

# **UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry:**

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## **Strategic Environmental Assessment – Post Adoption Statement**

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## Bibliography

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# Nuclear Decommissioning Authority

# UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry: Strategic Environmental Assessment

Post Adoption Statement

August 2010

Entec UK Limited



Certificate No. FS 13881



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# Post Adoption Statement

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# 1 Post Adoption Statement

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## 1 Post Adoption Statement

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### 1.1 Background

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This paper is the Post Adoption Statement (PAS) to accompany the final UK Nuclear Industry Solid Low Level Waste (LLW)<sup>1</sup> Strategy as adopted. It fulfils the plan and programme adoption requirements of the SEA Directive.

The UK Nuclear Industry Solid LLW Strategy has been developed for the sustainable management of solid LLW radioactive waste arising from the nuclear industry in the UK. It has been prepared by the NDA in response to the UK Policy for the Long Term Management of Solid Low Level Radioactive Waste (Defra, 2007).

The UK LLW inventory shows that around 3 million m<sup>3</sup> of LLW will require management whilst the Low Level Waste Repository (LLWR) has a planned volumetric capacity of some 0.7 million m<sup>3</sup>.

In response to this challenge, the UK Nuclear Industry Solid LLW Strategy proposes a strategy guided by the following three themes:

- Application of the waste hierarchy (ensuring, for example, that materials that can be reused or recycled are not disposed of and that the fraction of waste that is not radioactive or of very low hazard is separated out before disposal of the remainder as LLW);
- Best use of existing facilities, working more efficiently and potentially extending the life of the existing national repository; and
- Development and use of new fit for purpose management and disposal routes, so waste producers have more choice in determining and implementing more sustainable waste management routes.

The proposed strategy will provide a framework for continued capability and capacity for the safe, secure and environmentally responsible management and disposal of LLW in the UK, for both the nuclear and non-nuclear industries. It sets out a number of options to address the challenges from three distinct but inter-related perspectives:

- LLW treatment and disposal options;
- The location of waste management facilities; and
- The provision of disposal capacity.

As the UK will produce more LLW than the planned capacity at the LLW Repository, to maximise the efficient use of the remaining capacity, the need for additional capacity, and to implement the waste hierarchy, a number of treatment options have been proposed. Not all options will be suitable for all waste streams (for example thermal treatment may not be suitable for metal LLW). Therefore treatment techniques will be applied as considered appropriate and effective for managing different waste streams by site licensed operators.

The continued availability of a disposal route for LLW is vital for both the nuclear and non-nuclear industry. The UK Nuclear Industry LLW Strategy explores the potential options for ensuring sufficient capacity exists for use by both industries.

### 1.2 Purpose of the Post Adoption Statement

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The purpose of this 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 the adopted UK Nuclear Industry Solid LLW Strategy. Therefore, this statement includes the following information in line with the SEA Regulations:

- How environmental considerations have been integrated into the development of the UK Nuclear Industry Solid LLW Strategy;
- How the findings of the Environmental and Sustainability Report have been taken into account;
- How the opinions expressed in response to the consultation on the draft UK Nuclear Industry Solid LLW Strategy and the supporting Environmental and Sustainability Report have been taken into account;

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<sup>1</sup> Low Level Waste (LLW) is defined as radioactive waste having a radioactive content not exceeding 4 GB per tonne of alpha or 12 GBq per tonne of beta/gamma activity.

- The reasons for choosing the UK Nuclear Industry Solid LLW Strategy as adopted, in light of other reasonable alternatives dealt with; and
- The measures that are to be taken to monitor the significant environmental effects of the implementation of the plan or programme.

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### 1.3 How Environmental Considerations have been integrated into the LLW Strategy

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Environmental considerations have formed an important part in the development of the UK Nuclear Industry Solid LLW Strategy. The strategy has considered a number of options to manage waste in a more sustainable manner, consistent with the waste hierarchy. This has led to the identification and adoption of practices, where possible, to reduce the volumes of LLW. Alternative approaches to disposal and the location of facilities to manage waste have also been considered.

The range of environmental issues considered by the SEA is:

- Air Quality;
- Global Climate Change and Energy;
- Biodiversity;
- Landscape and Visual;
- Cultural Heritage;
- Groundwater Geology and Soil Quality;
- Surface Water Resources and Quality;
- Waste;
- Economy, Society and Skills;
- Traffic and Transport;
- Land Use, Natural and Material Assets;
- Noise and Vibration;
- Health and Safety;
- Hazard Reduction; and
- Value for Money and Affordability.

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### 1.4 How the Sustainability and Environmental Report has been taken into account in the LLW Strategy

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The Environmental and Sustainability Report and the draft UK Nuclear Industry Solid LLW Strategy were developed in tandem. An iterative approach was adopted which informed the development of the strategy.

The three considerations assessed, as in the Environmental and Sustainability Report, were used to identify key issues and conclusions for consideration in the development of the Strategy. These conclusions were described in the Environmental and Sustainability report and also in the draft Strategy.

The NDA has taken account of the findings of the assessment as highlighted in the following sections.

#### 1.4.1 Decontamination Reuse and Recycling

The SEA that supports the development of the UK Nuclear Industry Solid LLW Strategy considered decontamination, re-use and recycling. The assessment concluded:

- Decontamination to clean contaminated waste to allow it to be managed as exempt waste or to facilitate its onward management has a positive role to play. However, specific circumstances will determine the degree to which this should be implemented to ensure that the very real benefits outweigh the potential detrimental impact of decontamination, such as energy use, resource use, discharges and the secondary waste generation.
- The re-use of materials that would otherwise be disposed of as radioactive waste has potential benefit by deferring the need to dispose of existing waste and by avoiding the need for new material to be used, which would itself become contaminated. Re-use under appropriate control is also expected to result in limited environmental impacts. However, the scope of implementation will be limited by the practicability of identifying circumstances in which material can be re-used under appropriate regulatory oversight and the challenges of demonstrating the suitability of material for re-use.

In response to this, the Strategy addresses the need for waste prevention (section 2.5.1) and the role of a range of waste minimisation techniques including characterisation, segregation and decontamination (section 2.5.2). In addition the Strategy describes approaches to increase both waste reuse (section 2.5.3) and waste recycling (section 2.5.4).

#### 1.4.2 Thermal Treatment and Energy Recovery

Thermal treatment and energy recovery was considered as one of the LLW treatment and disposal options. The assessment concluded:

- Thermal treatment has the potential to significantly reduce the volumes of LLW requiring disposal through volume reduction. Thermal treatment is an appropriate option for the management of LLW both in the UK and using overseas facilities. Specific circumstances will need to be considered to ensure the benefits of this option outweigh the potential negative impacts of thermal treatment such as energy use, resource use, discharges, secondary waste generation, the risk exposure of workers and any additional transport.
- The use of thermal treatment with energy recovery presents potential environmental benefits over thermal treatment without energy recovery. However, this benefit is likely to be offset as the volumes of LLW which are suitable for thermal treatment are expected to be insufficient to support a substantial waste to energy facility. Therefore, unless practical technology for smaller scale energy recovery is developed, then this option is only likely to be implemented through the co-treatment of radioactive and non-radioactive waste by the wider waste management supply chain. However, the co-treatment of radioactive and non-radioactive waste will give rise to a number of effects as identified in the point above.

In response to this, the UK Nuclear Industry Solid LLW Strategy addresses the role of thermal treatment as an approach for waste volume reduction in section 2.5.5. Given the practical difficulties arising from the small volume of combustible LLW expected to be generated the UK Nuclear Industry Solid LLW Strategy suggests that energy recovery is not a key driver for treatment of LLW in this way. However, where supply chain organisations offer thermal treatment with energy recovery this has potential for additional benefit.

#### 1.4.3 Supply Chain

The use of the supply chain involves using waste management infrastructure owned by commercial operators rather than the NDA commissioning its own new waste facilities. The difference between these options was not assessed in the SEA as a single specific option. However, the assessment collectively allows the implications of this decision to be considered. The key outcomes from such a choice are the use of a mix of local, regional, national and international waste management facilities and consequent changes in transport. There are also implications that may result from the management of radioactive waste in facilities potentially distant from where waste arises or where it has historically been managed. The assessment concluded:

- Transport is a distinguishing factor in choices between waste management options and the transport of radioactive materials is an issue of potential stakeholder concern. Therefore, as with conventional waste management the principle of proximity between the location of waste arising and the location of treatment disposal facilities is a consideration. However, while transport is an issue of stakeholder interest, the actual impacts of LLW transport are small and so this issue is not a strong differentiator between options on a national scale.
- When considering disposal on or adjacent to nuclear sites there is a need to consider the net impact on transport holistically. It is possible that any benefit from avoiding LLW transport may be offset by additional construction traffic for new facilities.
- Some stakeholders have raised concern about the potential impacts on economy and society arising from the management of radioactive waste at sites away from existing nuclear sites, for example due to the negative impact on property prices or inward investment. The SEA looked at information on the potential effects of non radioactive and radioactive waste facilities in this way. The conclusions of the assessment were:
  - Any impacts on property prices of radioactive waste facilities are expected to be equivalent to those observed near non radioactive waste facilities and are expected to be both small and very localised
  - The potential for the presence of nuclear sites to discourage non-nuclear companies from investing in areas near to such facilities has been suggested. However, the SEA did not identify conclusive evidence of significant negative impacts on local economies near major nuclear sites. Where options require new waste management facilities, modest positive economic effects would be expected as a result of local investment, direct and indirect job creation and the creation of opportunities for local suppliers.
- Whilst widespread significant negative effects are not envisaged on local communities, like other waste management infrastructure, such as municipal waste landfills and incinerators, the development of new radioactive waste management facilities is potentially contentious and will require effective and proactive engagement with local communities.

In response to this, the UK Nuclear Industry Solid LLW Strategy addresses waste packaging and transport in section 2.6. The strategy recognises that transport of LLW is a significant stakeholder concern, particularly for residents of the

communities near the facilities involved. Government's policy for the management of LLW recognises that, although the desire to avoid excessive transportation of materials is an important consideration, it must be balanced with all the other relevant factors on a case-by-case basis.

#### 1.4.4 Alternative Packaging

Alternative disposal packaging was considered. The assessment concluded:

- There is an opportunity to reduce both the cost and environmental impact of LLW disposal through the use of waste packages that use fewer resources or enable improved packaging efficiency than current methods, provided it is demonstrated that alternative packaging does not compromise the ability of a disposal site to meet regulatory requirements and make an acceptable Environmental Safety Case.

In response to this, the UK Nuclear Industry Solid LLW Strategy addresses waste packaging in section 2.6.1. The Strategy recognises the significant opportunity that would result from improvements in LLW packaging and sets out actions to pursue this opportunity.

#### 1.4.5 Traffic and Transport

The potential issues associated with traffic and transport were considered. The assessment concluded:

- Transport is a distinguishing factor in choices between waste management options and the transport of radioactive materials is an issue of potential stakeholder concern. Therefore, as with conventional waste management, the principle of proximity between the location of waste arising and the location of treatment and disposal facilities is an important factor. Despite being an important consideration, when considered on a national level, this issue is not a strong differentiator between options.
- The contribution of LLW to local transport at consigning nuclear sites is generally only a very small constituent of total transport associated with the operation of the site. We would expect the adequacy of local transport infrastructure and potential disturbance to local communities to be considered in the siting of any substantial waste management facility providing such a service.
- Transport of LLW to more distant waste management facilities does result in increased carbon emissions compared with management closer to the site where wastes arise. However, such emissions are relatively small on a national scale when compared with UK transport related emissions and such emissions are also not a significant contributor to the carbon emissions of the nuclear sector.

In response, to this, the UK Nuclear Industry Solid LLW Strategy addresses waste transport in section 2.6.2. The Strategy recognises that transport of LLW is a significant stakeholder concern, particularly for residents of the communities near the facilities involved. Government's policy for the management of LLW recognises that, although the desire to avoid excessive transportation of materials is an important consideration, it must be balanced with all the other relevant factors on a case-by-case basis.

#### 1.4.6 Alternative Disposal Options

Alternative disposal options for VLLW and certain LLW waste were considered. The assessment concluded:

- As LLW encompasses a large range of radioactivity and a highly engineered facility such as LLWR is not necessarily required for lower activity waste and wastes containing short lived radioactivity, the use of conventional landfills presents potential benefits to the management of LLW. New disposal facilities will be required to demonstrate that disposal will meet the regulatory risk target prior to authorisation. The benefit of using landfill disposal options rather than vaulted disposal is achieved through reducing the raw materials used, ensuring the optimised use of the LLWR and improving the efficiency with which waste is packaged reducing the total volume of packaged waste requiring disposal.
- The use of landfill disposal for VLLW and suitable LLW would not significantly affect remaining UK landfill capacity. Total estimated LLW arisings are 3 million m<sup>3</sup> over a period of 120 years with an average annual arising of approximately 30,000m<sup>3</sup>. This is a small amount compared with the total remaining landfill capacity in England and Wales as of 2006 of 694 million m<sup>3</sup>.

