Managing Radioactive Waste Safely Participatory Methods Workshop Report

Volume 2: Background Papers

Background papers for a two-day expert workshop to develop a vision for the public and stakeholder engagement programme of the Managing Radioactive Waste Safely policy options review stage.

Prepared by University College London¹ and Department for Environment, Food and Rural Affairs²

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A two-day expert workshop to develop a vision for the public and stakeholder engagement programme of the Managing Radioactive Waste Safely policy options review stage.

Also known as the “Managing Radioactive Waste Safely Participatory Methods Workshop”, held on 10-11 March 2003, Manchester.

- Sponsored by the Department for Environment, Food and Rural Affairs (Defra)
- Planned, facilitated and reported on by the Environment and Society Research Unit (ESRU), Department of Geography, University College London

This document is one of two volumes on the above workshop:

**Volume 1** is the report of the workshop³. This is **Volume 2** and contains the three background papers that were prepared for the workshop:

1. An **overview** of the Managing Radioactive Waste Safely process as foreseen by Ministers, the outline structure set for it, the role of CoRWM in overseeing the programme and providing recommendations for the long-term management of the UK’s radioactive waste. This paper, prepared by Robert Jackson (Defra), formed the opening presentation of the workshop (see pages 3-11).

2. A **background paper** prepared by Katherine Mondon (Defra) which provided information on the nature and quantities of radioactive waste held in the UK and recent developments in its management (see pages 12-50).

3. A **participatory methods working paper** prepared by Jason Chilvers, Jacquie Burgess and John Murlis (ESRU, UCL), which provided a foundation for the workshop through ensuring that those attending had a common understanding of:
   - the range of public and stakeholder engagement approaches available;
   - key concepts and terms used in respect of them;
   - how such methods might relate to the MRWS process; and
   - existing experiences of the application of such methods in the area of radioactive waste management in the UK and internationally.
   This paper is at pages 51-97.

1. INTRODUCTION

[SLIDE 1. PRESENTATION TITLE]

This is the first of two opening presentations to set the scene for the conduct of this workshop.

The purpose of this first one is to indicate how UK Government and devolved administration Ministers view the “Managing Radioactive Waste Safely” process, what they expect to come out of it and, hence, what is being looked for from this workshop. Ministers’ expectations have been set out in various statements concerning the way forward and reports to their respective Parliaments and Assemblies.

For those participants who are less familiar with the topic of radioactive waste, a paper entitled “Background Paper on Radioactive Waste in the UK” has been provided.

Some participants may be aware of European Union proposals for a package of nuclear safety Directives, one of which would cover the management of spent fuel and radioactive waste. These will be the subject of discussion with Member States over the next few years, which may well lead to modification of the initial proposals. Therefore, in the meantime, UK Government and the devolved administrations wish to press ahead with the Managing Radioactive Waste programme to establish the UK’s policy position.

2. THE AIM OF THE “MANAGING RADIOACTIVE WASTE SAFELY” AND ITS BOUNDING PARAMETERS

[SLIDE 2. MRWS: GENERAL]
UK Government and devolved administrations Ministers have a clear view of the aims of the “Managing Radioactive Waste Safely” process, which have been reflected in the statements and reports that they have issued.

First, they are looking for the new independent body being set up to oversee the process – currently expected to be called the Committee on Radioactive Waste Management (CoRWM, pronounced CORUM) – to deliver a recommendation on what should be done with the higher activity radioactive wastes for which no long-term management strategy currently exists.

That is high and intermediate level waste now in storage or likely to arise over the next century or so, and some low level waste unsuitable for disposal to the existing Drigg disposal facility. It is also taken to include those parts of the UK’s spent fuel, plutonium and uranium stocks that could come to be regarded as wastes within the reasonably foreseeable future, say the next 100 years. Ministers are looking for recommendations that enable them to move forward positively to solve the problem of the long-term management of these wastes, and not merely a wait-and-see statement in the hope that something turns up.

That is not to say that the Government does not recognise that there may not be problems associated with the long-term management of lower level wastes. It accepts that these and other concerns in respect of radioactive waste may be raised and registered during the course of the process, for dealing with through other appropriate channels. But it is unrealistic to seek to do everything under this one initiative, and the main initial focus of the “Managing Radioactive Waste Safely” programme must remain the high and intermediate level wastes for which no long-term solution currently exists.

The Government has also set a time objective for delivery of the recommendations on the policy for the long-term management of these wastes. This is delivery of CoRWM’s recommendation by around the end of 2005 and announcement of the way during 2006. The view in respect of this is that a prolonged process is likely to add little, other than unnecessary time difficulty and expenditure for those involved. In addition, the choice of generic policy cannot be based on proof to a detailed safety case level (such a case cannot be compiled until implementation is underway) but rather on a reasonable expectation that such a safety case for the chosen solution could ultimately be delivered.

The initial aim of the Managing Radioactive Waste Safely programme is to identify the generic long-term management policy that should be adopted. It is not intended that the option assessment stage of the work should address specific facility siting issues, although it could raise generic siting issues relating to the choice of policy e.g. whether local communities should be invited to volunteer, whether they should be offered incentives or whether they should have the power of veto over facility siting within their administrative area. These are features of some overseas programmes.

Once the generic policy has been identified, it is foreseen that, if the recommended option is site, or sites, based then the process and criteria by which the siting of any necessary facility, or facilities, will be chosen will, similarly, be the subject of wide discussion with
the public and stakeholder groups as the next stage of the “Managing Radioactive Waste Safely” project. This could constitute a follow-on programme of work for the new CoRWM committee.

3. **THE PROCESS**

**Involving the public and stakeholder groups**

The process for compiling and delivering recommendations is to be overseen by the new body – CoRWM. At the time of preparation of this summary, it was expected that advertisements for expressions of interest in appointment to this new body would be issued in the national and some appropriate specialist press shortly. Current intent is to get the new body up and running by mid-2003. Appropriate resources – both staff and money – will be provided to CoRWM by Government to support its programme of work.

[SLIDE 3. INVOLVEMENT]

The Government is looking to CoRWM to secure wide engagement of members of the public and stakeholder groups in the process that leads to identification and delivery of the Committee’s policy recommendations. How best to achieve such involvement is what will be discussed over the next two days. But it is important to bear in mind that such involvement, and the techniques, used to achieve it are not an end in themselves. They must be used to support a clearly defined, and transparent decision-making process that will enable CoRWM to arrive at its recommendations to Government within the bounds and timescales envisaged by the programme’s sponsoring Ministers.

There is perceived to be a clear difference between the term “public” (the person in the street) and “stakeholder groups” (those representing particular knowledges or interests). It might be asserted that the views of the former would add greater legitimacy to any policy formulation process while those of the latter are more likely to be heard. This suggests a requirement for a programme that can canvass both sets of views and, if necessary, identify them separately. It may in turn imply a need for a programme of parallel public and representative group events. Professor Burgess will be saying more this in her following presentation.

**Programme Structure**

[SLIDE 4. PROGRAMME OUTLINE]

Ministers have indicated clearly the overall structure of the decision process that they expect to be used in the statements they have issued. It is conceptually very simple. First, the waste inventory to be considered in the work should be discussed and agreed. This will include HLW, ILW, some problematical LLW, and appropriate proportions of the UK’s spent fuel, plutonium and uranium stocks. Then, the available solutions for the long-term management of each of these inventory components should be discussed and agreed. Finally, a common set of criteria against which all the various options are
evaluated should be discussed and agreed. These three elements – inventory, options and assessment criteria – are the critical outputs from the initial stage of the programme.

Ministers have also said that, within this initial part of the programme, they wish to see the earliest possible opportunity taken to identify and eliminate from further consideration those management options which have no realistic prospect of being implemented in the reasonably foreseeable future. These might, for example, be options that are illegal, effectively involve transfer of the UK’s radioactive waste problems to other nations, or could, potentially, involve unduly speculative and costly technological development programmes and expenditure. This will allow the main effort in the assessment stage to be focussed on the options which are most likely to be practicable and deliverable. But how precisely this is to be done will be for CoRWM to decide.

The paper “Background Paper on Radioactive Waste in the UK”, that I referred to earlier includes discussion of the waste inventory and waste management options. It also includes a list of option assessment criteria that the RWMAC advisory committee set out in advice to Ministers. But I must stress at this point we are not here today to discuss such matters in any detail.

Having reached this stage, CoRWM will be at the point where it has:

- an agreed inventory of wastes to consider;
- an agreed set of options for the long-term management of the various components of this inventory;
- and an agreed set of criteria against which each of these options are to be evaluated.

