern-ment Funding
SLCs	Sites	A	Running Cost B	C	D = (B-C)	E = (A+D)
Magnox Limited	Magnox Support	859	-	23	(23)	836
	Berkeley	608	-	3	(3)	605
	Bradwell	724	-	-	0	724
	Chapelcross	804	34	-	34	838
	Dungeness A	879	17	9	8	887
	Hinkley Point A	890	-	-	0	890
	Hunterston A	671	-	-	0	671
	Oldbury	954	126	-	126	1,080
	Sizewell A	916	52	3	49	965
	Trawsfynydd	796	-	-	0	796
	Wylfa	964	297	-	297	1,261
Research Sites Restoration Limited	Harwell and Winfrith	1,203	-	-	0	1,203
Dounreay Site Restoration Limited	Dounreay	2,396	-	27	(27)	2,369
Sellafield Limited	Sellafield and Calder Hall	23,537	5,842	7,240	(1,398)	22,139
	Capenhurst	645	-	-	0	645
	Windscale	987	92	-	92	1,079
LLWR Limited	LLWR	290	180	516	(336)	(46)
Springfields Fuels Limited	Springfields***	687	-	102	(102)	585
Sub-Total		**38,810**	**6,640**	**7,923**	**(1,283)**	**37,527**
	Electricity Sales	0	60	187	(127)	(127)
	Geological Disposal Facility	3,767	-	-	-	3,767
	NDA Central Liabilities & Group	2,506	1,326	969	357	2,863
Total		45,083	8,026	9,079	(1,053)	44,030

Notes:

* Figures from 2009/2010 Annual Report and Accounts *(ref 4)*

** From Site *Lifetime Plans (ref 5)*

*** Springfields commercial revenue reflects income for lease of site to Westinghouse only.

****Costs are discounted in accordance with Treasury guidance.

*****In the 2009/10 Annual Report and Accounts Magnox Support costs are reported as separate numbers since in 2009/10 Magnox North and Magnox South were separate companies.

As Low As Reasonably Achievable (ALARA)
The ALARA principle is contained in the Euratom Basic Safety Standards Directive 96/29, which is transposed into UK law. Essentially, it means that all reasonable steps should be taken to protect people. In making this judgement, factors such as the costs involved in taking protection measures are weighed against benefits obtained, including the reduction in risks to people.

As Low As Reasonably Practicable (ALARP)
To satisfy this principle, measures necessary to reduce risk must be taken until the cost of these measures whether in money, time or trouble, is disproportionate to the reduction of risk. (Cm 2919) (Edwards v. National Coal Board [1949]).

Best Available Technique
BAT is defined as the most effective and advanced stage in the development of activities and their methods of operation, which indicates the practical suitability of particular techniques for providing, in principle, the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and impact on the environment as a whole.

Best Practicable Environmental Option
In the context of authorisations under Radioactive Substances Act 1993 (RSA93), for nuclear sites, the options' assessment method currently used is BPEO. BPEO was described by the Royal Commission on Environmental Pollution, Twelfth Report (Cm 210) 1988 as "...the outcome of a systematic and consultative decision-making procedure which emphasises the protection and conservation of the environment across land, air and water. The BPEO procedure establishes, for a given set of objectives, the option that provides the most benefit or least damage to the environment as a whole, at acceptable cost, in the long-term as well as in the short-term." A BPEO study is usually carried out by or on behalf of the waste producer and assessed by the relevant environment agency as a basis for its regulatory decision-making.

Best Practicable Means
BPM is a term used by the Environment Agency (EA) and Scottish Environment Protection Agency (SEPA) in authorisations issued under the Radioactive Substances Act. Essentially, it requires operators to take all reasonable practicable measures in the design and operational management of their facilities to minimise discharges and disposals of radioactive waste, so as to achieve a high standard of protection for the public and the environment. BPM is applied to such aspects as minimising waste creation, abating discharges, and monitoring plant, discharges and the environment. It takes account of such factors as the availability and cost of relevant measures, operator safety and the benefits of reduced discharges and disposals. If the operator is using BPM, radiation risks to the public and the environment will be ALARA.

Broadly Acceptable
Risks falling into this region are generally regarded as insignificant and adequately controlled. The level of risk below which, so long as precautions are maintained, it would not be reasonable to consider further improvements to standards if these involved a cost.

Business Case
Provides evidence and rationale to support decision making, and gives assurance to stakeholders that the NDA has acted responsibly. The business case process involves close scrutiny of all relevant financial and non-financial aspects of a proposed project, ensuring an optimal solution is selected for a given set of circumstances and that the identified benefits can be realised.