In response to this, the UK Nuclear Industry Solid LLW Strategy addresses alternative disposal options including disposal to landfill and on site disposal in section 2.5.6. The Strategy recognises that the provision of new facilities, both on and off site, will require consideration of a number of factors. As with other LLW management developments, clear and effective involvement of communities at an early stage when developments are planned is important. Provision of new facilities at

nuclear sites will require consideration of a number of additional factors linked to the future of the site, such as the suitability of the site of disposal purposes and long term impacts of disposal for de-licensing and achieving a desired end state and potentially end use.

#### 1.4.7 On-site Disposal

Options for on-site disposal were considered. The assessment concluded:

- One of the benefits often identified with disposal on or adjacent to nuclear sites is reducing LLW transport. However, when considering disposal on or adjacent to nuclear sites there is a need to consider net impact on transport. The transport implications of some LLW management options, such as disposal in engineered vaults, involve significant amounts of construction transport and it is therefore possible that any benefit from avoiding the need to transport waste from the site could be offset by additional transport to construct and on site facility.
- The widespread use of on-site disposal involves a larger number of relatively small facilities compared to other options and so may be less efficient in terms of raw material and resource use when compared with a smaller number of larger facilities.
- The location of nuclear facilities has been determined by their suitability for nuclear operations rather than as waste disposal sites. It is therefore not necessarily the case that existing nuclear sites are suited to radioactive waste disposal, although they may be suited to other waste management facilities.

In response to this, the UK Nuclear Industry Solid LLW Strategy addresses disposal options in section 2.5.6. The Strategy recognises that the provision of new facilities, both on and off site, will require consideration of a number of factors. The final strategy recognises that there are a range of impacts that result from development of disposal routes and facilities and has determined that these are best addressed at a project level to recognise those local effects. As noted above, clear and effective involvement of communities at an early stage when LLW developments are planned is important... Provision of new facilities at nuclear sites will require consideration of a number of additional factors linked to the future of the site, such as the suitability of the site of disposal purposes and long term impacts of disposal for de-licensing and achieving a desired end state and potentially end use.

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## 1.5 Consulting on the SEA and the Draft Proposals for LLW Management

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Consultation has been an integral part of the SEA and of the development of the UK Nuclear Industry Solid LLW Strategy.

Key stakeholders involved in the development of the strategy include LLW waste producers, the NDA, LLW Repository Ltd, representatives from Government, Regulators and planning authorities. The interests of the nuclear industry supply chain were represented by the Nuclear Industry Association.

To support strategy development a UK-wide LLW Strategy Group was established in April 2008. The aim of this group was to develop a working relationship between these organisations for promoting innovation, developing value for money solutions and implementing the waste hierarchy. The group provided significant review and feedback on the emerging strategy. These stakeholders were not required to formally endorse this strategy; however, their input was essential to its development. Particularly, input from nuclear site Regulators ensured appropriate consideration of Health, Safety, Security and Environmental issues in developing this strategy.

A draft version of this strategy was formally consulted on from June to November 2009 along with the Environment and Sustainability Report, which captured the outputs of the Strategic Environmental Assessment. The consultation period was extended to the end of November 2009 to ensure that all relevant stakeholders were aware of the consultation and had opportunity to respond.

In general the response to the consultation was supportive of the proposed strategy, particularly around the need to apply the waste hierarchy to the management of LLW and the need to make the best use of the UK LLW repository. The consultation response also provided extensive insight into key issues around the implementation of the strategy, particularly interaction with communities affected by LLW management and the role of the supply chain in delivering the strategy.

It is a SEA statutory requirement that the NDA consulted on the content of the Scoping Report with the UK statutory bodies, and with any other bodies that it deemed appropriate. The NDA were keen to engage with statutory and non statutory stakeholders early on in the process. In addition to the statutory SEA stakeholders (central government departments (Defra, DfT, DfH), Food Standards Agency, Health and Safety Executive, Devolved administrations and site licensed companies, and other related regulators (e.g. NII)), the Scoping Report was emailed to all statutory consultees and also made available on the NDA's website.

Twenty three responses from eighteen organisations were received on the Scoping Report. They referred to amendments to the baseline information, assessment objectives and other elements of background information. No major revisions to the suggested methodological approach were made and, as such, it was applied to the assessment of the UK Nuclear Industry Solid LLW Strategy.

The Environmental and Sustainability Report was completed and issued for 14 weeks from the 5<sup>th</sup> June 2009 to the 11<sup>th</sup> September 2009. This consultation period was then extended to the 30<sup>th</sup> November to allow for further comments to be received from consultees.

Appendix A outlines the process of consultation on the SEA of the draft UK Nuclear Industry Solid LLW Strategy.

Appendix B seeks to summarise the comments on the SEA received by NDA and its response to them.

Appendix C seeks to summarise the comments on the draft Nuclear Industry Solid LLW Strategy received by NDA and its response to them.

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## 1.6 Justification for the Adoption of the final LLW Strategy

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In developing the final UK Nuclear Industry Solid LLW Strategy the NDA has considered the findings of the Environmental and Sustainability Report (as described in section 1.4 of this Statement. It has also reflected on the wide range of views given in response to the consultation (as described in appendices B and C). This proposed strategy has been developed within the framework of the principles set out in the UK policy for the management of solid LLW:

- Use of a risk-informed approach to ensure safety and protection of the environment;
- Minimisation of waste arising (both activity and mass);
- Forecasting of future waste arisings, based upon fit for purpose characterisation of wastes and materials that may become wastes;
- Consideration of all practicable options for the management of LLW;
- A presumption towards early solutions to waste management;
- Appropriate consideration of the proximity principle and waste transport issues; and
- In the case of long term storage or disposal facilities, consideration of the potential effects of future climate change.

The final proposals have been refined to address the comments received during the consultations. Whilst the three strategic themes that guided the development of the strategy are still central to the strategy, the focus has shifted more onto the waste hierarchy and the enablers that will contribute applying it. Notably, it recognises the need to reduce the reliance on all kinds of disposal for the management of LLW.

The NDA considers that the final Strategy is justified in light of the findings of the Environmental and Sustainability Report.

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## 1.7 Monitoring

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The monitoring programme has been developed through the SEA process and will be finalised together with the UK Nuclear Industry Solid LLW Strategy. Details of the proposed monitoring framework are included in Appendix D.

It is a requirement of the SEA Directive to establish how the significant effects of implementing the UK Nuclear Industry Solid LLW Strategy will be monitored. However as ODPM Guidance<sup>2</sup> (ODPM, 2005) notes, *'it is not necessary to monitor everything or monitor an effect indefinitely. Instead, monitoring needs to be focussed on significant sustainability effects'*.

Monitoring should therefore be focussed upon significant effects that may give rise to irreversible damage, with a view to identifying trends before such damage is caused. Significant effects where there was uncertainty in the UK Nuclear Industry Solid LLW Strategy as well as where monitoring would enable preventative or mitigation measures to be applied should also be monitored.

Having regard to the responses received during the consultation process, the impacts identified in the Environmental Report are the basis for the proposed monitoring programme. The Environmental and Sustainability Report identified a need for focus on monitoring a number of topics as set out in Appendix D.

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<sup>2</sup> ODPM (now CLG) (2005) *Practical Guide to the Strategic Environmental Assessment Directive*, HMSO, London.

The monitoring programme will seek to use existing regulatory regimes and data collection processes to provide information for these potential environmental impacts. In consequence, the NDA would expect to make use of the information collected by a range of existing statutory agencies such as the Environment Agency and Natural England.

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## 1.8 Future Assessments

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There are no immediate plans to revise the UK Nuclear Industry Solid LLW Strategy and thus no current plans for further SEA of the UK Nuclear Industry Solid LLW Strategy.

As referred to in the Environmental and Sustainability Report there a number of more local issues which will need to be addressed in project level Environmental Impact Assessments when specific projects are brought forward for planning consent by their respective developers. Project Environmental Impact Assessments may also be required if changes in LLW management result from changes to existing decommissioning projects.

Finally, the NDA is currently undertaking further assessments to inform the development of its next Strategy document, which is expected to be consulted on in the second half of 2010. It is however not currently planned to reassess LLW management in this review of NDA's strategy, unless significant changes from the assessment undertaken to inform the UK Nuclear Industry LLW Strategy are identified.

The NDA is required by the Energy Act 2004 to review its Strategy at least every 5 years.

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## 1.9 Availability of Documents

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The UK Nuclear Industry Solid LLW Strategy as adopted will be available for viewing on-line at [www.nda.gov.uk/documents](http://www.nda.gov.uk/documents) or at:

Nuclear Decommissioning Authority  
Herdus House,  
Westlakes Science and Technology Park,  
Moor Row,  
Cumbria, CA24 3HU

## Appendix A

### Consultation to Date

Table 1.1 Consultation to Date

Publication / Event	Consultees	Date
Scoping Workshop	<p>The following consultees were invited to attend:</p> <ul style="list-style-type: none"> <li>▪ Cadw;</li> <li>▪ Communities and Local Government;</li> <li>▪ Countryside Council for Wales (Cyngor Cefn Gwlad Cymru);</li> <li>▪ Department of Environment Northern Ireland (Environment and Heritage Service);</li> <li>▪ Department for Environment, Farming and Rural Affairs;</li> <li>▪ Department for Transport;</li> <li>▪ English Heritage;</li> <li>▪ Environment Agency;</li> <li>▪ Food Standards Agency;</li> <li>▪ Health Protection Agency;</li> <li>▪ Health and Safety Executive;</li> <li>▪ Historic Scotland;</li> <li>▪ Natural England;</li> <li>▪ Nuclear Legacy Advisory Forum;</li> <li>▪ Scottish Councils Committee on Radioactive Substances;</li> <li>▪ Scottish Environment Protection Agency;</li> <li>▪ Scottish Government;</li> <li>▪ Scottish Natural Heritage;</li> <li>▪ South of England Advocacy Projects; and</li> <li>▪ Welsh Assembly Government</li> </ul>	10 <sup>th</sup> June 2008
Scoping Report	<p>Statutory consultees:</p> <ul style="list-style-type: none"> <li>▪ Cadw;</li> <li>▪ Countryside Council for Wales (Cyngor Cefn Gwlad Cymru);</li> <li>▪ Department of Environment Northern Ireland (Environment and Heritage Service)</li> <li>▪ English Heritage;</li> <li>▪ Environment Agency;</li> <li>▪ Historic Scotland;</li> <li>▪ Natural England;</li> <li>▪ Scottish Environment Protection Agency; and</li> <li>▪ Scottish Natural Heritage</li> </ul> <p>Non-statutory consultees:</p> <ul style="list-style-type: none"> <li>▪ Communities and Local Government;</li> <li>▪ Department for Environment, Food and Rural Affairs;</li> <li>▪ Department for Transport;</li> <li>▪ Department of Health;</li> <li>▪ Food Standards Agency;</li> <li>▪ Health Protection Agency;</li> <li>▪ Health and Safety Executive;</li> <li>▪ Nuclear Legacy Advisory Forum;</li> <li>▪ Scottish Councils Committee on Radioactive Substances;</li> <li>▪ Scottish Government;</li> <li>▪ Welsh Assembly Government;</li> <li>▪ Nuclear Installations Inspectorate (NII)</li> <li>▪ Magnox North</li> <li>▪ Magnox South</li> <li>▪ LLW Repository</li> </ul>	31 <sup>st</sup> July 2008 – 11 <sup>th</sup> September 2008
Environmental and Sustainability Report and the Draft UK Nuclear Industry Solid LLW Strategy	<p>As above. It was also available for wider public comment through the NDA's website. The NDA also consulted with wide a range of stakeholders through its National Stakeholder Group (see <a href="http://www.nda.gov.uk/stakeholders/">www.nda.gov.uk/stakeholders/</a> for more information) and meetings with specific consultees. NDA contacted all of its registered consultees and all local authorities in England, Wales, Scotland and northern Ireland to make them aware of the consultation.</p>	5 <sup>th</sup> June 2009 – 11 <sup>th</sup> September 2009 (consultation was then extended until 30 <sup>th</sup> November)
Post Adoption Statement	No formal consultation	December 2009

