Geological Disposal

Upstream optioneering - Update

June 2012
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Upstream Optioneering: Update – June 2012

The Upstream Optioneering project was set up to help identify and implement opportunities for improved management of higher activity radioactive waste in the UK. These improvements could lead to quicker and more cost effective hazard reduction, reduced environmental and safety impacts, and other benefits. Over the past two years, we have:

- Identified opportunities to improve waste management practices, in conjunction with waste producers.
- Developed a multi-year programme of work to deliver these opportunities.
- Reacted to the needs of waste producers by delivering other work to facilitate ongoing waste management.
- Engaged with Site Licence Companies on specific projects of national significance.

This year, we will:

- Deliver Year One of the work programme. The programme is listed overleaf, but this programme is subject to change – to enable us to react to requests from waste producers, we may need to defer some of the planned work.
- Interface with other functions within our Radioactive Waste Management Directorate, NDA Strategy, NDA Delivery and the Site Licence Companies to support their ongoing work.
- Hold a workshop to enable further engagement with interested parties.
- Issue regular progress updates.

This work is being delivered by our Radioactive Waste Management Directorate, supported by the ASSIST consortium. Each opportunity in the work programme is sponsored by NDA Strategy, NDA Delivery or the Radioactive Waste Management Directorate.

Recent work (Financial Year 2011/12)

During Financial Year 2011/12, the core work area of the Upstream Optioneering project has involved the collation, sorting, consolidation and prioritisation of opportunities to optimise Higher Activity Waste management across the NDA estate. The project was split into three phases (Table 1).

Table 1 Upstream Optioneering work breakdown

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description of activity</th>
<th>Date</th>
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<tbody>
<tr>
<td>Phase 1</td>
<td>Collation of opportunities from across the NDA estate</td>
<td>April 2011 – November 2011</td>
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<tr>
<td>Phase 2</td>
<td>Consolidation, analysis and prioritisation of opportunities</td>
<td>November 2011 – April 2012</td>
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<tr>
<td>Phase 3</td>
<td>Delivery/implementation of three-year programme of opportunities</td>
<td>April 2012 – March 2015</td>
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</tbody>
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SLCs and RWMD contributed to a list of opportunities, which were subsequently categorised into topical groups and discussed and further developed with subject experts in workshops. The workshop output was used to develop one-page Opportunity Briefs. The Phase 2 Upstream Optioneering project team (RWMD and ASSIST) has used the final Opportunity Briefs to develop, in conjunction with NDA Strategy and NDA Programmes, a prioritised three-year work programme. Each opportunity was further classified as an enabler, well-defined or poorly-defined. All opportunities were scored against Affordability and Time Sensitivity criteria. Well-defined opportunities were also assigned scores against other key
prioritisation criteria, such as Hazard Reduction, Cost and Ease of Implementation (these criteria are based on our Value Framework). Following the development, evaluation and consolidation of opportunities, a total of 69 distinct opportunities remained, and these have been allocated to the three sponsoring functions of NDA, these being RWMD, NDA Strategy and NDA Delivery.

Throughout Phase 2, feedback was obtained on the scoring methodology, Opportunity Briefs and prioritised programme by early engagement with sponsors, regulators and waste producers at various workshops.

Opportunities have been scheduled and prioritised in order to ensure that resources are deployed appropriately and urgent opportunities realised before benefit diminishes. During the prioritisation stage, it was noted that a number of dependencies or commonalities exist between opportunities, allowing them to be grouped, for example:

- Opportunities that concern wastes near the low/intermediate-level radioactive waste boundary, and that involve alternative approaches to manage wastes according to classification.
- Opportunities related to decontamination of wastes.
- Opportunities related to the optimisation of disposal facilities.
- Opportunities to resolve letter of compliance issues for existing waste streams.
- Opportunities connected with the management of wastes at the Sellafield Waste Treatment Complex.

In developing the Upstream Optioneering Phase 3 work programme, connections have been identified with other work in progress across the NDA estate. One way in which this has been done is to link the prioritised Opportunity Briefs to the NDA’s Higher Activity Waste Strategy by comparison with our Integrated Waste Strategy Development Programme. Many of the Opportunities align with activities in the Integrated Waste Strategy Development Programme. These Opportunities are sponsored by NDA Strategy and their implementation will support the development of outputs or products that provide instructions or guidance to waste producers.

During Financial Year 2011/12, the Upstream Optioneering project has also been managing and implementing other work that is reactive to the needs of waste producers and engaging with Site Licence Companies on specific projects of national importance. These studies include:

- A strategic examination of the potential role of robust shielded containers across the NDA estate
- Identification of opportunities for integrated processing of higher activity waste across the NDA estate
- A scoping study on the use of superplasticisers in the nuclear industry
- Identification and challenge of constraints and assumptions underpinning the emplacement rate of waste to a geological disposal facility
- Review and update of a technical report on leaching of thermally treated Intermediate Level Waste
- Support to Sellafield in developing a letter of compliance submission for the Waste Treatment Complex, which packages plutonium-contaminated waste from the engineered drum stores for disposal

**Planned work (Financial Year 2012/13)**

Year One of the work programme currently comprises 19 opportunities that will provide a range of benefits across the nuclear industry.

Some outputs of the Upstream Optioneering project take the form of technical advice and recommendations that enable further action. Implementation of the recommendations in relation to actual waste management practice is mostly the responsibility of other projects. The paragraphs below provide a brief statement on each of the opportunities included in Year One. These opportunities are further defined in the Phase 2 Overview report².