Care and Maintenance
When a plant/facility/installation is kept in a state of Care and Maintenance, it is made safe for a planned period of quiescence, after which decommissioning activities will recommence. At Magnox sites, Care and Maintenance begins when the only significant buildings on a site are the reactor buildings and an ILW store, which will be removed at the dismantling stage.

Characterisation of land
Work undertaken to understand the character of an area of land typically with respect to potential sources of contamination (a contaminating substance or pollutant), receptors (something that can be harmed by the source) and pathways (a means for the source to reach a receptor).

Cogent
This is the Sector Skills Council for the nuclear industry - www.cogent-ssc.com

Decommissioning and Clean-up
As used in the Energy Act (2004) - The entirety of our mission from decommissioning facilities, restoring the land and managing spent fuels, nuclear materials and waste arising. Where possible we avoid using this term, because the comprehensiveness of the Energy Act definition conflicts with natural usage.

Decommissioning
Taking a facility permanently out of service once operations have finally ceased, including decontamination and full or partial dismantling of buildings and their contents.

De-designation
This is a shortened expression which means a Revocation or Modification of a Designating Direction. Designations are made by the Secretary of State and for sites in Scotland by the Secretary of State in conjunction with the Scottish Ministers and laid before the UK Parliament and as appropriate in the Scottish Parliament.

Decay storage
Storing radioactive materials to allow radioactive decay. After decay storage materials will be less radioactive and will fall into a lower activity classification (for example ILW will become LLW). Decay storage is only suitable for materials with short half lives.

Delicensing
The act of revoking a Nuclear Site Licence once the Health and Safety Executive (HSE) has satisfied itself that licensable activities are no longer being carried out and there is no danger from ionising radiations from anything on the site or the part of the site to be delicensed. This ends the period of responsibility under the Nuclear Installations Act 1965.

Designation/designated
All nuclear installations on land owned by the NDA are designated as such under the Energy Act 2004. A designation is a specific description which controls use as a nuclear asset. Designations are made by the Secretary of State and for sites in Scotland by the Secretary of State in conjunction with the Scottish Ministers and laid before the UK Parliament and as appropriate in the Scottish Parliament.

Directive Waste
The phrase Directive Waste refers to European legislation called the Waste Framework Directive. This identifies the environmental protection principles behind waste regulation. It also identifies which wastes are covered by these principles and those which are not. It does not include radioactive waste, but does include the majority of non-radioactive wastes generated at NDA sites.

Disposition
Consignment of, or arrangements for the consignment of, material to some specified (interim or final) route or form.

Environmental Safety Case
A set of substantiated claims concerning the environmental safety of disposals of solid radioactive waste. It will be provided by the developer or operator of a disposal facility and should demonstrate that the health of members of the public and the integrity of the environment are adequately protected.

Geological disposal
A long-term management option involving the emplacement of radioactive waste in an engineered underground geological disposal facility or repository, where the geology (rock structure) provides a barrier against the escape of radioactivity and there is no intention to retrieve the waste once the facility is closed.

Hazard
Hazard is the potential for harm arising from an intrinsic property or ability of something to cause detriment.

Hazardous Waste
Hazardous waste is essentially waste that contains hazardous properties that may render it harmful to human health or the environment. The European Commission has issued a Directive on the controlled management of such waste (91/689/EEC) and hazardous waste is defined on the basis of a list drawn up under that Directive. Examples include asbestos, lead-acid batteries, oils and solvents.

High Level Waste
High Level Waste is heat generating waste that has accumulated since the early 1950s at Sellafield and Dounreay, primarily from the reprocessing of spent nuclear fuel. The temperature in HLW may rise significantly, this factor has to be taken into account when designing storage or disposal facilities.

Institutional Control
Institutional Control is a legal or administrative tool or action taken to reduce the potential for exposure to hazardous substances. Institutional controls may include, but are not limited to, land use restrictions, environmental monitoring requirements, and site access and security measures.

Intermediate Level Waste
Waste with radioactivity levels exceeding the upper boundaries for Low Level Waste (LLW), but which does not need heating to be taken into account in the design of storage or disposal facilities. ILW arises mainly from the reprocessing of spent fuel, and from general operations and maintenance of radioactive plant. The major components of ILW are metals and organic materials, with smaller quantities of cement, graphite, glass and ceramics.

Intolerable Risk
Above a certain level, a risk is regarded as intolerable and cannot be justified in any ordinary circumstance.

Irradiated fuel
Fuel assemblies taken out of a nuclear reactor after a period of energy production.