## Appendix B

### Response to Consultation on the SEA

Issue	Summary of Consultation Feedback	NDA Response
<p><b>Assessment Approach</b></p>	<p>One respondent questioned the approach taken in the assessment and in particular the decision not to weight the different sustainability criteria as is common practice in Best Practical Environmental Option Studies within the Nuclear Industry.</p> <p>Two respondents felt the summary assessment RADAR diagrams presented in the Environmental and Sustainability Report were difficult to understand. One of these did however comment that the text summaries accompanying these diagrams were very useful.</p>	<p>As consulted on in our 2008 scoping consultation, we chose not to weight the sustainability objectives used within the assessment. While we recognise this is a different approach to that commonly used in BPEO and BPM studies on nuclear sites, it is common practice in Strategic Environmental Assessments. We felt that, given the nature of the assessment, it was more transparent to present our view of how each option performed against each sustainability objective and allow decision-makers and stakeholders use this to inform their views of the preferred option rather than to seek to weight attributes in order to derive overall scores for each option.</p> <p>Summarising the key aspects of the assessment of the options on a single page presents clear challenges; however, it remains of value given the need to presents findings concisely. We do recognise the complexity of the RADAR diagrams (particularly for a non-technical audience) and we will investigate alternative approaches to present summary information in future assessments and consider ways to respond to the specific points raised by respondents.</p>
<p><b>Baseline Information</b></p>	<p>A number of respondents identified omissions from specific site's baseline information in the site baseline report which accompanies the Environmental and Sustainability Report.</p>	<p>We thank respondents for their comments and we have updated the site baseline reports to reflect these changes and we have published an updated set of site baseline reports on our website. We do not believe these amendments change the overall conclusions of the assessment reported in the Environmental and Sustainability Report. However, we will use this updates information in future assessments where relevant.</p>
<p><b>Plans and Programmes</b></p>	<p>A number of respondents suggested additional plans and programmes which they believe are relevant to the LLW Strategy, including a number of new plans and programmes published during the consultation period on the LLW Strategy.</p>	<p>We thank respondents for their comments and will include these plans and programmes where relevant in future assessments. However, we do not believe the inclusion of these plans and programmes affect the conclusion and outcome of the assessment reported in the Environmental and Sustainability Report.</p>
<p><b>Waste Avoidance Options</b></p>	<p>One respondent suggested that the assessment should have considered waste avoidance options in addition to those addressed and described in the Environmental and Sustainability Report.</p>	<p>We agree that waste avoidance is fundamental to radioactive waste management in line with the waste hierarchy. We did not specifically assess waste avoidance as the techniques for achieving this for VLLW and LLW vary widely in nature and potential impact. Therefore, it was considered unlikely that any assessment of avoidance as an option would be result in substantive and meaningful conclusions that</p>

		<p>could be applied to the strategy; however, as an outcome, waste avoidance and minimisation should be pursued wherever practical.</p> <p>The need for waste prevention is drawn out more clearly in section 2.5.1 of the final strategy and is one of the key principals identified as underpinning the strategy in section 2.1.</p>
<p><b>Strategy Implementation and the Habitats Directive</b></p>	<p>A number of respondents wanted further information on how the strategy would be implemented and in particular how the environmental and sustainability impacts of implementation would be assessed in individual plans, programmes and projects.</p> <p>In particular, several respondents wanted more information on how the Habitats Directive would be complied with in the development of lower level plans, programmes and projects.</p>	<p>The final strategy has been written to provide greater emphasis on implementation throughout and the influences on the implementation of the strategy are described in section 3 of the final Strategy.</p> <p>The uncertainties relating to the potential impact of specific proposals on habitats outlined within the Environmental and Sustainability Report will be identified, characterised and assessed when specific locations are determined at the project level. It is only at this point that the potential effects of new or modified facilities on protected sites and species can be considered in detail. This will result in Habitats Directive compliance for issues associated with discharges and disposals being addressed through the development consent process or through the process for consenting reactor decommissioning projects.</p> <p>In addition to being addressed through project level EIA both the Environment Agency and Scottish Environment Protection Agency have established arrangements in place to consider the impact of authorised discharges on wildlife as part of their existing authorisation and permitting procedures. We expect these arrangements to be sufficient to ensure any discharge authorisations or permits granted are consistent with the requirement of the habitats directive.</p> <p>The NDA will continue to consider biodiversity issues and the Habitats Directive in future strategic environmental assessments as outlined in our response to the Scoping consultation. This includes considering whether an Appropriate Assessment is required.</p>
<p><b>Strategic Monitoring</b></p>	<p>A number of statutory consultees suggested extra monitoring parameters including:</p> <ul style="list-style-type: none"> <li>▪ Climate Resilience;</li> <li>▪ Water Framework Directive;</li> <li>▪ Biodiversity;</li> <li>▪ Protected Species;</li> <li>▪ Protected Habitats; and</li> <li>▪ Visual Amenity.</li> </ul>	<p>We have considered the comments received from respondents in devising these monitoring proposals. We have focussed on strategic monitoring rather than seeking to duplicate statutory site-specific environmental monitoring, which we would expect to be introduced by regulators and/or planning authorities.</p>
<p><b>Climate Adaptation</b></p>	<p>Two respondents raised the importance of coastal erosion, flood risk, climate change and climate adaptation to the LLW Strategy. One respondent questioned the scoring of climate</p>	<p>We agree that climatic risks and both their mitigation and adaptation to unavoidable change are important and we have considered these issues in this</p>

	<p>change impacts.</p>	<p>assessment. Reference to climate change mitigation within the Environmental and Sustainability Report includes both climate change adaptation and the implications of accelerated coastal erosion.</p> <p>Detailed climate change, flood risk and coastal erosion issues are best addressed by site operators in the context of specific sites and their local environment. On nuclear sites, there are existing requirements to address these issues in external hazard safety cases and to periodically review these assessments.</p> <p>We have reviewed the scoring of climate change impacts. We agree that given the scale of the commitments made by UK Government and the devolved administrations to minimise the emission of greenhouse gases means that carbon emissions should be considered in the choice of LLW management approaches. However, the assessment adequately distinguishes between whether climate impacts are likely to be negative (for example thermal treatment of waste for volume reduction), where they are likely to be positive (e.g. from the reduction of embodied carbon in packaging), and where impacts are likely to be substantially unchanged from the current position. It is important to identify the relative scale of contribution to the overall carbon footprint of the NDA estate such that additional effort is targeted where it can have the greatest effect. This does not mean that practical opportunities to avoid emissions should not be pursued wherever they can be found.</p>
<p><b>River Basin Management Plans</b></p>	<p>One respondent felt more information should have been included in the Environmental and Sustainability Report about the impact of the strategy on water body status and implications for river basin management plans.</p>	<p>We have reviewed River Basin Management Plans. Current LLW management activities are not considered to be having a significant impact on water body status and we have found no information to suggest this is the case in River Basin Management Plans. As a result we do not expect implementation of the strategy in the short and medium term to have significant effects on water quality. It is possible that there could be localised effects from LLW disposal facilities in the long and very long term and these will be considered in site environmental assessments. Impacts of new facilities will depend on the type and location of those facilities, but such impacts are inherently uncertain at this stage. Also without knowing the specific location of new facilities it is not possible to meaningfully consider baseline water status at this level. We would expect specific environmental assessments (SEA's or EIA's) relating to these facilities should take into account the status of water bodies and the objectives contained in the relevant River Basin Management Plans.</p>
<p><b>Biodiversity Baseline</b></p>	<p>One respondent questioned why our assessment of effects on protected sites was limited to those within 2km of our sites.</p>	<p>We have not limited the consideration of impacts to 2km. However, possible effects on such sites are with the exception of discharges limited to direct physical impact of work, noise or dust. LLW activities are considered unlikely to create such</p>

		<p>impact more than a very short distance from the sites where they are undertaken and hence the baseline information presented in Appendix D focussed on sites within 2km. Authorised discharges may have more distant effects, but the authorisation process includes consideration of such effects to ensure appropriate conditions are imposed to prevent effects on European sites. The Environmental Agency's screening reports on radioactive discharges from these sites support the conclusion that these processes are adequately protecting such sites.</p>
<p><b>Siting of new facilities to minimise impact</b></p>	<p>Respondents felt that while the impact of new facilities on biodiversity is unclear, the strategy should state that the siting of new facilities should, where practical, seek to minimise impacts on protected sites and species. Such effects will depend on the nature of those facilities and their location in relation to sensitive receptor or habitats.</p>	<p>We agree that in siting new facilities, the developers of those facilities should seek to minimise the impact on protected sites, species, and biodiversity. The Habitats Directive places additional requirements on developers and competent authorities where facilities have a potential impact on sites or species of international significance. Section 2.3 of the final strategy focuses on the need for robust decision making in the implementation of the strategy. This includes development of new facilities as well as decisions on how waste should be managed. The potential impacts of new facilities on designated sites would be considered at this stage.</p>
<p><b>Water and Groundwater Directives</b></p>	<p>One respondent felt that the assessment should be clearer on compliance with the Water Framework Directive and groundwater protection.</p>	<p>Water and groundwater protection and minimisation of safety and hazard and environmental risk are important considerations and are, in our view, adequately addressed through the requirements of the existing regulatory framework.</p> <p>We eagerly await further clarity from the Government and EA on the implementation of the water and groundwater directive in the UK and its implication for radioactive waste disposal and land quality management.</p>
<p><b>Waste Inventory</b></p>	<p>Several respondents felt that the Strategy and the Environmental and Sustainability Report should more explicitly address the consequences of uncertainty in the future inventory of LLW from the nuclear industry.</p>	<p>We agree the impact of uncertainty in future inventories should be more explicit in the strategy and have attempted to do this in Section 2.4 of the final Strategy. However, both the strategy and SEA are robust to such changes in inventory, although major increases in inventory could require the development of additional UK LLW management infrastructure. We have considered variation of inventory as part of the business case for implementation of the strategy and this tells us that the strategy is tolerant of such changes.</p>
<p><b>Waste Hierarchy</b></p>	<p>One respondent felt that the strategy was overly focussed on optimising the use of the LLWR rather than the inherent benefit in the application of the waste hierarchy.</p>	<p>The focus on optimising the use of LLWR is due to this being one of the areas which the LLW policy requires the Strategy to address. We do, however, agree that the waste hierarchy has an important environmental benefit, and this is articulated in various ways within the detailed assessment. We have sought to make this point clearer in the final strategy (see Section 2.5) recognising that preserving capacity is an additional benefit of a more</p>

		central aim of applying the waste hierarchy to achieve more sustainable management of LLW.
<b>Landscape Effects</b>	Respondents felt that it was important that landscape effects should clearly include consideration of amenity effects.	We agree – these amenity effects are within the scope of the landscape and visual impact criterion. We have attempted to describe the impact of NDA sites and LLW facilities on key areas of amenity value (e.g. national parks and AONBs). However, in most cases, impact of LLW facilities on amenity is modest as activities take place on existing nuclear or waste management sites where access is controlled and visual, noise and odour effects associated with LLW management are modest. Use of sites for disposal of LLW may have longer term impacts on the potential use of such sites as described under material assets, but the long term public amenity effect of this is likely in most cases to be modest.
<b>International Effects</b>	<p>Several states responded to the consultation on the Environmental and Sustainability Report. They generally agreed the assessment suggested that there would not be significant effects on their respective territories.</p> <p>One state commented on the need for Project level EIA and Euratom Article 37 submissions to consider transboundary effects where these have not been ruled out by the SEA,</p> <p>One state also referred to the need to demonstrate that maritime transport of radioactive waste and materials do not adversely affect their territory including the marine environment.</p> <p>One international response also made some suggestions for potential environmental monitoring.</p>	<p>We agree that the assessment reported in the Environmental and Sustainability Report suggests there are not likely to be significant effects beyond the United Kingdom.</p> <p>We do not anticipate any transport of LLW through the other states maritime zone or territory resulting in significant environmental effects or effects on the health of their population. Other transport of radioactive wastes and materials is beyond the scope of the Strategy and consequently also of the supporting environmental assessment.</p> <p>Environmental impact assessment and EURATOM requirements will be complied with in relevant implementing projects. It is for the developers of these proposals to consider what scenarios for international treatment are appropriate.</p> <p>International transport standards will be applied to ensure transport of LLW by road, rail, sea or air to ensure people and the environment are protected. In addition the European Directive on the transboundary shipment of spent fuel and Radioactive Waste will be complied with wherever it applies.</p>

## Appendix C

### NDA Response to UK Nuclear Industry Solid LLW Consultation

# UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry

## Post Consultation Response

August 2010



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## **1.0 Introduction**

In response to the Policy for the Long Term Management of Solid Low Level Radioactive Waste (LLW)<sup>1</sup> in the United Kingdom, the NDA developed the proposed UK Nuclear Industry LLW Strategy<sup>2</sup> (hereafter called the LLW Strategy) with input from a wide range of Site Licence Companies (SLC), regulators, local planning authorities, supply chain companies, and stakeholders.