- **Use of superplasticisers in waste packages**
  This opportunity involves identification of superplasticisers and other organic grout additives that can be used in waste packages across the nuclear industry; currently, use of these materials is constrained by their acceptability to the geological disposal facility design concept.

- **Use of a higher fissile loading for IP2 packages**
  This opportunity involves considering revisions to the fissile exception assumptions for IP-2 packages that may lead to reduced assay requirements on waste producers.

- **Use of neutron poisons/absorbers to increase limits on the fissile material content of intermediate-level radioactive waste packages**
  This opportunity involves considering the potential uses of neutron poisons, absorbers or other materials to increase current limits on the fissile material content of intermediate-level radioactive waste packages.

- **Develop container, storage, transport and disposal cost norms**
  This opportunity involves developing consistent cost norms across a range of scenarios, potentially leading to changed liability estimates. This work will facilitate options assessments and business case development by helping to ensure that approaches are comparable across the nuclear industry.

- **Optimised management of orphan waste**
  This opportunity involves considering opportunities for consolidated management of orphan wastes across the nuclear industry in the UK, with the potential to reduce hazard by facilitating the identification of treatment routes for orphan waste streams.

- **Consolidate management of zeolite skips**
  This opportunity involves considering the lifecycle benefits of consolidated management of zeolite skips at a single site.

- **Earlier export of high-level radioactive waste to a geological disposal facility, pre-2075**
  This opportunity involves considering the feasibility of transport and geological disposal of high-level radioactive waste, at earlier times than in the current baseline.

- **Optimisation of the management of oils (and solvents)**
  This opportunity involves assessing the management of contaminated organic liquids with the aim of improving processes for disposing of them. For example, this might involve developing a national solution for management of radioactively contaminated oils.

- **Enable greater access to DIQuest software tool**
  This opportunity involves investigating options for allowing the DIQuest inventory tool to be made available to users outside RWMD. Allowing waste producers to access

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DIQuest may allow better decisions to be made during assessment of waste packaging options and Letter of Compliance development.

The following opportunities may be taken forward by Sellafield Limited. If they are taken forward, the upstream optioneering project will support as needed.

- **Seek optimum solution for Sellafield Miscellaneous Beta Gamma Waste Store packages**
  This opportunity involves examining the feasibility of allowing some passive waste from the Miscellaneous Beta Gamma Waste Store to be directly disposed of in a geological disposal facility in existing packages, with or without encapsulation.

- **Disposal of pile fuel cladding silo raw wastes to a geological disposal facility**
  This opportunity involves examining the potential for Pile Fuel Cladding Silo wastes to be packaged for disposal at a geological disposal facility upon retrieval, thereby saving the time and cost of repackaging at a later date.

In addition to the planned work included in the Phase 2 report, an additional task will consider the use of reinforced concrete packages. This has been commissioned in response to a number of proposed uses of those boxes by SLCs.

Several Upstream Optioneering opportunities from the Year 1 work programme interface with ongoing NDA/RWMD work. Watching briefs will be maintained on these work areas and the Upstream Optioneering project will provide support where necessary. These include:

- The use of self-shielding packages
- Development of an increased capacity reusable transport container
- High temperature treatment
- Broadening the feed envelope for the Waste Treatment Complex at Sellafield
- Implementation of a standardised canister for high-level radioactive waste/spent fuel
- Seeking an optimum solution for advanced gas reactor steel and graphite wastes
- Development of a larger plutonium contaminated material waste container
- Use of multi-purpose containers for spent fuel disposal

**Benefits realisation**

The Upstream Optioneering project is applying an Office of Government Commerce\(^3\) approach to help deliver best value. To achieve this, a benefits realisation plan is being developed in order to track realisation of benefits across the work programme and set review controls. The objective of benefits realisation plans is to ensure that all benefits are effectively and actively managed\(^4\). The Upstream Optioneering benefits realisation plan will exploit synergies with recent benefits planning experience at the Low Level Waste Repository and will be used to inform us in deciding whether or not to introduce new work to the Upstream Optioneering programme (for example, by identifying how the work contributes to already-identified benefits).

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\(^4\) [http://www.dfpni.gov.uk/benefits-management-mainsection3-12](http://www.dfpni.gov.uk/benefits-management-mainsection3-12)
**Upstream Optioneering Workshop**

The Upstream Optioneering project is responding to requests received from the industry (via the newly established GDF Users group) for wider engagement on the Upstream Optioneering work programme by organising a workshop on 31st July 2012.

Further details are available on our website\(^ 5\).

**Way forward**

The Upstream Optioneering Phase 3 three-year work programme is “live”. Interactions with waste producers, regulators and other interested parties will be maintained throughout the work programme and regular updates will be provided on the Upstream Optioneering website\(^ 6\) to inform interested parties of the progress of the work programme and of specific opportunities. Such updates will include an overview of current work and work to be started in the next quarter.

Feedback can also be sent to upstream.optioneering@nda.gov.uk. If any additional opportunities arise, the sponsors will consider whether and how they can be included in the programme.

\(^5\) [http://www.nda.gov.uk/stakeholders/newsletter/upstream-optioneering-workshop.cfm](http://www.nda.gov.uk/stakeholders/newsletter/upstream-optioneering-workshop.cfm)