The next step would be for CoRWM to oversee an assessment of the various management options against the agreed set of criteria to come up with a preliminary view of what its policy recommendations to Government should be. This first effort at option assessment would be put out to public and stakeholder group debate, before a final version, taking into account the points raised, is prepared by CoRWM and used to construct its recommendations to UK Government and devolved administration Ministers.

Overall, the process may be broadly summarised as follows:

<table>
<thead>
<tr>
<th>Stage</th>
<th>Possible activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Framing the assessment</td>
<td>• Agreeing a programme of work</td>
</tr>
<tr>
<td></td>
<td>• Gaining an understanding and knowledge of radioactive waste matters in the UK and elsewhere – for example, by reading, making visits and receiving presentations from a variety of sources</td>
</tr>
<tr>
<td></td>
<td>• Engaging with the public and stakeholder</td>
</tr>
</tbody>
</table>
Key points to note about this process, are that it is intended to allow CoRWM’s recommendations to flow logically and transparently from the structured programme of work that is undertaken whilst, at the same time, providing for public and stakeholder group engagement at each of the key points of that programme as it proceeds. This, it is intended, should provide legitimacy for the policy, or policies, ultimately recommended.

4. THE MEANING OF AGREEMENT

[SLIDE 5. THE MEANING OF “AGREEMENT”]

The foregoing description has talked of “agreeing” the inventory wastes, “agreeing” the long-term management options to be assessed and “agreeing” the criteria to be used for their assessment. At this point it is appropriate to contemplate the meaning of the term “agreeing” in this context.
There is no expectation that total unanimity of view can be achieved using the above approach, either among those members of the public and stakeholder groups involved, or, possibly, within CoRWM itself. Such an expectation is unrealistic. Rather, it is hoped that sufficient commonality of view can be achieved to legitimise any eventual decision for a particular form of approach through a full, systematic and open assessment of the options. Particularly important in this context also is that, if the process by which a decision is reached can be made sufficiently inclusive and deliberative, the process itself will be accepted as a valid one even if its outcome is not in line with each and every individual’s views.

Consequently, CoRWM and its chosen agents will not be expected merely to act as facilitators to allow those involved to reach a final decision based on the identification of common ground, as is the intent of some dialogue processes. Rather, Government will be looking to the Committee to arrive at a clear recommendation on the preferred approach. For this reason, CoRWM’s Code of Practice states that “sponsoring Ministers retain the right to request the Chairman for his or her personal perception of the predominant Committee view”.

5. THE CHALLENGES FOR WORKSHOP PARTICIPANTS

Against this background, there are a number of clear challenges for practitioners here today. A number of the more obvious ones will now be considered under the headings of choosing the right combination of engagement methods, ensuring the exchange of knowledge and information, arriving at a full UK perspective, views of nuclear communities and maintaining focus. No doubt other issues will be identified during the course of the workshop discussions.

Choosing the right combination of engagement methods

[SLIDE 6. WORKSHOP OBJECTIVE 1]

The key objective of the Managing Radioactive Waste Safely initiative is to develop a strategy for the long-term management of the UK’s higher activity solid radioactive wastes that can inspire public support and confidence and is thereby deliverable. To do this, it must engage the public and stakeholder groups effectively throughout the policy formulation process, within the bounds that have been identified by Ministers. It is the recipe for this that we are looking for this workshop to deliver.

A particular exhortation to practitioners here today is that they should not be looking at a particular method and saying how can I use this to deliver the desired outcome. Rather, the workshop should be looking to establish:

Objective 1. What combination of available methods can best be used at which stages in the decision-making process to engage the public and stakeholder groups within the Managing Radioactive Waste Safely process framework set out by Ministers?
In particular, there should be consideration of whether there are existing arrangements and channels that can be used to secure the required public and stakeholder group engagement in the context of the “Managing Radioactive Waste Safely” process foreseen. The need to ensure an effective and efficient process is key.

**Ensuring the exchange of knowledge and information**

**[SLIDE 7. WORKSHOP OBJECTIVE 2]**

So far this paper has talked of reaching a policy decision on the basis of a wide-ranging dialogue with members of the public and stakeholder groups. There will also be an important need to fold into the process the “expert” view. Such “expert” views must support, rather than drive, the process. It is also an objective of the workshop to identify, in terms of broad principle, how best to do this.

“Research” in this context should be taken in a wide sense, to include reviews and assessments as well as new studies. Some new “research” may be required, but much work has already been undertaken both in the UK and overseas. In practice, project timescales will serve to restrict the amount of new research that can be undertaken. Some of the more demanding requirements for such work may actually arise downstream when the facility safety case for any site, or sites, required is being prepared. Sponsored events e.g. conferences, seminars, arranged under CoRWM auspices, could be another way of securing an “expert” input.

In practice, “expert” views may well conflict. Such views are also likely to be based on evidence of variable quality. Hence, there will need to be some means of identifying “sources of information of high calibre”, probably through some means of appropriate peer review. There will be a need to secure “reciprocity” of views. Assertions and “myths” must be challenged. Science can never deliver absolute assurance. The basis for choice of policy should be that it can provide a level of assurance of protection from harm that society and individuals generally perceive to be reasonable, not least when compared with the available alternatives.

Effective and balanced communication of “expert” views to members of the public and representative groups, so as to help them to formulate their views of the issues, will pose another major challenge. The issues are complex and, generally, have many facets to them.

A second important task for this workshop is therefore to contemplate:

**Objective 2. How can the public and representative group debate best be integrated with the corresponding “expert” debate during the course of the “Managing Radioactive Waste Safely” process?**
Obtaining a full UK perspective

[SLIDE 8. OBTAINING A FULL UK PERSPECTIVE]

The Managing Radioactive Waste Safely initiative is sponsored by both the UK Government and the devolved administrations. The desire is to arrive at policy recommendations that can be said to reflect views that have been canvassed across the UK - England, Scotland, Wales and Northern Ireland.

There could, for instance, be particular national, regional or countryside issues that give rise to different perspectives in different parts of the UK. Against this background, a third issue for the workshop to consider is:

Objective 3. How can one best scale up views that will potentially have to be canvassed from a limited number of studies involved involving limited numbers of respondents to a position that can be said to be representative of the whole of the UK?

The views of nuclear communities

[SLIDE 9. NUCLEAR COMMUNITY VIEWS]

Ministers have indicated a desire to see the views of existing nuclear communities canvassed and fed into the policy formulation process, alongside those of non-nuclear communities. The creation of a nuclear communities forum to contribute to the policy formulation process has been suggested as one possibility.

A key question here is how does one define a “nuclear community” and secure access to its views? How far out from an existing nuclear site might one see such a community be seen to extend? Is there a need to distinguish those who are employed by the industry from those who are not?

Hence, a fourth issue on which the workshop is invited to give a view is therefore:

Objective 4. How is the “existing nuclear community” perceived and how could its views best be drawn upon without unbalancing the policy formulation process?

Maintaining focus

[SLIDE 10. MAINTAINING FOCUS]

Particular members of the public are likely to have wider views and concerns about the nuclear industry and the management of radioactive waste. It is right and proper that people should have the opportunity to express these wider views and concerns, and that those that are appropriate are fed into the planning of the policy formulation process. However, equally, there will be an important need to maintain focus on the key

Can suitable means be devised for registering wider public and stakeholder group concerns, potentially to be dealt with through other channels? Should, for example, a summary record of such views also be prepared and delivered separately as part of the process?

Workshop participants are therefore invited to consider:

Objectives

Objective 5. How are expressions of wider views and concerns best managed, given the need to maintain focus on the core programme needs and timings identified by Ministers?

6. RESOURCE CONSTRAINTS

Inevitably Government has to work within budgets, and there will consequently be limits on the resources that can be allocated to the Managing Radioactive Waste Safely policy formulation process. To assist the process of deciding what scale of resource input is necessary, workshop members are asked to consider:

- what could be achieved with a financial allocation of £500,000 per year up to the point where recommendations are delivered to Government (this to cover both public and representative group engagement and any supporting preparation during this period)?

- what could additionally be undertaken with an extra £250,000 per year, and what clear additional benefit would this provide?

- what should be the priorities if only £300,000 per year was available, and, as a consequence, what specific opportunities or benefits would be lost from the £500,000 per year programme?