The LLW Strategy considered the continued capability and capacity for the safe, secure and environmentally responsible management and disposal of LLW in the UK for both the nuclear and non-nuclear industries through:

- application of the waste hierarchy
- best use of existing facilities, working more efficiently and potentially extending the life of the existing national repository
- development and use of new fit for purpose management and disposal routes, so waste producers have more choice in determining and implementing waste management routes

In order to ensure that the proposed strategy was robust, we undertook to consult with a wide a range of stakeholders and interested parties. The consultation on the draft LLW strategy was from 05 June to 30 November 2009 and in total we received 74 responses to the strategy and its accompanying Strategic Environmental Assessment<sup>3</sup>.

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<sup>1</sup> Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom, By Defra, DTI and the Devolved Administrations, March 2007

<sup>2</sup> UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry – Consultation Document June 2009.

<sup>3</sup> UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry: Strategic Environmental Assessment - Environment and Sustainability Report, NDA and Entec, April 2009

## **2.0 Themed Responses**

We established a review panel to consider all the responses received and assess how the responses should influence the development of a final strategy. The sections below reflect the range of stakeholder comments received and how the review panel proposes that these comments should be reflected in the final LLW Strategy.

Responses are considered for each of the consultation questions.

### **2.1 Response to Question 1 – Proposed approach to avoidance and characterisation of waste**

The proposed approach to avoidance and characterisation of waste was supported almost universally by respondents. The focus on the top of the waste hierarchy was particularly welcomed, and the importance of characterisation to allow appropriate segregating and sentencing of waste was clearly recognised.

Within the responses, there was a recommendation to adhere to the terminology of the waste hierarchy more rigorously and particularly to separate out and therefore strengthen the discussion on waste avoidance from waste characterisation and segregation.

A few respondents commented that the waste hierarchy applies to all waste whether it is radioactive or not, and recommended that a staged approach to waste avoidance be promoted: 1) avoid creating any waste; 2) avoid creating any radioactive waste (as defined in the Radioactive Substances Act); and 3) avoid creating any non-exempt radioactive waste.

The importance of waste characterisation was recognised by the majority of respondents, including the characterisation of land and potentially contaminated areas. A few respondents highlighted the role of characterisation in waste forecasting as well as waste segregation and sentencing.

The Strategy identifies segregation of waste at source as the preferred option, which was supported by a number of respondents, one of whom expressed support for segregation of waste particularly to facilitate decay storage. Some respondents also indicated their preference more generically for on-site solutions, particularly recycling and reuse of materials at source.

A number of comments refer more to the implementation of strategy and associated stakeholder engagement rather than strategy itself. For example, the design of new waste containers; the process of setting up new facilities; and establishing waste acceptance criteria were specifically mentioned. One respondent suggested the value of an “independent verification agency” for ensuring that waste exported from a nuclear licensed site is managed appropriately. We note that this role is already performed by the independent environmental regulators, consistent with the regulatory framework.

All proposed important work areas were generally supported to a greater or lesser degree. The greatest support was shown for programmes to improve characterisation and sentencing of materials, including investment in research and development. One respondent added that

the focus should be around improved characterisation of wastes forecasted to arise in large volumes within the short to medium term, and for characterisation of waste at the boundary between different waste categories.

Work to develop standardised procedures for characterisation and sentencing of waste were also strongly supported so long as they were agreed with regulators consistent with regulatory requirements. Characterisation guidance was also recommended instead of mandatory procedures to account for the heterogeneity of waste forms.

One respondent suggested that work to share good practice could be enhanced by developing training courses and improving the current asset transfer database.

The desire of respondents to separate out and strengthen the discussion of waste avoidance was mirrored in comments about important work areas. In particular, work to provide incentives to waste producers, to invest in research and development, and to share and develop good practice could apply to the avoidance of waste as well as the characterisation and segregation of waste.

A number of additional work areas were proposed, for example, ensuring that realistic waste management options and their waste acceptance criteria are widely known to inform meaningful waste characterisation. Waste forecasting information (including forecasts of VLLW) could also be made available to the supply chain.

Two respondents suggested re-examining accessible waste stores to improve segregation. However, NDA believes that the opportunities for this work area are limited due to the safety implications of retrospectively sorting through waste.

A couple of more generic points were made by respondents. Firstly, there was a request that the term “waste” be defined at the start of the Strategy to clarify when the text is referring to LLW rather than general waste. Secondly, there was a request to mandate that waste management decisions be supported by sound business cases and demonstrate the use of robust decision-making processes to identify the most advantageous option.

### **NDA Response**

We propose to refine the structure of the Strategy to reflect the waste hierarchy and its terminology more rigorously. Waste avoidance/prevention will be given more prominence in the management of wastes, where possible. Further information on waste characterisation and segregation will be introduced. This will make clear the distinction between avoiding waste being sentenced to LLWR and avoiding waste generation in the first place. The text on waste avoidance and characterisation will also be strengthened, including examples where appropriate.

The current preference for segregation of waste at source will remain a feature of the Strategy. We will also express a preference for reusing material at source (i.e. on the site of origin) to minimise the challenge of exporting and transporting material. However, we will continue to emphasise the importance of a case-by-case analysis of on-site and off-site solutions, particularly with respect to locating treatment and disposal facilities.

As noted above waste avoidance will be further developed and characterisation and segregation; the nature of “standardised procedures” for characterisation and sentencing of waste will be clarified; and, a work area to inform characterisation via an improved understanding of available waste routes will be added.

We will clarify throughout the Strategy when the discussion is around general waste as opposed to LLW.

We will articulate that waste management decisions must be supported by sound business cases and demonstrate the use of robust decision-making processes to identify the most advantageous option.

We welcome the proposals from many stakeholders with regard to possible approaches for implementation, and these will be considered with regard to applicability. We will also highlight the roles of various stakeholder groups, particularly the role of NDA to work with regulators, the supply chain and other stakeholders as appropriate in enabling the development of solutions for waste management that demonstrate value to the UK taxpayer.

## **2.2 Response to Question 2 – Potential benefits from re-use and recycling of waste from the nuclear industry**

The majority of respondents to the consultation were supportive of the key themes around implementation of the waste hierarchy and recognising the opportunities for the reuse and recycling of certain LLW materials. Whilst other respondents did not explicitly include a direct statement of support, the response was generally supportive. As with responses elsewhere in the consultation process, a number of the comments received were related to implementation and suggested ways to apply strategic principles referring to aspects of the implementation – i.e. that reuse and recycling should be pursued to achieve the stated aims of the strategy.

Within those comments there are three areas that captured particular interest:

- The need for guidance on opportunities for reuse
- The importance of the legal framework that these opportunities to be implemented
- A preference for reuse of LLW (where appropriate) within the nuclear industry

Many respondents recognised the opportunity presented by the reuse of material, particularly bulk materials such as soil and rubble. However, some raised the issue that the specifics of delivering this opportunity were not clearly understood. This appears to relate to both practical and regulatory issues. Our engagement with stakeholders in developing the strategy, particularly the regulator community, has confirmed that these opportunities do exist and can be implemented in the current regulatory framework. A number of respondents provided potential opportunities in new nuclear build activities. Further, guidance was requested on opportunities for waste reuse and recycling.

A number of respondents referred to the regulatory regime in their responses, noting that implementation of reuse and recycling options needs to be undertaken within that regime. Other respondents expressed concern over the safety of reuse and recycling options and an apparent “dispersal” of radioactive material and this clearly represent genuine stakeholder concern. The consultation document noted widely that it should be implemented within the legal framework, which in the UK adopts an approach that is intended to protect people’s interests in this area (safety and security for people and the environment). The nuclear industry and regulators will have a key role in further explaining this position where required.

A number of respondents, either directly or indirectly, expressed some level of preference for the reuse of LLW material within the nuclear industry. An assessment of this nature will be considered in determining suitable options and must consider stakeholder, practicality and legal requirements arising from any such opportunity. It is also important to recognise that for recycling, where that recycling involves decontamination to exempt levels, that there is scope (and indeed it is usual practice) for this waste to be exempted and recycled within the conventional metals recycling market.

Additional areas that were also addressed include:

- Confirmation of the position on decay storage - some respondents requested a national position and preference for decay storage
- A key theme that has also come through in other parts of the consultation is the importance of the waste producer's planning and decision making process, usually achieved through Best Practicable Environmental Option (BPEO) assessments, and linked to issues of duty of care. The option for a waste producer to use alternative waste management routes needs to be rigorously underpinned and will not be driven solely by consideration of costs. A number of respondents made reference to ensuring that alternative waste management options offer true value for money and are affordable.
- A few respondents made reference to the NDA Asset Transfer Website as an example of good practice in the area of reuse.

### **NDA Response**

In light of the discussion above, the final strategy will maintain the emphasis in the strategy on the waste hierarchy, and particular recycling and reuse options. To support this we will refer to the NDA Asset Transfer Website (used to support re-use within the NDA estate).

We will look to develop guidance associated with opportunities and issues around reuse and recycling for use in the UK nuclear industry based on experiences currently utilised within the UK and internationally. We shall also look to provide some strategic guidance around decay storage.

We will include reference to the legal framework that governs reuse and recycling activities, specifically recognising their function to ensure safety for people and the environment and its contribution to public confidence.

Specifically we will include commentary on the preference for reuse within the industry – we consider this most likely to be the case for materials reuse and the final strategy will look to provide more clarity. This may not necessarily be the case following treatment, where materials can be proven to be exempt and therefore be recycled in conventional waste management ways.

Finally to underpin the importance of waste producer decision making process - we will provide specific reference to the importance of these processes (for example, Best Available Techniques etc).

## **2.3 Response to Question 3 - Optimisation of LLW management and the role of compaction.**

LLW compaction was nearly universally accepted by consultation respondents for waste volume reduction to preserve disposal capacity at the LLW Repository near Drigg, Cumbria. Additional recommendations on specific vendor equipment or types of compaction systems, such as high-force compaction (e.g. supercompaction), or use of mobile compaction services were noted.

There were also several recommendations involving technical innovations for waste compaction. One example noted was “series waste compaction” such as compaction of fly ash following incineration of LLW to further reduce waste volumes for disposal. Another innovation was compaction of non-cylindrical waste packages, instead of drums, to improve packing efficiency in ISO containers. Potential application of in-situ compaction of rubble-type materials directly in disposal trenches was also recommended.

NDA / LLWR will continue to evaluate opportunities for use of compaction as appropriate in the UK LLW Management Plan. The LLW Strategy encourages innovations and support from the supply chain to provide cost-effective waste treatment services. Super compaction of appropriate wastes is one such treatment service. Applications as described are consistent with the principles proposed in the LLW Strategy. However, dedicated systems and facilities are subject to business case development, evaluation, and approval by Site Licence Company and NDA prior to implementation in accordance with NDA and commercial procurement requirements.

### **NDA Response**

On the basis of consultation responses received, we consider that the approach set out in the LLW strategy regarding the use of compaction in optimising LLW management is appropriate and we do not envisage any amendments to the final draft of the strategy.

We do accept that a number of initiatives were proposed by various consultees that have the potential to maximise the effectiveness of supercompaction. It is our intent that these initiatives will be assessed in relation to the opportunity they may yield and managed by NDA and our SLCs to maximise their impact should they be implemented.

## **2.4 Response to Question 4 – Benefits and detriments of metal treatment**

Most respondents agreed with the benefits of metal treatment, such as preservation of natural resources, re-use and recycling of metal wastes in industry, and potential cost savings in comparison with direct waste disposal. Most respondents also agreed with the benefit to the LLW Repository in significantly minimising waste volumes and extending the disposal capacity of the facility through metal recycling and treatment. Most people also suggested NDA ensure safety and environmental protection standards if metal treatment facilities are utilised or expanded.

The primary advantage of metal treatment is the combined benefits of significant waste volume reduction and recycling of the metal resource for alternative use both within and

outside the nuclear industry. The generation of secondary wastes are a very small percentage of the original waste volume and the remaining radioactivity from metal treatment is then appropriately disposed of. The risks from treatment processes have to be carefully considered and mitigated in order to satisfy regulatory requirements.