Lifetime Plans
The Lifetime Plan is produced by the site contractor to meet a contractual requirement of the NDA, and is revised annually. It gives details of the planned activities and costs of the work required to fully decommission the site to an agreed end state. The combination of all Lifetime Plans across the NDA estate yields the total cost of dealing with the NDA's liabilities.

Low Level Waste
Low Level Waste which includes metals, soil, building rubble and organic materials, arising principally as lightly contaminated miscellaneous scrap. Wastes other than those suitable for disposal with ordinary refuse, but not exceeding 4 GBq/te (gigabecquerels) of alpha or 12 GBq/te of beta/gamma activity. Metals are mostly in the form of redundant equipment. Organic materials are mainly in the form of paper towels, clothing and laboratory equipment that have been used in areas where radioactive materials are used – such as hospitals, research establishments and industry. The National Repository for LLW is near Drigg, Cumbria.

M&O Contracts
Management and Operations – a term relating to the day-to-day running of the sites by the SLC in accordance with the contract with the NDA.

Monitored Natural Attenuation
Monitors the effects of naturally occurring physical, chemical, and biological processes or any combination of these processes to reduce the load, concentration, flux or toxicity of polluting substances in ground or groundwater in order to obtain a sustainable remediation objective.

Near site, near surface disposal facilities
Facilities located at the surface of the ground or at depths down to several tens of metres below the surface. Near surface facilities may use the geology (rock structure) to provide an environmental safety function, but some may rely solely on engineered barriers.

Non-Radioactive Waste
We use the term non-radioactive waste to describe those wastes generated at our sites that are not radioactive waste. It includes both hazardous and non-hazardous waste.

Nuclear Installations Act 1965
UK legislation which provides for the operation and regulation of nuclear installations within the UK.

Nuclear Site Licence
A formal notification of the authorised body which can operate a nuclear operation under the Nuclear Installations Act 1965.

Nuclear Waste Research Forum (NWRF)
Sitting underneath the Research Board the NWRF is focused on sharing nuclear waste R&D needs, risks and opportunities across the nuclear site licence holders. Membership of the forum includes Regulators and other industry participants such as Atomic Weapons Establishment (AWE), Ministry of Defence (MoD) and EDF Energy*. Specialist topic subgroups have been formed by NWRF to focus on common areas.

OSPAR
(Oslo-Paris Convention) Convention which established requirements on the level of nuclear and non-nuclear discharges to the marine environment of the North East Atlantic, the North Sea and the Irish Sea.

Parent Body Organisation
Entities, competitively selected by the NDA, that own the SLCs for the duration of their PBO contract, responsible for bringing improvement in SLC performance.

Post Operational Clean Out
POCO – the first stage in preparing plant for Care and Maintenance after operations have ceased.

Priority Areas
Owing to the dominance of the nuclear sector and the lack of alternative, high-value employment opportunities, we have identified four priority geographic areas where we believe the impact of decommissioning and clean-up on local communities will be greatest.

Our four priority areas are:
— West Cumbria
— Caithness and North Sutherland
— Anglesey and Meirionnydd
— The Gretna-Lockerbie-Annan Corridor in Dumfries and Galloway

Repatriation
The process of returning material/waste to the place of origin.

Research Board
Focused on Decommissioning and Clean-Up in the UK, set up by NDA to look at strategic coordination of R&D issues. Current members of the Board include Government representatives, Regulators, Engineering and Physical Sciences Research Council (EPSRC) and the NDA.

Risk
Risk is the chance that someone, or something that is valued, will be adversely affected by the hazard.

Safety Case
A safety case is the written documentation demonstrating that risks associated with a site, a plant, part of a plant or a plant modification are As Low As Reasonably Practicable and that the relevant standards have been met. Safety cases for licensable activities at nuclear sites are required as licence conditioned under the Nuclear Installations Act.

Site Licence Company
Entities that deliver the NDA's programmes of work on the sites, under contract to the NDA. SLCs are owned by competitively selected Parent Body Organisations. SLCs employ the majority of staff, place contracts with the supply chain, and hold the authorisations for the activities they undertake, particularly the Nuclear Site Licences for the sites for which they are responsible. Some SLCs operate a single site, whereas others operate multiple sites.

Site Strategic Specification
Issued to our SLCs to ensure our requirements are incorporated into our SLC Lifetime Plans to achieve delivery.

Strategic Environmental Assessment
SEA refers to the type of environmental assessment legally required by the Environmental Assessment of Plans and Programmes Regulations 2004 (SI 2004/1633) and the Environmental Assessment (Scotland) Act 2005 in the preparation of certain plans, programmes and strategies. The authority responsible for the plan, programme or strategy must prepare an environmental report on its likely significant effects, consult the public on the report and the plan or programme proposals, take the findings into account, and provide information on the plan or programme as finally adopted.