RAS/Defra
February 2003
WORKSHOP TO SCOPE A PUBLIC AND STAKEHOLDER ENGAGEMENT PROGRAMME ON RADIOACTIVE WASTE
10TH AND 11TH MARCH, 2003, MANCHESTER

Background paper on radioactive waste in the UK

Prepared by Defra in consultation with UCL, 25th February 2003

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   2.2 Quantities and types of radioactive waste
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4. Waste management policy in the UK up to 2001

5. Issues arising during the “Managing Radioactive Waste Safely (MRWS) consultation period

   5.1 Reports from Parliamentary Committees
   5.2 Views from RWMAC
   5.3 Additional actions by Defra and the devolved administrations as part of MRWS

6. Events since the end of the “MRWS” consultation period

7. The task ahead for the independent body

8. The “Information Needs Research Project”

Annexes

Annex A: Extract from House of Lords Select Committee on Science and Technology report “Management of Nuclear Waste” 1999
Annex E: Secretary of State’s announcement to MPs, July 2002
1. Introduction

This paper is one of three that has been prepared for the Defra-sponsored workshop to scope a public and stakeholder engagement programme on radioactive waste, to be held on 10th and 11th March 2003, in Manchester. The other two papers are:

- “Securing public confidence in radioactive waste management: developing a vision for a process of public and stakeholder engagement” prepared by University College London

This background paper is primarily for those invitees to the workshop who may not have much familiarity with radioactive waste, and how it has been managed in the UK. It is not a detailed technical document, but aims to provide all participants with some background information for the purposes of the workshop.

2. Definitions

Radioactive waste is waste contaminated by radioactivity above certain levels defined in legislation. These levels are given in terms of becquerels, (one becquerel is one radioactive disintegration per second) per unit volume (cubic metres) or mass (tonnes).

2.1 The problem with radioactive waste

Radioactive waste varies enormously in its physical form, and its content and level of radioactivity (see section 2.2 below). It contains very long-lived components (some of it will remain radioactive for hundreds of thousands of years) and this is the major issue in deciding its eventual fate.

Radioactive waste has the potential to deliver a radiation dose to people. At very high levels of dose, death may occur in days to weeks; such exposures would only occur after accidents or possibly as a consequence of terrorism. Properly managed and contained, radioactive waste of any type is likely to deliver only very small doses to people who live close to it. However, it is currently accepted that all exposures to radioactivity increase the risk of contracting cancer. Hence man-made sources of radioactivity are subject to regulation which minimises and limits this risk. Sometimes, natural sources of radioactivity also have to be controlled.

Currently stored radioactive waste delivers virtually no dose to the public, although workers on nuclear sites will receive some radiation doses during its treatment, and if it requires repackaging. However, the waste will, to varying degrees, be at risk from terrorism, especially if it is stored above ground, or transported.

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Any plan for its long-term management must consider the likelihood of its eventual release into the biosphere, through natural processes, or due to human intrusion – either deliberate or accidental. So estimates of risk to people far into the future must be made when deciding on its long-term fate. Inevitably there will be uncertainties associated with such estimates, and it is now generally accepted that it is unrealistic to expect no risk to future generations; only that the risk from the chosen management option should be acceptably low as far as can be reasonably foreseen.

2.2 Quantities and types of radioactive waste

The UK has been producing radioactive waste for over 50 years. Most of it (just under 90% by volume) comes from the nuclear power industry, around two thirds of this arising from the reprocessing of used fuel from nuclear reactors. Research and development work related to nuclear power creates another 9% of the waste by volume. Minor quantities of waste arise from military applications, and from medical and industrial uses of radioactivity.

Radioactive waste can be in the form of solids, liquids and gases. Gases and most liquids are discharged into the environment after treatment to remove the bulk of radioactivity. This is done under authorisations issued by the Environment Agencies which aim to control impacts on people and the environment.

Radioactive waste that is to be the subject of the forthcoming UK review, and therefore of relevance to the workshop, will all ultimately be managed in solid form. Currently, however, the bulk of radioactivity in this waste is in concentrated liquid form that is stored (see description of High Level Wastes in the table below).

There are currently four recognised categories of waste, defined according to its radioactivity content and the heat it produces.

- **Very low level wastes (VLLW)** that can be disposed of with ordinary refuse. These are not considered further in this paper, nor will they be part of the review.
- **Low level wastes (LLW)** containing more radioactivity than VLLW – these cannot be disposed of with ordinary refuse. Most LLW is disposed of to a site in Cumbria (see section 3), and therefore will not be part of the review (except for particular types of LLW).
- **Intermediate level wastes (ILW)** which exceed the upper boundaries of LLW in terms of their radioactivity but which do not require cooling when disposed of or stored.
- **High level wastes (HLW)** in which the temperature may rise significantly as a result of their radioactivity so this factor has to be taken into account in the design of storage or disposal facilities.
The table below provides some basic statistics on LLW, ILW and HLW\(^5\) that exist now and will arise as a result of current nuclear operations and their decommissioning.

<table>
<thead>
<tr>
<th>Category</th>
<th>Cubic metres (conditioned volumes)</th>
<th>Constituents of waste before conditioning with cement or by making into glass (vitrification)</th>
<th>% radioactivity of all waste in each category</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLW⁶</td>
<td>1,510,000</td>
<td>Mainly soil and metals. Also organic materials, graphite, glass, ceramics</td>
<td>Less than 0.001%</td>
</tr>
<tr>
<td>ILW⁷</td>
<td>237,000</td>
<td>Mainly metals, also graphite, building materials, inorganic materials</td>
<td>5%</td>
</tr>
<tr>
<td>HLW</td>
<td>1,510</td>
<td>Mainly nitric acid solutions containing fission products from reprocessing of used fuel</td>
<td>95%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,750,000</td>
<td></td>
<td>355 TBq⁸</td>
</tr>
</tbody>
</table>

To give an idea of the quantities involved, the total volume given in the table (1,750,000 cubic metres) is equivalent to about two and half times the Albert Hall, although the vast bulk of this (86%) is LLW.

Many wastes are treated to reduce volume and reduce storage requirements. Volume reduction techniques include compaction and incineration (for solid wastes) and evaporation, dewatering, ion exchange and flocculation (for liquid wastes). Wastes are also conditioned – this is the process used to prepare them for long-term management. Conditioning aims to immobilise wastes using materials which produce solid and stable forms which are typically packaged within stainless steel or concrete containers. Most conditioned LLW can be disposed of, whereas conditioned ILW is stored.

It is intended that HLW liquid wastes will be conditioned using a process called vitrification. After the liquid waste is heated to dryness, it is mixed with glass-making components to produce a molten product incorporating the waste. This is poured into stainless steel canisters which are sealed and transferred to air-cooled stores.

2.3 Radioactive materials not presently considered as waste

There are other radioactive materials that are not generally used at present, but neither are they classified as wastes. They derive from the fuel used in nuclear reactors. The basis

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⁶ Excludes material already disposed of to sea prior to 1982 (see next footnote) and to Drigg (1 million cubic metres)

⁷ Excludes material disposed to sea prior to 1982. The total quantity of UK waste (LLW and ILW) dumped in the Northeast Atlantic between 1949 and 1982 was 73,530 tonnes in 149,627 packages. In addition, 15,300 tonnes of radioactive waste was disposed of into the Hurd Deep, near the Channel Islands, between 1951 and 1963 (from FGT Holliday, 1984 “Report of the independent review of disposal of radioactive waste in the northeast Atlantic” HMSO).

⁸ TBq is a terabecquerel which is one million million (10¹²) becquerels.
of fuel is uranium, which in a nuclear reactor, splits (fissions) to produce heat which in turn generates electricity. The by-products of the fission process are two-fold:

- Intensely radioactive fission products that are approximately half the size of the parent uranium atoms.
- Some atoms in the fuel become other, heavier elements, in particular uranium is transformed into plutonium.

However, most of the uranium in a used fuel element (called spent fuel) is unchanged from its original state. Spent nuclear fuel is either stored or reprocessed. The main purpose of reprocessing is to recover the unused uranium, and to separate out the plutonium. During this process, a waste stream containing most of the fission products is created, and becomes HLW. The separated plutonium can be used in nuclear weapons. Also, the recovered uranium, together with separated plutonium, can be used to make more fuel for nuclear reactors, called mixed oxide fuel (MOX). Sellafield manufactures MOX fuel for overseas customers (it is not used in the UK).

Hence, because spent fuel contains material that can be used to manufacture other fuel (and weapons), it is regarded as a strategic material and not currently classified as waste in the UK, nor are plutonium and separated uranium. However, long term management plans for radioactive waste will have to take into account the possibility that some spent fuel, plutonium and uranium may indeed eventually be declared waste. This would add to the volume of waste requiring long term management, and increase the complexity of the problem.