Several respondents expressed concerns over the cost-effectiveness of metal treatment and recommended additional guidance in the strategy for pursuing metal recycling and treatment. They believed that metal recycling should only be initiated if determined to be less than the cost of direct waste disposal. In contrast, numerous people expressed views that cost should not be the only criterion and stated that higher costs should not prevent the nuclear industry from pursuing metal recycling. Others were already convinced that metal recycling was a significant, cost-effective opportunity and cited long-term international experience in successful metal recycling of radioactive metals. Regardless of view, it was clear from the consultation responses that the true, lifecycle benefits for metal recycling and treatment compared with direct waste disposal in the UK are not fully understood by waste producers. NDA will ensure that these lifecycle benefits/cost analyses are developed, evaluated, and disseminated for effective decision-making.

Some respondents also noted an apparent discrepancy between metal treatment of LLW and Very LLW (VLLW) categories. The cost effectiveness of metal recycling of VLLW, due to other available less expensive disposal options in landfills, was a concern. Others noted that to not recycle VLLW metal would be inconsistent with the waste hierarchy. NDA will evaluate implementation of the strategy related to metal recycling in the NDA estate, VLLW metal recycling, and potential criteria and priorities for decision-making for recycling.

NDA is accountable to Government and the UK taxpayer to ensure cost-effective use of site funding to deliver hazard reduction and nuclear clean-up throughout the NDA estate. This includes appropriate and reasonable preservation of our national resources. However, it may be required to make appropriate management decisions if the cost of implementing the waste hierarchy greatly outweighs other less-desirable alternatives, such as direct disposal. NDA is committed to ensuring effective programmes are in place to identify, evaluate, and make appropriate decisions on waste management activities for proper balance of all considerations.

### **NDA Response**

We continue to support the position described in the draft strategy that metal treatment and recycling services are essential to the success of the LLW strategy in applying the principles of the waste hierarchy. We consider that the approach set out in the LLW strategy regarding metals treatment and recycling is appropriate. We do not envisage any significant amendments to the final draft of the strategy in this respect.

We do note the challenges faced by waste producers in having robust criteria and information that supports effective decision-making regarding recycling versus disposal. We recognise that to enable the right behaviours to be introduced, information relating to waste lifecycle benefits/cost benefit analysis are needed for waste producers to support decisions for metal treatment costs particularly if this costs more than disposal to implement.

We have gone some way to try and ameliorate this issue. LLW Repository Ltd now provides a metals treatment service (including decontamination, re-use and recycling) on behalf of the NDA estate and other waste consignors. This service is now beginning to underpin waste

management decision-making based on key data such as volumetric and radiometric cost comparisons with direct disposal.

We remain committed to ensuring effective programmes are in place to identify, evaluate, and make appropriate decisions on waste management activities. Work required to underpin opportunities of recycling VLLW metals is now being undertaken on behalf of the NDA estate and other waste consignors by LLW Repository Ltd to ensure that decisions based on VLLW recycling and disposal are adequately supported.

## **2.5 Response to Question 5 – Proposals for thermal treatment**

With regard to the use of strategic proposals for use of thermal treatment for radioactive wastes, many respondents expressed concerns about the potential safety and environmental risks from air and liquid discharges. The operators of any proposed facility will clearly need to demonstrate compliance with the regulatory framework to ensure safety for people and the environment. This includes discharges from thermal treatment processes (including control of particulate emissions), which are key parameters in the design and operation of any facility.

Pollution prevention and control and other potential safety and environmental concerns are all key topics associated with thermal treatment of wastes. Packaging and transportation are also important factors that need to be considered. It is vital that all these topics are communicated early in the planning process and discussed in an open and transparent fashion to ensure information and potential risks are considered in determining whether facilities should be utilised in the management of LLW. It is also important that a common understanding of potential treatment technologies, including use of technical terms such as pyrolysis, incineration, and thermal treatment, be developed to clarify potential misconceptions and issues. NDA recognises that radioactivity currently causes communities concern, in part due to past misconceptions that will require enhanced public education and effective communication.

It was also noted by numerous respondents from local and regional planning authorities and NDA site representatives that early stakeholder and community engagement is critical to the success of any thermal treatment project. It is realised by NDA that treatment of radioactive wastes may be an emotional issue for communities and the general public. However, incineration technology can be operated safely and in an environmentally-responsible manner, within regulatory requirements. There are substantial benefits in waste volume reduction and overall thermal destruction of hazardous substances in the waste, such as solvents and oily compounds. NDA agrees that stakeholder engagement is a vital function to properly and accurately communicate proposals for public review and comment as early in the process as possible.

Other respondents communicated concerns about encouraging use of the waste hierarchy and evaluating other methods of volume reduction, such as waste compaction, before considering thermal treatment options. Some thought incineration should be used only as a last resort.

Application of the waste hierarchy is a key strategic theme for the UK Nuclear Industry LLW Strategy. Waste avoidance, reuse, and recycle are fundamental principles of the waste hierarchy and are promoted throughout the nuclear industry by the regulator framework.

Waste characterisation and segregation are required in order to implement appropriate management options for the waste and not foreclose more fit-for-purpose and cost effective alternatives for treatment and disposal of the waste. NDA is challenging all NDA facilities to institute methods for proper waste segregation and improved management of their LLW inventories.

The UK Nuclear Industry LLW Strategy views incineration as one tool among many for waste treatment and volume reduction of LLW. Thermal treatment technologies at commercial facilities, both overseas and within the UK, are viable options for combustible wastes and waste oils. Serious consideration will be given to NDA site locations for thermal treatment facilities as well, including the source and location of current LLW inventories and future production of appropriate incinerable waste streams. NDA will ensure effective coordination amongst the NDA sites to properly evaluate the needs of the entire NDA estate and non-nuclear industry.

Thermal treatment for nuclear wastes has been successfully implemented internationally in numerous countries in Europe and North America. Similar projects of the same technical complexity and community concerns have also undergone planning authority and stakeholder review throughout the UK. However, there is no single method that is suitable and considered the Best Practicable Environmental Option (BPEO) for all types of wastes. Before any waste treatment facilities are proposed for use in the UK, local and regional stakeholders, community governments and planning authorities, and regulatory agencies need to be actively involved early in the decision-making process.

We received limited responses regarding the cost-effectiveness of thermal treatment processes. Within the NDA estate, we are accountable to Government and UK taxpayer to deliver hazard reduction and nuclear clean-up. Waste treatment systems and facilities need to be subject to business case development, evaluation, and approval by Site Licence Companies and NDA. We do concur with the respondents that the cost analysis should be based on all appropriate costs involved in LLW management for proper comparison with other alternatives. The direct charge rates for disposal of waste at LLWR do not represent the full costs associated with LLW management at the facility; all cost parameters need to be available to all those involved in management, treatment and disposal of LLW.

### **NDA Response**

We continue to support the position described in the draft strategy that thermal treatment opportunities are essential to the success of the LLW strategy in applying the principles of the waste hierarchy and we consider that the approach set out in the LLW strategy remains appropriate. We do not envisage any significant amendments to the final strategy in this respect.

NDA have engaged LLWR Ltd who are currently undertaking a programme of supply chain engagement to assess the UK capability to undertake thermal treatment services on behalf of the NDA estate and other waste consignors. Where it is identified that the supply chain does not yet have fully underpinned solutions for thermal treatment, the NDA and waste producing organisations may look to implement work programmes to close existing technology gaps.

We are clearly sensitive that treatment of radioactive wastes is an emotive issue for communities and the general public. The need for comprehensive stakeholder and

community engagement with local and regional bodies and community groups and NDA site representatives will be critical to the success of any thermal treatment project.

The issue of comprehensive stakeholder engagement has been identified in response to a number of the consultation questions. In order that this is considered in a coherent manner for the implementation of the strategy, the revised strategy will include commentary on the engagement that should be adopted in order that the waste hierarchy and strategy implementation can be effectively delivered.

## **2.6 Response to Question 6 – Nuclear Industry Capability and Capacity for waste management solutions**

The majority of consultation responses were largely in agreement with the draft strategy, (i.e. that the waste management solutions are available either in the supply chain or in the nuclear estate). However, it is important to recognise some key concerns expressed by other stakeholders specifically relating to third party management of radioactive waste away from nuclear sites.

As noted above, NDA is sensitive that treatment and disposal of radioactive wastes is an emotive issue for communities and the general public. The need for comprehensive stakeholder and community engagement with local and regional bodies and community groups and NDA site representatives will be critical to ensure delivery.

The strategy emphasises the key principles for the treatment and disposal of radioactive waste – that health, safety, security, and environmental performance is vital to the successful implementation and that implementation will be subject to all relevant legal and regulatory requirements, regardless of location or service provider. Further, determination of where waste treatment or disposal may be undertaken is required to be underpinned by robust decision-making processes and optioneering to ensure that the waste is managed in the most appropriate way.

With regard to the strategy's supply chain approach, it will continue to be our preference to utilise the existing capacity in the estate and the supply chain for the provision of waste management, treatment and disposal services rather than invest in centralised services where this is shown to deliver enhanced value to the UK taxpayer and is supported by strategic optioneering.

It was highlighted in the responses that the supply chain does not yet have solutions for all aspects of radioactive waste management and treatment solutions. The NDA and waste producing organisations are working with LLWR and industry to identify and implement work programmes to close these existing technology gaps – this may require direct NDA investment which, among other issues, will need to consider the best use of available land. Whilst NDA will continue to invest in relevant infrastructure where necessary to deliver our mission, this will be underpinned by a presumption that supply chain services are utilised to the fullest extent to build on the mature and expert capability currently available.

We also note from the responses that some of these technologies currently exist either within the UK or internationally and that efficient implementation of the waste hierarchy with regard to inter-site transfer or trans-frontier shipment should continue. These services should be

utilised on a case-by-case basis supported by strategic optioneering and be undertaken within the regulatory regime.

The key challenge for the nuclear industry to utilise the supply chain for the provision of waste management, treatment and disposal services is to provide robust forecasts and a forward-looking programme to enable the supply chain to determine capacity based on a degree of surety of future arisings. It is essential that NDA and LLWR Ltd continue to work with the waste producing organisations to ensure the adequacy and accuracy of this waste forecast information.

### **NDA Response**

Most respondents supported our view that there is capability in the NDA estate and supply chain for the provision of waste management, treatment and disposal services.

With regard to the strategy's supply chain approach, it will continue to be our preference to utilise the existing capacity in the estate and the supply chain rather than invest in centralised services where this is shown to deliver enhanced value to the UK taxpayer and is supported by strategic optioneering

Although the supply chain does not yet have solutions for all aspects of radioactive waste management, the NDA and waste producing organisations are working with LLWR and industry to identify and implement work programmes to close these existing technology gaps. It is recognised that this may require direct NDA investment.

The key factor to ensure success is to support the supply chain through the provision of robust forecasts and forward programme to enable the supply chain to invest based on a degree of surety of future arisings. NDA and LLWR Ltd are currently undertaking a programme of supply chain engagement to assess the UK capability to undertake thermal treatment services on behalf of the NDA estate and other waste consignors.

## **2.7 Response to Question 7 – Optimised approach to management of LLWR**

Consultation responses were consistent in recognising the value to waste producers and the UK through the optimisation of LLWR (with very few exceptions) and that implementing change in the operation and historic practices are essential enablers in allowing waste producing sites to implement the waste hierarchy.

Therefore, based on this degree of concordance, NDA will, with our delivery partner (LLW Repository Ltd), ensure adequate arrangements are introduced that supports waste hierarchy implementation. Wastes most suited to engineered vaulted disposal shall only be consigned to the LLWR. Whilst there was good agreement regarding the value of optimising capacity at the LLWR, the direct implication is that other wastes that would have historically been directly-disposed, now require alternative treatment and disposal.

We received a number of responses suggesting initiatives that may further support and optimise disposal capacity at the repository. It is our intent that these initiatives will be assessed in relation to the opportunity they may yield and how they can be managed by NDA and our SLCs to maximise their implementation and impact.

The consultation responses highlighted various concerns over the proposed use of alternative disposal sites other than LLWR. The UK LLW Policy recognised that any treatment or disposal will require further facilities to be licensed and authorised. A wide range of proposals were expressed ranging from disposal on existing sites only (irrespective of proposed site end state or end use), development adjacent to existing sites, through to new developments or alternate national disposal facilities.

We believe that the approach set out in the strategy remains robust, in that following the application of waste hierarchy and where waste requires final un-retrievable disposal, the series of disposal options that should be considered on a case-by-case basis needs to include:

- In-situ disposal
- Specified landfill or incineration, locally, regionally or nationally (e.g. VLLW)
- On-site or adjacent to site disposal (e.g. decommissioning rubble)
- Other near surface facilities, locally, regionally or nationally.