Strategy Management System
The SMS is a management tool used to develop, control and communicate our Strategy for decommissioning and cleaning up the UK's civil public sector nuclear sites. It also provides the basis for the periodic review of our Strategy which summarises the current strategy at the time that it is published.

Thermal treatment
Any waste treatment technology that involves high temperatures in processing the feedstock and is normally deployed to enable the volume of radioactive waste for storage or disposal to be reduced. All thermal treatment technologies require an off-gas system to capture any gaseous radioactive waste produced during treatment and give the ability to manage the concentrated radioactive waste product that is produced as a result of the process.

Tolerable Risk
Tolerability does not mean 'acceptability'. It refers to a willingness to live with a risk so as to secure certain benefits and in the confidence that it is being properly controlled. To tolerate a risk means we do not regard it as negligible or something we might ignore, but rather as something we need to keep under review and reduce still further if and as we can.

Value Framework
A combination of factors which we consider when selecting a preferred strategic option, helping us balance our top priority of risk and hazard reduction alongside socio-political and affordability considerations. The Value Framework incorporates the requirements of Strategic Environmental Assessment (SEA), and therefore sustainability and environmental considerations underpin our strategy development and decision making.

Waste Hierarchy
A hierarchical approach to minimise the amounts of waste requiring disposal. The hierarchy consists of non-creation where practicable; minimisation of arisings where the creation of waste is unavoidable; recycling and re-use; and, only then, disposal.

* Formerly British Energy

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Abbreviations

AGR	Advanced Gas-Cooled Reactors
ALARA	As Low As Reasonably Achievable
ALARP	As Low As Reasonably Practicable
AWE	Atomic Weapons Establishment
BAT	Best Available Technique
BNFL	British Nuclear Fuels Limited
BPEO	Best Practicable Environmental Option
BPM	Best Practicable Means
CNPP	Combined Nuclear Pension Plan
CoRWM	Committee on Radioactive Waste Management
D&CU	Decommissioning & Clean-Up
DECC	Department of Energy and Climate Change
DFR	Dounreay Fast Reactor
DRS	Direct Rail Services
EC	European Commission
EIA	Environmental Impact Assessment
GDF	Geological Disposal Facility
HAL	Highly Active Liquor
HAW	Higher Activity Waste
HEU	High Enriched Uranium
Hex	Uranium Hexafloride Tails
HLW	High Level Waste
HSE	Health and Safety Executive
HSSSEQ	Health, Safety, Security, Safeguards, Environment & Quality
IAEA	International Atomic Energy Agency
IFNEC	International Framework for Nuclear Energy Cooperation
ILW	Intermediate Level Waste
INS	International Nuclear Services
IP	Intellectual Property
IWM	Integrated Waste Management
LAW	Lower Activity Waste
LLW	Low Level Waste
LLWR	Low Level Waste Repository
LTP	Lifetime Plan
LWR	Light Water Reactors
M&O	Management & Operations
MDU	Magnox Depleted Uranium
MoD	Ministry of Defence
MOP	Magnox Operating Programme
MOX	Mixed Oxide Fuel
NAO	National Audit Office
NDA	Nuclear Decommissioning Authority
NDPB	Non-Departmental Public Body
NEA	Nuclear Energy Agency
NGO	Non-Governmental Organisations
NIA	Nuclear Industry Association
NIA65	Nuclear Installations Act 1965
NLE	Nuclear Liabilities Estimate
NSAN	National Skills Academy for Nuclear
NSG	National Stakeholder Group
OECD	Organisation for Economic Co-operation and Development
OGC	Office of Government Commerce
OSPAR RSS	OSPAR Radioactive Substances Strategy
PAS-55	Publically Available Specification - 55
PBO	Parent Body Organisation
PCM	Plutonium Contaminated Material
PFR	Prototype Fast Reactor
PNTL	Pacific Nuclear Transport Limited
POCO	Post Operational Clean Out
R&D	Research & Development
RWMD	Radioactive Waste Management Directorate
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SGHWR	Steam Generating Heavy Water Reactor
SLC	Site Licence Company
SMP	Sellafield MOX Plant
SMS	Strategy Management System
SPRS	Sellafield Product and Residue Store
SSG	Site Stakeholder Group
THORP	Thermal Oxide Reprocessing Plant
TPU	THORP Product Uranium
UKAEA	United Kingdom Atomic Energy Authority
VLLW	Very Low Level Waste

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