3. What has been done with our radioactive waste to date?

- Radioactive wastes currently in storage and those that will arise from operation and decommissioning of current nuclear facilities amount to around 1,750,000 cubic metres.
- Most LLW has been disposed of in shallow trenches at Drigg, which is close to the British Nuclear Fuels (BNF) plant at Sellafield in Cumbria. This route of disposal will continue to be used for most LLW until around 2050, when Drigg will be full.
- Up until 1982, some LLW and ILW were dumped at sea. Since 1983, all ILW has been stored on land due to the London Dumping Convention Moratorium. Around two thirds of this is stored at Sellafield, and the rest at UK nuclear power stations, the United Kingdom Atomic Energy Authority sites of Dounreay in Scotland and Harwell in Oxfordshire, and the Atomic Weapons Establishment at Aldermaston.
- No HLW has been disposed of at all, and remains in storage, 90% of it by volume at Sellafield, the rest being at Dounreay. Liquid HLW is slowly being vitrified. To date, only 17% of HLW (by volume) has been vitrified. It is anticipated that vitrification of the remaining HLW and of that still to arise will take until about 2014.9

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4. Waste management policy in the UK up to 2001

The key events in UK radioactive waste management, up to 1998, are summarised in the table below. These have been extracted from reports by the House of Lords Select Committee on Science and Technology in 1999\(^{10}\) and the House of Commons Environment, Food and Rural Affairs Committee\(^{11}\).

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>Royal Commission on Environmental Pollution published its sixth report <em>Nuclear Power and the Environment</em> (Cmnd 6618). This report advised: “there should be no commitment to a large programme of nuclear fission power until it has been demonstrated beyond reasonable doubt that a method exists to ensure the safe containment of long-lived, highly radioactive waste for the indefinite future”</td>
</tr>
<tr>
<td>1977</td>
<td>Government made Dept of Environment (now Defra and devolved administrations) responsible for radioactive waste management policy (White Paper, Cmnd 6820). It increased research into the disposal of HLW and recognised the need for a national disposal facility for ILW.</td>
</tr>
<tr>
<td>1978</td>
<td>Government set up the Radioactive Waste Management Advisory Committee (RWMAC).</td>
</tr>
<tr>
<td>1979-81</td>
<td>As part of the research on HLW disposal, the drilling of boreholes began at a site in Scotland and later at Harwell in Oxfordshire, the aim being to investigate the properties of various types of rock. The research-drilling programme was discontinued in 1981, as a result of public opposition.</td>
</tr>
<tr>
<td>1982</td>
<td>The Government published another White paper on radioactive waste management (Cmnd 8607). This established the Nuclear Industry Radioactive Waste Executive (shortened to Nirex). The remit of Nirex was mainly to construct and operate new land disposal facilities for LLW and ILW. The Government stated that it was envisaged that HLW would be stored for about 50 years, to allow it to cool.</td>
</tr>
<tr>
<td>1983</td>
<td>Sea dumping halted when the meeting of the International London Dumping Convention passed a non-binding resolution intended to establish a moratorium on sea dumping. Nirex announced its initial choice of potential new land disposal sites: a clay site at Elstow (owned by the Central Electricity Generating Board) for a near surface facility for LLW and short-lived ILW, and a disused anhydrite mine at Billingham (owned by ICI) for long-lived ILW. There was a great deal of local opposition at Billingham and ICI became unwilling to allow the site to be investigated.</td>
</tr>
<tr>
<td>1984</td>
<td>The Government announced that Nirex would be required to investigate at least three possible sites for a new near-surface facility and at least three sites for a deep repository, excluding Billingham</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1986</td>
<td>Nirex announced that they wished to investigate four sites for the near-surface facility: Killingholme, Fulbeck, Bradwell and Elstow. There followed much opposition from the local councils and public, under the umbrella of Britons Opposed to Nuclear Dumping.</td>
</tr>
<tr>
<td>1987</td>
<td>The Government and Nirex decided that investigations at the four potential sites for a near-surface facility should cease, and that both LLW and ILW should be disposed of in a deep repository. The reason given was economic.</td>
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<tr>
<td>1989</td>
<td>Nirex announced its intention to investigate Sellafield and Dounreay as potential sites for the repository, following publication of a discussion document, responses to it, and a preliminary safety assessment report. Drilling began at both sites.</td>
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<tr>
<td>1990-91</td>
<td>The decision was made to focus on Sellafield. In the White Paper <em>This Common Inheritance</em> (CM 1200, published in 1990) the Government confirmed the choice of disposal in a deep repository as the long-term management option for ILW.</td>
</tr>
<tr>
<td>1992</td>
<td>Nirex stated its intention to construct a Rock Characterisation Facility (RCF) at Sellafield and hoped its repository would be operational by 2007.</td>
</tr>
<tr>
<td>1994</td>
<td>The RCF planning application was submitted. The target date for repository operation was stated to be 2010.</td>
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</table>
| 1995-96 | Cumbria County Council opposed the application, and following an appeal from Nirex, a local planning inquiry was held. In his report, the Inspector of the Inquiry recommended that the planning application be refused, on the basis of two types of reason:  
- one type concerned straightforward planning matters, which might apply to any type of development including the adverse visual impact of the above ground RCF buildings and spoil heaps, criticisms of road traffic and parking plans, and possible harm to the habitat of a badger clan.  
- the other type was particular to the RCF and to the repository which might have followed it. The main particular reason was that the proposal to build the RCF was premature. More needed to be known about the hydrogeology and geology of the site before disturbing the rock and groundwater conditions by sinking the shaft for the RCF. Also, the location of the RCF had not been shown to be the best one from the point of view of the location of the repository, and the ‘potential repository zone’ might be damaged by constructing the RCF. Underlying these particular reasons were concerns about the process by which the Sellafield site had been selected and about the suitability of the site itself. |

The Inspector concluded that the site had not been selected in an objective

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12 A Rock Characterisation Facility is an underground laboratory built to conduct research into geology and hydrology, for the purposes of deciding on the suitability of the area for a repository.

13 Another interpretation of the result of this planning inquiry has been summarised in the report by Wilkinson Environmental Consulting “Identification of information needed to decide with confidence on the long term management of options for long lived radioactive waste”; DEFRA report no: DEFRA/RAS/02.014, WEC/DEFRA/01-2/01” January 1993. This view was that the planning refusal was a process failure in which there was inadequate transparency in the investigation process being followed and inadequate public and stakeholder buy-in to the criteria to be met at each stage.
and methodical manner. His Technical Assessor was of the view that the site was more geologically and hydrogeologically complex than would be expected of a choice based principally on scientific and technical grounds. He pointed out that while the preliminary safety case for a repository at the site was certainly not a patent failure, nor were its results so clearly within targets as to command any substantial degree of confidence.

A Government review of radioactive waste management policy was also carried out and the results published as Cmd 2919 “Review of radioactive waste management, final conclusions”. This announced that the policy for radioactive waste management should be, and is, based on sustainable development. Disposal was favoured over indefinite storage and it was concluded that there was no advantage in delaying the development of a repository for ILW. The Department of the Environment was to carry out work on a research strategy for HLW.

1997 The Secretary of State completed his consideration of the Inspector’s report on the Public Inquiry into the RCF at Sellafield, and decided that Nirex should not be allowed to construct the RCF at Sellafield, citing in his letter to Nirex both straightforward planning matters and reasons particular to the RCF.

1998-99 The House of Lords Select Committee on Science and Technology held an inquiry into radioactive waste management, which it published in 1999 (see ref 7). Some of the key recommendations were to establish a board to set criteria for selecting disposal sites, to engage the public in decision making, and to recognize uncertainty as an integral part of science and technology. Their main conclusions and key recommendations pertinent to this workshop are repeated in annex A.

The Government made its initial response to the House of Lords Select Committee’s recommendations in October 1999. It said it proposed to publish a detailed and wide-ranging consultation document.

2001 The consultation paper, “Managing Radioactive Waste Safely” (MRWS) was issued in September 2001 by Defra and the environment Departments of the devolved administrations. This paper proposed a programme of action for deciding how to manage UK solid long-lived radioactive waste in the long term. It aimed to begin a debate on:
- The size and scale of the problem of long lived radioactive waste

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14 In November 1997, the Parliamentary Office of Science and Technology published its report “Radioactive Waste – where next” in which it reviewed the issues and options for managing radioactive wastes.
15 In January 1998, RWMAC published its report “Initial recommendations on the long term management of ILW following rejection of the UK Nirex RCF planning application: Rethinking disposal”.
• How the views of the public would contribute to policy making
• Any organisational changes needed to ensure a sound policy would be chosen and implemented
• The programme for the development and implementation of policy.