The responses align generally to the disposal options described above and it is important to note that any disposal option proposed by a waste producer will be required to show that it demonstrates health, safety, security, environmental compliance and that implementation will be subject to all relevant legal and regulatory requirements, regardless of location or service provider. Waste disposal will be required to be underpinned by robust decision making processes and optioneering to ensure that the waste is managed in the most appropriate way. This is further addressed below in response to questions 11 & 12.

It is our continued approach to work with all stakeholders to look to develop alternative disposal capacity that not only robustly meets the technical and regulatory criteria for disposal, but also look at the role of the NDA and its waste producers to strengthen our offer of support to all local and national stakeholders in explaining our role and potential risks and impacts.

This issue of comprehensive stakeholder engagement was also identified in response to a number of the consultation questions. Stakeholder engagement must be considered in a coherent manner for the implementation of the strategy. The revised strategy will include commentary on the stakeholder engagement that should be adopted in order that the waste hierarchy and strategy implementation can be effectively delivered.

Further it is incumbent on the nuclear industry to support stakeholder communities and the supply chain in providing waste management and disposal services. This support includes robust forecasts and forward programme to enable the supply chain to invest based on a degree of surety of future arisings.

### **NDA Response**

In response to our question, the respondents agreed that development of an optimised approach to management of LLWR was needed. The revised strategy will emphasise that preservation of capacity is not only achieved through diversion to other disposal locations but more importantly through the application of the waste hierarchy.

Although we received a significant number of responses to this question offering strong and counter views to where radioactive wastes not suited for disposal at the LLWR (i.e. VLLW)

should be managed, we believe that the approach set out in the strategy regarding final disposal options is robust.

We have presented a series of disposal options to be considered on a case-by-case basis. These options include in-situ disposal; specified landfill or incineration, locally, regionally or nationally (e.g. VLLW); on-site or adjacent to site disposal (e.g. decommissioning rubble); or other near surface facilities, locally, regionally, or nationally. The responses we have received align generally to these options described above and it will be incumbent on the waste producer to demonstrate health, safety, security, environmental and regulatory compliance.

The nuclear industry is required to work with all stakeholders to look to develop alternative disposal capacity that not only robustly meets the technical and regulatory criteria for disposal, but also looks at the role of the NDA and its waste producers to strengthen our offer of support to all local and national stakeholders in explaining our role and potential risks and impacts.

## **2.8 Response to Question 8 – New packaging solutions for LLW management**

Almost every responder to the consultation provided one or more key considerations for the development of new packaging solutions for LLW management and these will be directly distributed for consideration by LLW Repository Ltd to develop new innovative packages for LLW transportation, treatment, and disposal. We are encouraged by the views, recommendations, and potential vendor interest provided in the responses related to new packaging solutions for use in the UK.

Various innovative and alternative packaging and transportation methods are being examined through implementation of the UK Nuclear Industry LLW Management Plan. Re-usable containers and fit for purpose container designs are included under this remit, including the examination of international methods. The management plan can be found on the LLW Repository website ([www.llwrsite.com](http://www.llwrsite.com)).

Caution was expressed by some respondents for ensuring safety and environmental protection from the use of new packaging methods for waste disposal. The long-term implications to be addressed in the Environmental Safety Case at the LLW Repository were particularly noted. NDA agrees that the minimisation of safety and environmental risks are primary considerations in the evaluations of suitable alternative approaches and designs. NDA also shares the concerns from some respondents about preventing unnecessary risks to employees and the public at receiving sites as being a significant consideration for implementation of alternative packaging.

NDA believes it is important that packaging solutions are integrated and centrally-managed to ensure uniform standards and designs for LLW containers and maintain economies of scale for bulk purchasing. One responder was concerned that LLW Repository Ltd, having a lead role in developing alternative packaging designs, may impact market entry of more commercially competitive packages for use by individual sites. All waste producers and suppliers are encouraged to work with LLW Repository Ltd in development of practical waste packaging solutions.

## **NDA Response**

We continue to support the position described in the draft strategy that packaging developments will be led by LLWR on behalf of the industry in development of practical waste packaging solutions.

We do not envisage any significant amendments to the final draft of the strategy in this area.

## **2.9 Response to Question 9 – Transport of LLW and local communities considerations.**

While many respondents agreed with the position presented in the consultation documents that the impact of LLW transport on local communities is unlikely to be substantial in the majority of cases, there was recognition that transport of LLW and other radioactive materials is likely to remain a key area of interest for local communities and other stakeholders in the UK. Respondents felt there was benefit in taking reasonably practical steps in minimising transport and the impacts of transport on people and the environment.

Many respondents felt that engagement with local communities (both existing and new) on LLW management and transport is important to build trust through openness and transparency. One respondent felt that engagement on these stakeholder issues is not likely to be addressed entirely through the National Stakeholder Group and Site Stakeholder Groups. One respondent emphasised the need for effective communications with local communities around specific movements of large loads and the potential disturbance caused by LLW transport to be minimised by site operators.

Respondents referenced the full range of potential environmental benefits and detriments associated with travel including: carbon emissions, air quality impacts, fuel use, noise, nuisance and disturbance of local communities, road traffic risks and concerns about transport of radioactive materials. There were also references to the potential public and media interest which respondents felt would result from a potential transport accident involving the movement of LLW. However, a number of respondents concurred with the information presented in the consultation documents that these impacts were likely to be modest.

A number of respondents felt that communities where waste is generated should take responsibility for its management as they obtained the social and economic benefit of the activities, which had resulted in the generation of those wastes. We also received commentary that developers of new facilities should invest in community infrastructure to support those developments.

Several respondents felt that increased use of regional facilities for the management of LLW and/or the development of facilities on or adjacent to existing sites would have a positive impact by minimising the distances over which waste is transported. The concept of regional transport hubs was also raised. Several respondents also noted that on-site treatment or reuse of waste may have a positive impact by reducing the wastes requiring transport.

Given the range of factors outlined above, a number of respondents felt that it was important that transport decisions are taken on a case-by-case basis with the aim of achieving the best overall outcome for people and the environment taking account of value for money and waste managers' legal responsibilities. Several respondents also felt that there was a need to make

transport decisions in an integrated way rather than seeking to optimise the transport of LLW in isolation (e.g. by considering joint shipments of LLW and spent fuel by rail).

Several respondents identified the importance of transport to the local community around LLWR and in particular the residents of the village of Drigg given the limitations of the local road network and the limited access to the LLWR by road.

Sharing good practice was also deemed important to improve the effectiveness and efficiency of waste management and transport and also to improve public confidence in the approaches used.

One respondent felt that the management and disposal of LLW should only take place on nuclear licensed sites. This is further addressed under questions 7, 11 and 12.

**NDA Response:**

We recognise that while the impact of LLW transport on local communities is unlikely to be substantial in the majority of cases (although in certain specific circumstances it may be) the transport of LLW and radioactive waste in general is a key area of interest to stakeholders.

Noting the strategic importance to UK of the repository near the village of Drigg in West Cumbria, we recognise the specific issues associated with road transport through the village and the significant effort and capital expenditure by LLWR to minimise transport.

We recognise that many of the local community concerns regarding LLW transport are not limited to LLW but relate to the transport of any nuclear materials or waste. However, the discussion within the strategy and the supporting SEA is limited to LLW. Engagement with local communities (both existing and new) on LLW management and transport is important to build trust through openness and transparency. National Stakeholder Group and Site Stakeholder Groups provide part of the solution, but further efforts are required to ensure early and effective dialogue with local communities.

Any investment in community infrastructure to support new developments is a matter for the developer and the planning authority as set out in planning legislation.

While noting the general preference for minimising transport and the view from some stakeholders that those communities where waste is generated should take responsibility for its management, we agree that there is a continuing need for national or regional facilities for the management of LLW in a similar way to hazardous waste management. We will seek to align consideration of the proximity principle within the final Strategy with Planning Policy Statement 10: Planning for Sustainable Waste Management (July 2005).

Based on the assessment described in Environmental and Sustainability Report, the impacts of LLW transport are unlikely to be significant in the majority of cases. However these issues do need to be considered in specific decisions on waste management and transport as there are circumstances where impacts could be significant and in any case there may be simple measures which can be taken to further minimise impacts of LLW transport.

We recognise that the availability of a more diverse suite of national LLW infrastructure may reduce the need for transport. However, as described in the Environmental and Sustainability Report, LLW waste makes a relatively small contribution to overall transport in proximity to nuclear sites and so any benefit in terms of reduced transport is in the majority of cases unlikely to be significant.

We note that the increased carbon emissions arising from transport of LLW to more distant waste management facilities are relatively small on a national scale and are not a significant contributor to the carbon emissions of the nuclear sector.

We believe that UK transport legislation and regulations are sufficient to ensure the safety of radioactive waste transports within the UK by any transport mode and to ensure the safety of radioactive waste packages.

There is a need to consider all relevant considerations holistically in making choices about waste management and transport including both stakeholder concerns around transport and the presumption towards early solutions. There is a need to take decisions to optimise transport in an integrated manner rather than considering LLW transport in isolation. We also note that consignors will need to take decisions about waste management and transport in line with their duties under safety, environmental and transport legislation and with the aim of achieving the best overall outcome.

We note that there are a number of approaches which can be used to minimise disruption of local communities beyond choosing alternative modes of transport (e.g. choice of transport route, limiting times when transports take place, communicating with local communities in advance of abnormal loads) and the importance of communications with local communities about abnormal loads. This type of flexibility is encouraged in the Strategy.

## **2.10 Response to Question 10 – Movement of waste from road to rail for transport**

A large number of respondents expressed a preference for alternatives to road travel to be used where practical including both rail travel and transport of large items by sea. The reasons given for this preference largely related to: lower anticipated environmental impact, reduced disturbance to local communities and perception of improved safety of rail or sea transport compared to road transport.

However, a significant number of respondents also pointed out a range of difficulties in using rail travel which they felt may make rail travel impractical in particular cases. These challenges included: the limited access to rail heads at a number of nuclear sites, the limited suitability of rail heads designed for fuel transports for transport of radioactive waste, the cost of retaining access to the rail system where it currently exists, costs and practical difficulties of sites without rail heads accessing the rail network, the cost and environmental impacts of developing additional rail infrastructure, and challenges in storing sufficient volumes of LLW to make rail travel practicable.

Some respondents suggested that where existing rail heads are remote from sites, the local beneficial effect of increased use of rail infrastructure is likely to be limited.

Several respondents expressed the view that any preference for rail travel within the strategy should not foreclose the use of new or existing waste management facilities which do not have access to the rail network.

Several respondents identified the importance of minimising road transport to the local community around LLWR and in particular the residents of the village of Drigg given the limitations of the local road network and the limited access to the LLWR by road.

The concept of regional transport hubs was also raised as was the concept of storing waste from one or more sites to enable a smaller number of larger rail movements.

A number of respondents felt that it was important that transport decisions are taken on a case-by-case basis with the aim of achieving the best overall outcome for people and the environment, taking account of value for money and waste managers' legal responsibilities.

Several respondents felt that there was a need to take transport decisions in an integrated way rather than seeking to optimise the transport of LLW in isolation (for example, by considering joint shipments of LLW and spent fuel by rail).

**NDA Response:**

We recognise the preference for both rail and sea travel expressed by respondents due to perceived impact of these alternatives on climate change, disturbance and safety impacts of transport. However, the less flexible nature of rail travel and the variable access to rail infrastructure, together with the other issues summarised above, means that the use of rail transport is unlikely to be reasonably practicable in all cases and specific proposals will need to be considered on a case-by-case basis.

We recognise the specific issues associated with road transport through the village of Drigg and the significant effort and capital expenditure by LLW Repository Ltd to minimise transport through the village (particularly in relation to the recent construction of Vault 9 at the site). Use of transportation hubs will be investigated by LLW Repository Ltd, including greater use of near-by Sellafield rail options.

Transport of large LLW consignments by sea, both internationally and within the UK, should be considered where appropriate. However, it is unlikely to be the optimal transport mode for a large proportion of LLW transport due to limited direct access to the relevant infrastructure at many current consigning and receiving sites.

There is a need to consider all relevant considerations holistically in making choices about waste management and transport including both stakeholder concerns around transport and the presumption towards early solutions. There is a need to take decisions to optimise transport in an integrated manner rather than considering LLW transport in isolation.

In many cases existing rail heads are remote from sites and in such cases the local beneficial effect of increased use of rail infrastructure is likely to be limited. This will need to be considered on a case-by-case basis.

The challenges involved in establishing new facilities for the bulk storage of LLW have the potential to reduce the feasibility of developing transport hubs for LLW.

Where investment in new rail infrastructure is contemplated, consideration should be given both to the beneficial effects of rail transport and the negative environmental social and financial impacts of the construction of such infrastructure.

The constraint on relatively short train lengths resulting from the design of rail heads at a number of nuclear sites (which have been primarily designed for fuel transports), and the likely closure of these rail heads following defuelling due to high costs of maintenance, may prove a limitation for increasing the use of rail transport of LLW.

While it is true that if decommissioning results in increased waste volumes then the transport of those wastes are likely to result in increased conventional safety risks. Our assessment

would suggest that LLW is unlikely to be a significant part of total transport associated with any individual consigning nuclear site and so is unlikely to be a primary contributor to overall transport risk.

On-site treatment or reuse of waste may have a positive impact by reducing the volume of wastes requiring transport and we agree this should be considered with other relevant considerations in waste management decision making.

We note the modest benefit of rail travel in reducing carbon emissions and that this will be less significant in the context of regional facilities. However, we do recognise that although there may be potential disadvantages, consignors will need to take decisions about waste management and transport in line with their duties under safety, environmental and transport legislation and with the aim of achieving the best overall outcome.

We recognise that many of the local community concerns regarding LLW are not limited to LLW and relate to the transport of any nuclear materials or waste. However, the discussion within the strategy and the supporting SEA is limited to LLW. Engagement with local communities (both existing and new) on LLW management and transport is important to build trust through openness and transparency.

We recognise that an accident involving LLW would be likely to result in intense public interest but believe UK transport legislation and regulations are sufficient to ensure the safety of radioactive waste transports within the UK by any transport mode.

It is not intended to constrain new facilities to locations with rail access. However, where NDA are considering directly investing in new facilities transport infrastructure is likely to part of this consideration.

## **2.11 Response to Question 11 – Landfill disposal of LLW and VLLW**

The opportunity to use landfill disposal for VLLW, and other LLW, has been the topic of most debate associated with the consultation. Earlier versions of the draft strategy had shown a preference for the use of landfill as opposed to on-site disposal. Whilst this preference was removed in response to consultation with stakeholders during the development of the strategy, much of the comment associated with the debate has remained the same during the formal consultation period. However, the consultation did receive a varied response, as described below.

A large number of the responses confirmed the desire for public acceptability in the implementation of options associated with respect to the disposal of VLLW and the use of landfill type facilities. This was recognised within the strategy consultation document. Many of the responses received were related to site specific issues, which we recognised early on as a key issue for this part of the strategy, and the obvious difficulty in trying to develop a national position. Public acceptability is of course important to the development of such facilities and will be inherently local. The draft strategy effectively says that it will make the use of these opportunities as they arise if they can be demonstrated to be BPEO by the waste producer. The draft strategy does not comment on where and when they should arise. Many of the responses are suggesting that the NDA should take a stronger role in determining what types of facilities are required and where this should happen, and include this in the strategy.

We need to consider how this should be carried forward in implementation of the strategy and how to ensure that the final strategy can be implemented in a way that will build public acceptance. Whilst the draft strategy intends that the planning and Radioactive Substances Act permitting arrangements would be the framework to determine appropriate locations for these facilities, it would appear that there is a call for a more strategic steer on what is needed where. There is a need to ensure a robust interface with the planning system when looking at this issue.

A number of respondents explicitly stated a preference for disposal (and in some cases treatment) on or adjacent to existing nuclear sites. This preference is stated particularly in comparison to the use of landfills away from sites, either new or existing. Many respondents made reference to the proximity principle in their responses.

Issues of proximity and its interpretation are important to ensure open and transparent communication on the topic. Therefore, the final strategy will include information on how the proximity principle has been interpreted for the strategy (i.e. in accordance with the European Waste Framework Directive and Planning Policy Statement 10<sup>4</sup> (PPS10)). Whilst the proximity principle is an important factor, it is often set against the economies of scale that can be achieved through reducing the number of sites managing waste. The disparity in amount and location of VLLW (and LLW) arisings in the UK is a key issue in this area. For example, consideration of these factors will be different in Cumbria where a significant proportion of the waste is in one location to other parts of the country, where smaller arisings are generated and spread over a much wider area. It is intended that this disparity is reflected in the final strategy and it may be further useful to state an intention / action in the strategy to look strategically at what facilities are required and where they might be located

Several respondents expressed support to the proposed strategy as written in the consultation, with some expressing explicit support for the use of landfills for the disposal of appropriate wastes.

A number of responses refer to the regulatory framework in the implementation of these opportunities. Whilst we did receive some commentary proposing that the regulatory framework was insufficient, the majority more simply referred to the importance of that framework and its critical role in demonstrating that these opportunities were safe for people and the environment and also in the provision of confidence to communities around any such facilities. Part of this process is the importance of the waste producer decision-making process, which was raised by a number of respondents, noting that the use of alternative sites should they become available is not automatic.

Queries regarding the liabilities for disposal of LLW from existing nuclear licensed sites to landfill have been raised. A number of organisations involved are currently liability issues associated with landfill disposal of LLW and VLLW.

Waste producers will have to demonstrate that the use of the site is appropriate through BAT / BPEO / strategic optioneering and a number of respondents made particular reference to the

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<sup>4</sup> Planning Policy Statement 10: Planning for Sustainable Waste Management (July 2005)

waste producers Duty of Care in ensuring that waste is managed in an acceptable way once it has left their site.

Issues of technical suitability of a given facility and the management at a given site were raised and will clearly be essential in any optioneering process and captured by the authorisation process. Inclusion of expectations in this area linked to the authorisation process, are to be highlighted in the final strategy.

The final strategy will continue to emphasise the critical importance of landfill to other industry sectors and the need to ensure that VLLW disposal to landfill from decommissioning and clean-up would not jeopardise other usage.

Finally, as noted above, a number of respondents noted that landfill has a role to play, but emphasised that disposal is a last resort.

### **NDA Response**

The final strategy will emphasise waste avoidance and volume reduction through the application of the waste hierarchy and where waste requires final un-retrievable disposal then the strategy will continue to include the option of landfill disposal in the range of available options, with no stated or inferred preference.

The final strategy will describe arrangements for decisions supporting disposal to landfill to be underpinned by optioneering and transparent decision-making. We recognise issues of public acceptability and liability with relevant organisations and the need to be engaged in early dialogue with stakeholders. In order that decision-making is underpinned with robust information, we will ensure waste information is available to all parties. Other aspects that will be emphasised in decision-making are:

- The regulatory and legal framework that governs LLW treatment and disposal activities to ensure safety for people and the environment, but should also contribute to public confidence.
- The approach to implementing the proximity principle will be further detailed to improve communication on its application, specifically looking at arrangements for local communities and authorities.

## **2.12 Response to Question 12 – On-site disposal of LLW and VLLW**

This consultation question covers issues of on-site disposal and relates directly to Question 11 on the use of landfills for some LLW. Many of the themes of the previous responses to Question 11 also carried forward into this question.

In general, there was a positive response for on-site disposal with some responses noting it as a preference over other forms of alternative disposal, whilst others commented on the potential value for reuse of material following large scale decommissioning. We also received comments that land adjacent to nuclear sites has potential for waste disposal. It was also noted that a large disposal facility could offer long-term security for a waste route. Often this preference was stated in relation to the likely public acceptability of on-site disposal when compared to the use of landfills as an alternative route for LLW.

Whilst there was a preference for on-site disposal stated by some respondents, others were cautious with respect to some of the potential limitations that may be associated with on-site disposal, most notably the impact on site end states and other legacy issues that may result from disposal. This was linked in one case to what this could mean for contaminated land and buried structures. Technical suitability was also raised, specifically where some sites may not provide the appropriate conditions for waste disposal. This brought out some of the key considerations associated with pursuing this option and that indeed there are complicated issues and impacts that need to be addressed. Often these are case-specific issues, and the need for case-by-case assessment was recognised by a number of respondents. It is these case-specific issues that suggest that the draft strategy is robust in not including a preference for or against on-site disposal.

Criteria for consideration for alternative disposal were set out in the consultation document, and were broadly agreed with, although some respondents noted that these should relate to all decisions in this area, not just on-site disposal. Important considerations in determining waste management decisions will be captured in the final strategy.

We received conflicting responses with respect to on-site disposal facilities accepting waste from other waste producing sites. A number of respondents recognised receipts from other sites as a key opportunity to reduce the dispersal of waste disposal activities and achieve economies of scale. This was countered with other responses commenting that on site disposal should only be used for the wastes from the site at which it is located.

It is likely that a national preference for on-site disposal could be reached if some of the economies of scale from multi-site use could be employed, but in reality it would seem that this approach would be unpopular with local stakeholders and therefore likely to impact on issues around planning and development of such facilities.

Other comments received included views relating to on-site disposal ranging from widespread on-site disposal being viewed as abandonment rather than management of LLW; it represents a dispersed approach to LLW management; preference for use of LLWR over any on-site disposal; and opportunities for disposing of other waste types (e.g. reactor decommissioning wastes).

Further, some respondents noted international experience with respect to the management of VLLW in their responses. It is noted that there is much to be learnt from international approaches to managing such wastes.

These cumulative comments have led us to consider that developing a national position for on-site disposal is not appropriate and that specific issues associated with on-site disposal make a case-by-case assessment approach appropriate.

## **NDA Response**

In light of the discussion above, we will undertake the following actions in developing the final strategy in response to the comments we have received. Many of those raised in response to the consultation on Question 11 are relevant here.

The final strategy will emphasise waste avoidance and volume reduction through the application of the waste hierarchy and where waste requires final un-retrievable disposal then the strategy will continue to include the option of on-site disposal in the range of available options, with no stated or inferred preference.

The final strategy will describe arrangements for supporting on-site disposal to be underpinned by optioneering and transparent decision-making. It will recognise issues of public acceptability with relevant organisations to be engaged in early dialogue with stakeholders. In some cases, there may be a requirement for NDA and LLWR to work with SLCs and Local Authorities to undertake a site specific review of disposal needs. In order that decision making is underpinned with robust information, we will ensure consistent information is available to all parties. Other aspects that will be emphasised in decision-making are:

- The regulatory and legal framework that governs LLW treatment and disposal activities to ensure safety for people and the environment, but should also contribute to public confidence.
- The approach to implementing the proximity principle will be further detailed to improving communication on its application, specifically looking at arrangements for local communities and authorities.

There is a requirement to continue to emphasise the potential impacts of on-site disposal to ensure that stakeholder engagement in this area covers all of the key issues (for example, site legacy issues, impacts on site end state, de-licensing, and receipt of wastes from other sites).

## **2.13 Response to Question 13 – Encouraging the right behaviours - waste recycling targets**

The responses received largely acknowledged that the approaches proposed to encourage a change in the management, treatment and disposal of low level radioactive waste could lead to cultural and behavioural change.

Although respondents were not universal in accepting all the proposed approaches, it was noted that a combination of those identified could be usefully employed.

Specifically, it was noted that the responses acknowledged the responsibility of the NDA to drive change contractually and strategically in the management and disposal of radioactive waste on our sites and with our Site Licence Companies. Application of our influence to other sectors of the UK nuclear industry and waste producers was also recognised as a potential means to influence change.

There was some concern expressed that introducing arrangements or change without recognition of the maturity of waste producing sites' current arrangements could limit effectiveness and implementation.

It was also noted that the NDA can only "instruct" its own sites and can only seek to "influence" other waste producers – we recognise this but note that the NDA (based on current information) will be responsible for circa 80% of the total waste arisings. We did receive limited commentary that current annualised funding may in itself be challenging the implementation of multi-year initiatives fully encompassing behaviours that will deliver the maximum application of the waste hierarchy.

The strategy consultation received a significant number of responses agreeing that waste recycling targets and metrics would be an appropriate tool to develop and monitor change and effectiveness of the strategy implementation. But almost universally, the responses were

caveated with comments requiring that any targets or metrics must be appropriately developed so as not to drive perverse behaviours and the need to reflect sites' maturity in some areas. We acknowledge this and are considering a programme of work that will look to scope a needs-driven approach to establish suitable targets/metrics.

Skills and capability were also highlighted in a few responses to ensure the continued implementation of the LLW strategy. This specific area will continue to be addressed through the UK and local skills and capability strategies and specifically for the NDA estate will be considered through our NDA skills and Capability Strategy.

### **NDA Response**

In light of the discussion we will seek to introduce (either directly or through influence) arrangements to support change and different approaches to LLW management, treatment, and disposal.

To deliver this change, we are already working with our delivery partner (LLW Repository Ltd) to fundamentally change the contractual arrangements for the consignment of LLW waste to the LLWR, and LLW Repository Ltd have been working to offer a broader scope of waste treatment and disposal options to the waste producer community.