In the same month that the MRWS consultation paper was issued, RWMAC published their advice to Ministers on formulation of future policy for radioactive waste management. Amongst other things, this advice said:

• “it should be made clear from the outset that the objective is not to secure unanimity of view as this is unrealistic: rather it is to try to allow, through a process of open discussion of the issues and options, a sufficient concurrence of view to legitimise the choice(s) of policy choices that are made” and
• “within the overall process, it is essential to determine, and take full account of, the wider public’s view of key issues, as well as those of vested interest groups, some of whom may purport to represent the public’s views”.

5. Issues arising during the “Managing Radioactive Waste Safely” (MRWS) consultation period

During the 6 month MRWS consultation period, both Houses of Parliament considered the paper, via Committees. RWMAC also gave their views. DEFRA and the devolved administrations commissioned social research, and a technical review.

5.1 Reports from Parliamentary Committees

The House of Lords Select Committee on Science and Technology report was largely based on a meeting with the Environment Minister, Mr Meacher. The House of Commons Environment, Food and Rural Affairs Committee launched an inquiry and took evidence from the nuclear industry, environmental organisations, academics and government departments (see ref 8). Both committees were concerned about the future consultation process itself, and the length and content of the proposed policy process. The Lords’ Committee made the following comment regarding public engagement:

“While we fully support the development of policy with public involvement, the present consultation is flawed by providing insufficient background to enable meaningful responses – let alone encourage them. At an early stage, consultation should be more focused on some key general questions, posed in a suitably accessible way.” Their full comments on “effective consultation” are repeated in annex B.

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18 RWMAC “Advice to Ministers on the process for formulation of future policy for the long term management of UK solid RAW” September 2001

Amongst other things, the Commons Committee recommended that the proposed consultation be conducted methodically and transparently, in a way which encourages public participation. Its comments on engaging the public are given in annex C, as well as their summary of recommendations.

5.2 Views from RWMAC

RWMAC welcomed “the decision to initiate a national debate on radioactive waste management”.

In their report, they refer back to their earlier advice to Ministers (see reference 15) which had called for full and open discussion of all the issues. They reiterated their belief that this approach offered “the best way of promoting public confidence and encouraging public participation, factors that are crucial if a policy enjoying widely-based support is to be identified and implemented”. RWMAC’s advice was for the policy formulation process to follow six key guiding principles:

- Openness and transparency
- Early involvement of public/other stakeholders
- A deliberative and accessible decision-making process
- Adequate time for exploration and resolution of complex issues
- Commitment to peer review of scientific and other expert input
- Equity (the principle by which the process for deciding policy, and the policy itself, are generally perceived and accepted to be fair.

RWMAC believed the MRWS consultation appeared to endorse these principles. A copy of their comments on the policy formulation process is in annex D and includes a section of “providing public information and engaging the public”.

5.3 Additional actions by Defra and the devolved administrations as part of MRWS

During the MRWS consultation period, Defra and the devolved administrations undertook additional steps to widen the debate, and conduct research into public attitudes, advice on which was informally sought from a number of experts in public engagement processes.

A public seminar on radioactive waste was held in February 2002 in London. Participants included a mixture of newcomers to the debate and people with previous experience of nuclear issues. The seminar included a series of presentations and discussion groups.

Research into public attitudes to radioactive waste was undertaken in Scotland and England and Wales. A Citizen’s Panel originally set up in 1999 by the UK Centre for

22 Two reports as follows: Scottish Council Foundation “Managing radioactive waste safely: engaging Scotland” July 2002; Scottish Opinion Ltd “Managing radioactive waste safely: awareness and attitudes of the Scottish public” July 2002
Economic and Environmental Development (UKCED) to consider radioactive waste, was reconvened, specifically to consider the MRWS paper.

6. Events since the end of the “MRWS” consultation period

Consultation on “Managing Radioactive Waste Safely” ended in March 2002. In July of that year, Defra and the devolved administrations published a summary of the 330 responses they had received. This included the findings of the research projects into public attitudes and the UK CEED report (see section 5.3 above). The summary of responses can be found on [http://www.defra/environment/radioactivity/waste/index.htm](http://www.defra/environment/radioactivity/waste/index.htm).

The result of the consultation was an announcement by the Secretary of State for the Environment, Food and Rural Affairs, to Members of Parliament, in July 2002 - the letter is reproduced in **annex E**. The key points are given in the box below:

**Key points made in the Government and devolved administrations’ announcement following the consultation “Managing Radioactive Waste Safely”**

- There would be a review of waste management options that would seek the views of interested stakeholders, the public and government departments
- An independent body would be appointed to oversee the review process which will make recommendations on the option, or combination of options, for managing waste by around 2006.
- The Government and the devolved administrations would continue to be responsible for taking the ultimate decision on the final management option.

7. The task ahead for the independent body

The work of the new independent body (to be called the Committee on Radioactive Waste Management, CoRWM) is outlined in the Defra opening presentation paper for this workshop “The UK Government’s and devolved administrations’ objectives for the Managing Radioactive Waste Safely process”. In summary, it will have to discuss and agree:
- what materials will be considered as waste
- the management options available for each type of waste
- a common set of criteria for evaluating these options.

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23 Market Research Services “Benchmarking public opinion on the management of radioactive waste – MRWS/02.007” DEFRA report no DEFRA/RAS/02.012: July 2002
25 DEFRA, Scottish Executive, National Assembly for Wales, Department of the Environment, Northern Ireland: “Managing Radioactive Waste Safely: Summary of responses to the consultation” July 2002
26 Letter from Mrs Beckett to MPs, 29 July 2002 on “Managing Radioactive Waste Safely”
It will then have to assess each of the options using the agreed criteria, and finally, it will recommend to Ministers the option or options to be used for the long-term management of UK waste.

An outline of the waste types, including materials not yet considered as wastes, was given in sections 2.2 and 2.3 of this paper.

The main options likely to be considered are listed in the box below. In practice, there are likely to be variations in the precise design of some of these options.

1. Above ground storage
2. International above ground storage
3. Underground storage
4. International underground storage
5. Underground disposal
6. International underground disposal
7. Direct injection – injection of waste as liquid into deep geological strata.
8. Disposal at sea – disposal onto the sea bed
9. Sub-seabed disposal - disposal in sediments beneath the sea bed
10. Disposal in ice sheets
11. Disposal in subduction zones - disposal at tectonic plate boundaries.
12. Partitioning and Transmutation – the transformation of long-lived substances into shorter-lived or more stable forms.
13. Disposal in space
14. Dilute and Disperse - diluting and dispersing into the general environment

In considering the criteria to use for the evaluation of options, RWMAC has made some suggestions that are repeated in the box below (from reference 15):

Extracted from reference 15

“RWMAC’s own view of the kinds of criteria that should apply, which may be taken as illustrative, are in no particular order:

- Radioactivity containment
- Potential health impact
- Vulnerability to societal breakdown
- Vulnerability to natural disasters
- Reliance on institutional survival

27 Taken from: Wilkinson Environmental Consulting “Identification of information needed to decide with confidence on the long term management of options for long lived radioactive waste: DEFRA report no: DEFRA/RAS/02.014, WEC/DEFRA/01-2/01” January 2003
- Carryover of problems to future generations
- Adherence to the self-sufficiency principle
- Adherence to the proximity principle
- Associated security risk
- Reversibility (including monitoring and retrieval)
- Compliance with current national and international laws and agreements
- State of current scientific knowledge, including international knowledge, relating to the option (hence technical difficulty and feasibility)
- Costs and ability to fund (notably over time); and implementation requirements.

All of these would need to be considered over the same appropriate timeframes”.

It had been realised that the evaluation of these criteria would require information and knowledge that might not yet be acquired. Hence, in August 2000, Defra commissioned a project that was to identify the need for research into the potential options for managing the wastes, including an assessment of the current knowledge base and identification of gaps in knowledge. This became known as the “Information Needs Research Project”

8. The “Information Needs Research Project”

The “Information Needs Research Project” was undertaken by Wilkinson Environmental Consulting Ltd. It was guided by a Steering Group reflecting a range of stakeholder views.

The final report was published in January 2003 and amounts to around 700 pages.