Further, we recognise that waste producers will require a degree of flexibility in the management, treatment, and disposal of their wastes and, as such, it is not our intent to be prescriptive in relation to identified waste management arrangements.

With regard to specific activities to drive the right behaviours, there are clearly some that can only apply to the NDA estate, such as contractual incentives. We will provide our Site Licence Companies with strategic guidance on the implementation for the strategy and will seek to influence other waste producers through existing or new technical and stakeholder working groups.

We shall be looking to scope and initiate a programme of work to determine a needs-driven approach to ensure that appropriate metrics (and if appropriate targets) can be established that enable effective monitoring of strategy implementation.

We shall also encourage information to be made available that adequately supports the business case for introducing different services – e.g. comparing VLLW disposal or controlled burial balanced against re-use or re-cycling of waste materials and vaulted disposal.

## **2.14 Response to Question 14 – Risks and mitigation**

The inclusion of the risks and mitigation measures in the strategy consultation document was intended to capture some of the background issues that have been considered in strategy development in an informative way for the consultation respondents. It is not intended that the final strategy document should include a risk and mitigation table because risk management is an ongoing activity whilst the strategy document is a reference and guidance tool.

The respondents have largely supported the risks that were included in the consultation, although some responses were critical of the level of detail, firmness of mitigation actions, or their ability to address the risks that have been raised. Several respondents thought that the

section in the document did not capture all of the risks, whilst others provided commentary on which they considered the most important.

For those risks that were in the consultation document, the issue of potentially contaminated land received the most attention. In the final strategy, we will ensure that this interface issue is captured effectively. Work NDA is undertaking in this area is focussed on NDA sites, however it should benefit non-NDA sites as well.

The area not explicitly covered in the consultation document that received considerable attention was whether or not the supply chain would deliver the services required by the strategy. This was captured to a certain extent in the risk section on VLLW routes. Whilst there is a certain amount of focus on the supply chain, it is not intended that this is the only way the strategy is to be delivered. The strategy was intended to be flexible in implementation. It is worth noting that responses generally considered that there is supply chain *capability* to deliver treatment and disposal services, but that *capacity* may not be currently available.

The other risk that received a number of responses was associated with waste forecasting and inventory. This risk will always exist to some degree because waste arisings will fluctuate as a result of a multitude of factors but is recognised as a key work activity that supports robust decision-making and transparency.

### **NDA Response**

In developing the final strategy, we will clarify how risk will be managed. We will specifically consider interfaces with contaminated land strategy and expectations in this area.

The strategy will emphasise implementation and delivery – which will include self performing work and utilisation of the supply chain, as appropriate. However, these activities can only be appropriately planned and managed with robust inventory forecasting – the revised strategy will describe activities in this area.

For other comments received, these will be used to inform NDA and SLC risks registers, as well as, sharing the outputs with the National LLW Strategy Group to give the information wider coverage.

## **2.15 Comments on any other aspect of the Low Level Waste Strategy**

A number of respondents decided to provide further comments in addition to, or instead of, responding to the specific questions in the consultation document. This covered a broad range of issues, although many of the comments reiterated points made elsewhere in their own consultation responses or covered issues that had been raised by other respondents.

As would be expected, responses received were widely varied and do not lend themselves well to a generic response. It is worth noting however, that certain issues were raised by a number of respondents. This may be because those issues are of particular importance, or maybe because they did not receive sufficient coverage in the consultation document and therefore this was the only appropriate place to raise them. The three themes that came out strongest in these responses were:

- Integrated waste management – the need to recognise that management of LLW is one part of a wider waste management process that needs to be integrated in order to be effective. This includes integration with other radioactive wastes and with non-radioactive wastes as well.
- Opportunities around “boundary wastes” – a number of respondents provided comments on the need to ensure best use is made of opportunities where LLW interfaces with other wastes. Particular reference was made to ILW, where opportunities are driven by the costs associated with ILW management; whilst there are challenges and costs associated with LLW management, there are greater costs involved in managing ILW. From an integrated view of radioactive waste management, managing ILW as LLW following treatment or better characterisation may have significant benefit.
- Inventory / Waste information – The need for a robust inventory of wastes to be managed is critical to effective waste management planning. The final strategy needs to capture this important point and should address recent efforts to derive more realistic estimates of waste arisings.

Some other issues that were raised in this area and were not specifically covered elsewhere in the consultation include the following.

- Clarity on the role of various decision-making and assessment processes (e.g. SEA / BPEO / BPM / BAT).
- Incentivisation – there was a call that incentivisation is an important mechanism to get strategic change, but that incentives through pricing structures at LLWR should not be used to punish non-NDA waste consignors.
- Community benefit – there was a call for inclusion of some commentary on community benefit in the final strategy. This is a valid request, although a very sensitive topic, and as such it would be appropriate to obtain guidance from Government on appropriate text to include.
- Cost model / business case / value for money – a number of respondents brought out issues associated with demonstration of value for money and the business case for the strategy. A detailed business case and cost model has been developed for both the strategy development work and also the Strategy Management System. In order to be useful to a wide range of stakeholders, this information should be published and referenced to in the strategy.
- International experience – international experience was raised in a number of areas and should be addressed in the final strategy.
- NDA take the lead in provision of infrastructure – a number of responses made reference to our role in the strategy, some suggesting that the strategy was too “NDA-centric”, whilst others suggested that the NDA should take a stronger active lead in constructing the infrastructure needed to implement the strategy. Several respondent noted that the scope of the strategy is beyond the NDA estate, but most of the key benefits of change will occur within the NDA estate. This should be made clear in the final strategy. We will also look to explain our role more effectively in the final strategy.

- On-site facilities open to new nuclear build / Regional waste management options / Role of local authorities / Supply chain development at sites – a number of responses covered issues around developments at nuclear sites. These comments sit firmly in the implementation of the strategy. As noted in this strategy consultation, there is a need to explain roles more clearly particularly around the NDA role and also local authorities in planning for the implementation of the strategy. These comments do also recognise the site-specific nature of implementation of the strategy. We have seen that several responses have recognised the potential advantages of a more regional approach to waste management although other respondents have stated that on-site infrastructure should only be for the hosting site. Aligned to this were comments reiterating the need for continued stakeholder engagement in implementation of the strategy and particularly the need for public acceptability around disposal issues.
- Waste hierarchy application to VLLW – the consultation has had a broadly favourable response with respect to the waste hierarchy. In this section, one respondent wished to make a plea that the waste hierarchy is just as important for VLLW as it is for LLW. There is a risk that issues of cost could result in a preference for disposal of VLLW material over other options higher in the waste hierarchy, such as recycle or waste treatment. The costs of managing radioactive waste are high and cost assessment alone will often result in disposal coming out more favourable, particularly if new less-expensive disposal routes become available. As such, it will be important to emphasise the need for value-based decisions that are not just based on cost. Disposal capacity is a valuable commodity, not only for LLW but for other users throughout the UK.

As a final point, the aim for “zero waste to landfill” that a number of planning authorities and organisations support is recognised. This is a salient reminder about where the focus of the strategy should be. Much of the debate around the strategy has focussed around disposal options, whereas the main aim should be to reduce the amount of waste that requires disposal. Whilst there are some low level radioactive wastes that are not amenable to any alternatives to disposal, there will be much waste generated that is and the strategy should look to make the most of this opportunity. This point should not be lost in all the discussions on disposal options.

### **NDA Response**

In light of the discussion above, we will undertake to reflect key issues in the final strategy.

We will look to reflect the critical importance of integrated waste management and consider those opportunities identified arising from the consultation process. Specifically we will further stress the application waste hierarchy in relation to waste management to avoid disposal of waste as far as possible.

As discussed above, we will provide further information on the importance of waste management information, forecasting, and inventory and how this will support the application of BAT and other decision-making processes necessary to underpin implementation and decisions associated with treatment and disposal options.

We will also provide commentary on the issues associated with on-site facilities accepting waste from elsewhere and the potential opportunities around reactor decommissioning wastes – recognising the concerns of local communities and with stakeholders.



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We will look to provide some commentary on community benefit, following discussions with Government and devolved administrations.

We will also look to include revised text on the role of planning authorities in waste treatment and disposal.

Finally, we will explain our role in relation to identifying and developing of new capacity.

### **3.0 Conclusions and Way Forward.**

The responses shown were received from a wide range of stakeholders in response to the consultation on the UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry.

The consultation ran from June 2009 to November 2009 (the consultation was extended from an original close date of September 2009 as we specifically looked to encourage further views, especially from Local Authorities).

In total we received 74 responses to the strategy and its accompanying Strategic Environmental Assessment.

The review panel that was established considered all the responses received and assessed the likely impact on the proposed draft strategy. Responses were collated and evaluated to reflect the range of stakeholder comments received.

General observations following the review of the consultation responses are: reasonable agreement with the principles set out in the draft strategy; early dialogue with stakeholders and local communities is essential; transparency of the decision-making processes based on robust information. The dominant discussion largely centred on the suitability of location of treatment and disposal facilities, rather than on an objection in principle to the aspects of the proposed strategy.

Based on these responses, the LLW Strategy will be revised. We are targeting completion of the final draft of the strategy by 31 December 09, and following NDA agreement propose to circulate to HMG for approval in the first quarter of 2010.

## Appendix D

### Monitoring Measures

Objective	Monitoring Measure	Source(s) of Information
Air Quality	Authorised gaseous discharges of radioactivity.	<b>Radioactivity in Food and the Environment (RIFE) Annual Reports</b> (Food Standards Agency (FSA), the Environment Agency, SEPA, and the Environment and Heritage Services of Northern Ireland).
Global Climate Change and Energy	Energy consumption at facilities.	NDA; Site Licensed Companies and facility site operators; and Environment Agency ( <a href="http://www.environment-agency.gov.uk">www.environment-agency.gov.uk</a> )
	Emission of greenhouse gases	Defra ( <a href="http://www.defra.gov.uk">www.defra.gov.uk</a> ); Nuclear Sector Plan
	Climate change resilience and adaptation	Site Licensed Companies risk management and safety case arrangements.
Biodiversity	Condition Reports for Designated Sites	Scottish Natural Heritage; Countryside Council Wales; Natural England. RD128 assessments of impact of discharges on biota.
	Protected species	JNCC / Site Licensed Companies' Environmental Management Plans.
	Biodiversity	JNCC / Site Licensed Companies' Environmental Management Plans.
Landscape and Visual	Visual appearance of facilities.	Relevant Landscape Character Assessments EIA associated with LLW management projects
	Visual amenity of surrounding areas	Relevant Landscape Character Assessments EIA associated with LLW management projects
Cultural Heritage	Condition of historic assets	English Heritage; Historic Scotland; Cadw EIA associated with LLW management projects
Groundwater, Geology and Soil Quality	RIFE aqueous discharges.	<b>Radioactivity in Food and the Environment (RIFE) Annual Reports</b> (Food Standards Agency (FSA), the Environment Agency, SEPA, and the Environment and Heritage Services of Northern Ireland).
Surface Water Resources and Quality	RIFE aqueous discharges.	<b>Radioactivity in Food and the Environment (RIFE) Annual Reports</b> (Food Standards Agency (FSA), the Environment Agency, SEPA, and the Environment and Heritage Services of Northern Ireland). Environment Agency; SEPA; DoENI. Nuclear Sector Plan
	Water quality monitoring	
	Water Use	
	Water body status	Environment Agency; SEPA; DoENI.
Waste	LLW inventory	UK National Radioactive Waste Inventory, LLW Strategic Review
Economy, Society and Skills	National Statistics data – unemployment level, level of	National Statistics

Objective	Monitoring Measure	Source(s) of Information
	qualifications etc.	
Traffic and Transport	Traffic activity levels around NDA sites (Annual Average Daily Traffic Flows)	Department for Transport ( <a href="http://www.dft.gov.uk">www.dft.gov.uk</a> ) EIA associated with LLW management projects /decommissioning reactors
Land Use, Natural and Material Assets	Quantity of materials ordered by sites / facilities	Facility operators; Site Licensed Companies
Noise and Vibration	Monitoring of noise levels at facilities or on NDA sites	Facility operators; Site Licensed Companies
Health and Safety	RIFE radiological dose levels	<b>Radioactivity in Food and the Environment (RIFE) Annual Reports</b> (Food Standards Agency (FSA), the Environment Agency, SEPA, and the Environment and Heritage Services of Northern Ireland).
	Radiological Exposure to workers; TRIR; RIDDOR rates	NDA; Site Licensed Companies NDA; Site Licensed Companies
	National Statistics – Long term ill etc.	National Statistics
Hazard Reduction	Safety and Environmental Detriment	NDA; Site Licensed Companies
Value for Money and Affordability	Estimated costs to the NDA;	NDA