In brief, the report contains reviews of:
- The properties of 5 current and potential waste types, namely HLW, ILW, spent fuel, plutonium and uranium
- The UK radioactive waste inventory and risks posed by radiation
- 14 possible management options
- The interaction between radioactive waste management policy and other areas of Government policy, environmental principles and societal concerns
- National, European and international legal aspects
- General scientific and technical aspects
- Public perception and perspectives of environmental groups.

The report includes an analysis of work packages that might be needed theoretically to meet the information needs for each management option. Undertaking all these work packages would take a long time and for some options, could be unjustified. Hence, the authors suggest a process for prioritising the work packages, so as to produce a more sensible and manageable overall programme.

28 Wilkinson Environmental Consulting “Identification of information needed to decide with confidence on the long term management of options for long lived radioactive waste: DEFRA report no: DEFRA/RAS/02.014, WEC/DEFRA/01-2/01” January 2003
The MRWS paper had stated: “We recognise that whichever methods are chosen to engage the public in the debate over managing radioactive waste, the process will only work if the information given to the public is accepted as accurate, objective and complete by all interested parties”. When CoRWM is appointed, one of its tasks will be to advise on “what that information is, where further information is needed, and when enough information has been gathered for decisions to be taken”. So it is intended that the output from the “Information Needs Research Project” will assist CoRWM as it takes on this task. However, most of the research needs identified in the project report will apply to the implementation phase, once a generic policy has been decided. **Annex F** contains the executive summary of this project.

Main conclusions

- The bulk of the UK’s waste is a legacy from the past and has to be dealt with, regardless of the future of civil and defence nuclear programmes.
- An integrated strategy for all long-lived wastes was needed, including decisions on what materials are to be declared wastes.
- The majority view from the scientific and technical community was that wastes should be emplaced in deep geological repositories. A minority view held particularly by environmental pressure groups, was that wastes should be stored above ground pending more research to find the best means to manage them in the long term.
- The Committee itself concluded the preferred approach was phased geological disposal, such that that the wastes could be monitored and retrieved.
- More than one repository might be needed, depending on what was declared waste. It was important that a repository was operational within 50 years, otherwise there would need to be a major programme of replacement and refurbishment of surface stores and some repackaging of wastes.
- Public acceptance of a national plan for management of the waste was essential and it had to be achieved at the local level (i.e. close to the potential repository sites) as well as within the country as a whole.
- Openness and transparency in decision-making were necessary to gain public trust, but were not enough. Mechanisms had to be used to include the public or groups within it representing a wide spectrum of views, in decision-making.
- At the local level, offering compensation for blight and benefits in exchange for hosting a national disposal facility would do much to achieve acceptance.

They also made a number of recommendations, of which the following are possibly the most relevant to the workshop:

- The Government should develop a comprehensive policy for the long-term management of all nuclear waste. The policy should have explicit endorsement by Parliament, as well as a large measure of public acceptance.
- The policy had to be the subject of wide ranging consultation, and the Government should issue a Green Paper which stated the problem, possible solutions and principal means for implementation of that policy.
- New organisations should be set up to oversee the implementation of policy, and to design, construct, operate and eventually close the repository
- Site selection should be open and transparent and involve Parliament and the Government, and site choice examined at public inquiry.
Annex B: Extract from the House of Lords Select Committee on Science and Technology 2001 report ”Managing Radioactive Waste: the Government’s consultation” – paras 11-14 (bracketed numbers refer to the full response)

“Effective Consultation

11. The Minister emphasised at the outset of the meeting (QQ3,4&6) that the consultation paper’s purpose was to seek views on how the public would wish to be consulted when, under that paper’s proposed timetable, strategy options were published in 2005. As in our 1999 Report, we fully support the need for wide public consultation in developing the radioactive waste strategy. However, we do not see how people can form any meaningful view on how they would wish to be consulted until there is some indication of the kind of questions to be asked about the various waste management options and their implications. Much of this needed analysis is already to hand in our 1999 Report although that can be simplified further in the light of new security considerations as discussed in paragraph 15.

12. The Minister agreed (QQ16-18) that all decisions in this difficult matter needed to be based on sound information rather than prejudice. Without information about the possible options, the public will either respond in the light of preconceptions (and, perhaps, the dogmatic views of special interest groups) or simply not engage with the present consultation at all. Far from clearing the ground for the succeeding stages of the Government’s intended programme, an ill-informed, unfocused or minimal public response to the present exercise seems likely to make things more complicated and waste even more time.

13. We must also say that, if the aim was to consult only about means of consultation, it was not followed rigorously. Paragraph 8.8 of the consultation paper states that it “is not just about the process by which decisions will be reached” and explicitly seeks “views on a number of important radioactive waste management issues”. The Minister’s comment that this additional material was not to seek views but formed part of the narrative surrounding the issue of consulting public opinion (Q31) is not persuasive. Moreover, the high specialised questions [15] seem likely to be a further disincentive for the public to engage with the consultation.

14. We urge that, at an early stage, the consultation should be more focused. For example, we see two important areas in which there should be early and effective consultation to help shape later stages in developing the radioactive waste strategy.

1. The first issue concerns the general principles of storing intermediate and high level waste where the broad alternatives are:

   (i) storage in a repository which is secure against terrorism but which allows the waste to be monitored and, if future generations desire, to be recovered or disposed of in some other way; and
(ii) storage in a way that is effectively permanent – that is, from which any recovery would be impossible without a major mining operation.

2. The second issue is how people would eventually wish to be consulted over the preliminary and final stages of disposal site selection.

On this last point, we emphasise that the early consultation we want to see is only about the general principles. When possible sites begin to be identified, subsequent and more detailed consultations will be needed – as part of the detailed planning process (see paragraph 24 below) or otherwise.”
“26. Engaging the public and enabling them along with stakeholders to guide the development of policy is the key to the success of the consultation process. Without such a commitment, the whole process loses legitimacy and will founder in the same way that previous efforts have failed.

27. The consultation document proposes “a major programme of research and public discussion, using many techniques – some traditional, some relatively new – to stimulate discussion, and to involve as many people and groups as possible”. Mr Meacher invited us to let him “just spell out the things we are planning to do over the next three months; the consultation ends, as you know, on 12 March. We are seeking to reconvene the Citizens Panel from the 1999 Consensus Conference; we have commissioned an omnibus survey of a representative sample of people; we have commissioned a facilitated discussion with a group of people over a weekend with a chance to question witnesses, BNFL, Nirex, the NGOs (non-governmental organisations), and indeed in my view we should do a lot of those all over the country if they work. We are arranging a Radioactive Waste Seminar, which is targeted at people who are delicately defined as ‘previously unconsulted’, which I suspect is the great majority of the people in the country. We are arranging meetings with specific non-nuclear groups, pensioners, youth organisations, small campaign groups; and we have actually even commissioned a schools pack, because it probably is future generations who are going to bear the brunt of this perhaps more than we are”.

28. We welcome this eclectic approach; we believe that public involvement and engagement will be critical to the success of the consultation. In her evidence to the Subcommittee, Professor Judith Petts also welcomed the use of several consultation methods, noting that “all experience of public participation exercises shows that integration of multiple methods is essential to ensure that the number of people who can contribute is extended that the full range of potential views on the subject is identified.” There is however a danger that the public could see an ill-managed attempt at public engagement merely as a way of gathering public support for the Government’s preferred policy. We recommend that the Government come forward with a clear statement of the purpose of its public engagement, and some indication of how the outcome will be evaluated.

29. Earlier in this report we commented on the fact that the parameters of the consultation process were not clearly defined, because the values and principles thought by the Government to underpin radioactive waste management policies have not been spelt out. It has been argued that the public should play a part in framing such basic
values. The Nuclear Free Local Authorities Steering Committee, for example, told us that “the (consultation) paper fails to recognise that facilitating public involvement in the framing of policy formulation is an essential first step.” We agree. The Government needs to elicit from the public consultation and publicise the values and principles which should underpin the process of developing a radioactive waste management policy. If the public are properly consulted about such fundamental matters at the outset, the outcome of the consultation process is much more likely to attract public support.

30. Some suggestions of principles which might frame the consultation process have already been made. The consultation paper suggests some principles, such as the “need for an open and fair assessment of options”. RWMA makes its own proposals, as does Nirex, which emphasises that “if any future project is to succeed, transparency must be, and be seen to be, at the heart of the project. Certain principles and characteristics are fundamental to the consultation process. These include openness and transparency, equity, public acceptability and legitimacy.

31. The Government must also make clear how much control of the policy outcome will be given to the public. There is potential for much scepticism about ‘another consultation’. This will only be overcome if a guarantee is given that the public have some degree of real influence over the outcome. Public engagement should be regarded as an aid to democracy rather than a substitute for it. The consultation process should therefore be an opportunity for democratic participation through existing representative bodies at national and local levels. The Centre for Reform suggested that “there should be substantial new powers for a Parliamentary Select Committee with specific oversight of the Commission, and a remit to monitor the entire nuclear industry”. Professor Judith Petts, opposed that proposal, saying that “the further you go into formalising new commissions and bodies, the further away from the public you actually get”. When asked whether Parliament should be consulted, Mr Meacher replied that “it would be very helpful to have a debate in Parliament. I certainly would be very keen for MPs to take a lead in developing this debate.” We believe that Parliament, having considered the advice of the overseeing body, should decide the elements of national policy including, most crucially, the preferred option for long-term management of radioactive wastes.

32. Nirex told us that “we judge at the moment...that we could dispose of the intermediate level wastes that we are responsible for..in about 30 per cent of the deep geology of the United Kingdom”. In addition to a national public debate, the participation of local communities, which may be asked to host such a storage facility is critical. In some other countries local communities may receive compensation for hosting a facility and incentives may be offered to encourage volunteers. In Finland and Sweden, local communities may have a right of veto over proposals. Such overseas experience should be considered when developing the UK’s policy.

33. At some point in the process, the issue of the siting of a prospective waste management facility will have to be explicitly considered. There is a timing problem. On the one hand, if siting issues are deferred, it may be relatively easy to engage the
public in debate and to reach a consensus on a management option, but it may subsequently prove very difficult to achieve agreement on siting. On the other hand, an early introduction of siting issues may distract from the debate on overall strategy and, at worst, result in conflict and political impasse, as has occurred previously. We consider a better approach would be to introduce the siting issues gradually, in stages, moving from consideration of siting principles (compensation, incentives, veto, etc.), to a consideration of broad areas of search and eventually to specific sites. In this way the ground rules for siting could be established using the principle of equity. However, once this process has begun it is vital that the Government is robust in seeing it through to its conclusion. Any loss of will to reach a final decision, against what could be a rising tide of controversy, would fundamentally undermine a carefully structured exercise in consultation. Those likely to be most immediately affected would be consulted at a relatively early stage before any specific siting decisions were made. **We urge the Government to make a decision as early as is practicable in the consultation process as to the stage at which local communities likely to be asked to host a storage or disposal facility will be identified, and subsequently involved in the decision-making process. It should also be determined in advance whether local communities, however defined, will be given the power of veto over hosting such a facility, and whether they will be provided with benefits for doing so.**

34. We agree with Professor Curtis’ comment in evidence that compensation raises no ethical problems. Incentives might however be construed as bribes. As the Minister commented, “if you have a system of sweeteners, you are compromising the rights of future generations in order to satisfy the present one”. Incentives might be used to seek out volunteers. Great care must be taken to ensure the process is even-handed and does not produce sub-optimal siting solutions. There is also a major political issue to be addressed here. It is possible to argue that a repository for radioactive waste is a unique case, and that the community accepting it is acting in the national interest. It is however also easy to imagine the same argument being used for other planning issues such as airports, defence installations, incinerators and wind farms. The Government will need to have a firm policy in place if it decides to consider the use of compensation. As to the use of a veto, careful consideration is needed as to when and in what circumstances it might be applied and whether it could be overridden. All these issues are complex and should be the subject of debate during the consultation process.”

**The following is the Summary of Recommendations taken from the report (pages 21 and 22 – paragraph numbers refer to the full report).**

“(a) A measured and open staged process enabling participation and involving stakeholders and the public has the potential to yield the acceptability necessary to ensure an effective decision. But delay is an ever-present danger. The timetable for the programme of action should not be allowed to extend beyond 2007 (paragraph 18).

(b) We welcome the document as a first step towards developing a long overdue policy for the disposal of radioactive waste. We are however concerned that the process of policy development should be well defined and transparent at all stages. The Government should address concerns that a generally phrased
consultation document will not engage the public in the debate. It should also set clearer objectives defining the nature of the outcome of each of the remaining stages of the consultation and policy development process, and provide further details of how it will ensure that the programme of action will be completed by 2007 (paragraph 20).

(c) We are convinced that, if the process of consultation and policy development is to be successful, it should be managed by an independent body which ultimately provides policy advice and recommendations to the Government. The membership of the overseeing body should include experts, stakeholders and lay people, and should be appointed in a personal and not a representative capacity. The body should be adequately staffed. We recommend that the independent body should be established as soon as possible after the end of the first consultation period (paragraph 24).

(d) We recommend that in order to ensure that the roles performed by the various institutions involved continue to be as clear as possible, a decision be taken quickly about the future role of Nirex, about future responsibility for the functions it currently performs and that it or its successor should be independent of other nuclear companies (paragraph 25).

(e) We recommend that the Government come forward with a clear statement of the purpose of its public engagement, and some indication of how the outcome will be evaluated (paragraph 28).

(f) The Government needs to elicit from the public consultation and publicise the values and principles which should underpin the process of developing a radioactive waste management policy. If the public are properly consulted about such fundamental matters at the outset, the outcome of the consultation process is much more likely to attract public support (paragraph 29).

(g) We believe that Parliament, having considered the advice of the overseeing body, should decide the elements of national policy including, most crucially, the preferred option for long-term management of radioactive wastes (paragraph 31).

(h) Such overseas experience [i.e. Finland, Sweden] should be considered when developing the UK's policy (paragraph 32).

(i) We urge the Government to make a decision as early as is practicable in the consultation process as to the stage at which local communities likely to be asked to host a storage or disposal facility will be identified, and subsequently involved in the decision-making process. It should also be determined in advance whether local communities, however defined, will be given the power of veto over hosting such a facility, and whether they will be provided with benefits for doing so (paragraph 33).

(j) However, work should be undertaken now on how best to deal with the
consequences of eventually revealing possible sites if the whole exercise is not to be sunk by local opposition (paragraph 35).

(k) We recommend that the issues of siting a potential radioactive waste facility should be debated as part of the consultation process in stages moving from generic issues to specific siting questions; that among the generic issues to be debated and decided should be compensation, incentives, volunteerism and vetoes; that the devolved administrations and local authorities should be fully involved in the decision-making process; and that the planning process should not be changed in any way that would impede the process of public debate and staged policy formulation which is necessary for effective decision-making (paragraph 38).

(l) It is incumbent on all sides of the nuclear debate to enter into the more open and constructive dialogue that is being envisaged in the consultation paper and endorsed by all the witnesses we spoke to (paragraph 40).

(m) We recommend that the consultation process seek from an early date to establish the sensitivity of public support for a facility to the possible presence of plutonium (paragraph 44).

(n) We recommend a review of the remit and independence of Nirex or its successor companies to ensure that there is neither duplication nor a gap in the responsibilities of the many parties involved in the disposal of nuclear waste, especially in view of the formation of the Liabilities Management Authority. Resolution of responsibilities for the various waste streams would make the resolution of the definition of waste a great deal easier (paragraph 45).

(o) We recommend that the process of consultation cover at the appropriate stage the possibility of a facility requiring regular receipt of additional waste (paragraph 47).

(p) We anticipate that the establishment of the LMA (Liabilities Management Authority) will be one of the major steps in this process and hope that the Government will find time for the primary legislation in the next session so that this process is not delayed (paragraph 49).

(q) It will be necessary for the LMA to establish whether or not there is a problem with the current system of regulation of the storage and conditioning of waste. Should this prove to be the case, it will be necessary to act quickly to rectify the problem (paragraph 50).

(r) The Committee requires that the Government submit to it a report on progress with the consultation process by 31 December 2002 and that it should do so annually thereafter (paragraph 54).”

“2. THE POLICY FORMULATION PROCESS

Introduction

2.1 In July 2001, RWMAC submitted advice to Government on the overall process by which policy for the long-term management of solid radioactive waste should be decided. This advice, published in September 2001, and hereafter described as the 2001 advice, is referred to in paragraph 1.10 of MRWS. The Committee stands by its advice. This response develops some aspects of the advice and draws out the features, which, the Committee believes, must characterise the process of policy formulation.

Guiding principles for the process

2.2 The 2001 RWMAC advice set out six key guiding principles, which the policy formulation process should follow. The purpose of such principles, which would need to be publicised at the outset, is to promote public confidence, thereby encouraging participation in the process, and to help secure the necessary widely based support for it. The principles are:

- openness and transparency;
- early involvement of the public and other stakeholders;
- a deliberative and accessible process of decision-making;
- provision of adequate time for the exploration and resolution of complex issues;
- commitment to appropriate peer review of scientific and all other expert input;
- equity - the principle by which the process for deciding policy, and the policy itself, are generally perceived and accepted to be fair.

2.3 RWMAC is pleased that MRWS appears to endorse these principles. Chapter 1 of MRWS describes the key principles by which the policy formulation process will be guided, including openness and transparency. The need to involve the public and other stakeholders from the beginning is acknowledged in Chapter 5; this also discusses the range of deliberative consultation techniques available for doing so. Chapter 7 firmly endorses the principle of taking sufficient time. The issue of scientific and other expert input is discussed in Chapter 6, although RWMAC believes that greater emphasis is needed on peer review in order to ensure that the ultimate policy decision is soundly based. Lastly, while the need for fairness in respect of assessment of options is referred to in Chapter 1, it is, in RWMAC’s view, something that should be taken to apply to all aspects of the policy formulation process.

The nature and staging of the process
2.4 Both MRWS and RWMAC see the need for a structured process of policy formulation, but the approaches advocated are different.

2.5 RWMAC continues to believe that the process for deciding future policy should be a measured one, will take time, and should not be rushed. On the other hand, the existence of an extended, staged, process should not be used as an excuse for procrastination. There is a need for balance with adherence to specified time targets within a carefully scheduled programme.

2.6 RWMAC commends the five stages proposed in its 2001 advice. In summary, these were:
1. Project initiation;
2. Development of the framework for evaluating the long-term management options (both the options to be considered and the criteria against which they are to be evaluated);
3. Assembly of expert input to support option evaluation;
4. Evaluation of options;
5. Preparation of policy recommendations.

2.7 Building up public confidence through this open, staged, process is paramount. There will, of course, be a need, from the outset if necessary, to inform the public debate by providing information and in some instances it may be necessary to commission research. This should not be confused with stage 3 above, which is intended to ensure that expert advice is available to support the evaluation of the long-term management options. More is said of providing public information, and engaging the public, later in this section of the RWMAC response.

2.8 In its 2001 advice, RWMAC stated that “do nothing” is unacceptable. Nevertheless, it can seem an attractive alternative in the short term. RWMAC believes that “do nothing” should be included in the list of options that are evaluated so that its full implications can be appraised.

2.9 The last stage of the policy formulation process proposed by RWMAC in its 2001 advice is the recommendation on the policy option to be adopted for the long-term management of each of the types of solid radioactive waste under consideration. The Committee remains of the view that if this is to stand any chance of achieving public acceptability, all the management options will, as part of Stage 4, have to be evaluated against an agreed common set of criteria which reflect the public’s stated concerns and the full range of risks that could potentially be involved.

2.10 Overall, it is important that the ordering of the stages is clearly defined at the start and subsequently maintained so that, ultimately, the choice of policy can be seen to have emerged logically from the process.

Policy formulation and policy implementation
2.11 RWMAC has emphasised the need for clear separation between the process of choosing policy options for the long-term management of the various wastes and subsequent actions to implement the preferred policies. The end point of implementation will be the identification of locations, which, subject to the necessary regulatory and planning consents, can be used for long-term waste management.

2.12 It is important to bear in mind that there currently exist a number of sites throughout the UK where low and very low-level radioactive wastes (LLW and VLLW) are disposed of, either by burial or incineration, and other sites where more active wastes are stored and have been for many years. A comprehensive UK policy for solid waste management would, in all probability, result in the confirmation of the status of some existing storage and disposal sites. RWMAC itself is undertaking a study of the UK’s management of its solid LLW. One outcome of the MRWS-led initiative could be that new sites for managing LLW, as well as more active solid wastes, are needed.

2.13 Before seeking to identify specific locations for new long-term management facilities for solid wastes, it will be necessary to define how the generic process for deciding site selection is to be constructed. Development of the site selection process itself should stop short of identifying specific sites. This distinction is necessary in order to ensure that an objective evaluation of options is not influenced by local, site-specific, questions, although consideration of generic siting issues is essential in order to engage with the public who may be most affected by the policy. The strong connection between the choice of policy option and the site selection process, and the implications that these have for political decisions and the provision of expert advice, need to be recognised.

2.14 Policy on how sites should be selected should give consideration to concepts such as volunteer communities and the use of incentives so as to determine the role that these might play. The idea that local communities might be able to veto proposals also needs consideration. There is a substantial body of overseas experience to study and UK legislation may be necessary. Some of these issues will need to be given an initial airing at the policy formulation stage.

2.15 In RWMAC’s view, decisions concerning the kind of process to be applied to site selection must adhere to a similar set of key guiding principles as those used in the policy formulation stage, crucially the need for open and inclusive public debate. Decisions will again need to be taken at a measured pace, and not rushed. RWMAC believes that the MRWS target of 2007 for setting out the means of implementation of the preferred long-term management strategy (including decisions on the site selection process) is ambitious but needs to be met.

Managing the policy formulation process

The overseeing body

2.16 Both MRWS and RWMAC have proposed the involvement of specialist bodies in the policy formulation process, but MRWS limits its discussion to the context of research. RWMAC is convinced of the need for a body with the duty, given to it by
Government, to design and oversee the overall process of formulating policy, including responsibility for determining the staging of the process – up to the point at which a long-term management option can be recommended. Hereafter, this body will be referred to as the “overseeing body”.

2.17 This overseeing body must be independent, or at least balanced interest in nature, if it is to carry out its role in relation to the formulation of policy. RWMAC believes that it should be given an appropriate membership template, with appointments made on an “ad hominen”, as opposed to representative, basis, and should be established as soon as possible after the end of the MRWS consultation period (and certainly not later than the end of 2002). The Committee believes that such an organisation, established at one step removed from Government, would be more widely accepted than, for example, a department of Government, as being capable of upholding the wider public interest. The overseeing body must also be adequately resourced in order to be able to undertake the tasks allocated to it.

2.18 The overseeing body would also help to ensure that the principle of equity is observed and to measure the extent of public acceptability of the proposals. It would support and inform the legitimate decision-making role of Parliament, the devolved administrations and local government.

2.19 The relationship that the overseeing body will have with Government, and with Parliament, including its reporting arrangements, will need to be worked out in detail. It is not the intention that the overseeing body should take over responsibility for determining policy. The need to maintain the preeminence of the democratic decision-making process cannot be over emphasised. But, equally, it is essential to avoid a scenario in which the overseeing body spends a number of years and millions of pounds producing recommendations that are simply discarded by Government. RWMAC suggests that the relationship of the overseeing body to Government and to Parliament should be such that decisions can be banked stage by stage. One means of doing so might be provision for Parliamentary debate at each stage.

2.20 The overseeing body’s functions would include the provision of information to support the public debate, commissioning necessary research, identifying the long-term management options and the criteria against which they are to be evaluated, and recommending a preferred option. It would also liaise with Government departments and industry and provide advice to Government generally. Its role in managing the use of public engagement techniques and encouraging public participation in the policy formulation debate is discussed below.

Providing public information and engaging the public

2.21 However the policy formulation process is ultimately staged, work undertaken to explore public views, beliefs and attitudes, must be based on the provision of sufficient information to enable people to engage with the issues. As MRWS acknowledges (paragraph 5.6), many people do not know much about radioactive waste and current arrangements for its management.
2.22 Information is likely to be needed to underpin a number of different techniques of public engagement. These include: widespread provision of information with an opportunity to respond (for example, through newspaper advertisements and websites); research on public opinion (for example, through surveys and polling); and consultation aimed at eliciting public views on specific proposals in order to develop and improve the proposals (for example, through discussion groups or citizens' panels). Appropriate strategies for involving the public - which utilise these different techniques - will have to be identified by the overseeing body in accordance with the requirements of the policy formulation process.

2.23 Within these strategies, provision of information on waste hazards and risks is important. Ultimately, it will only be possible to justify the adoption of a long-term management option for radioactive waste if there has been public involvement in appraisal of the risks that are involved across the range of possible options. In RWMAC's view, the provision of public information to underpin this appraisal presents a major challenge. Simple assertions of safety, such as those made by MRWS in relation to current storage arrangements for radioactive waste, will not be sufficient.

2.24 Chapter 5 of MRWS itemises a number of techniques for engaging the public and stakeholders in policy formulation on an informed basis. RWMAC believes that these techniques need to be selected and applied by the overseeing body in an appropriately planned way - on a "horses for courses" basis - to support the overall process for deciding future policy. A combination of different techniques can be used to secure broadly based public participation, which is required to underpin and add to the legitimacy of political decision-making.

**Planning procedures**

2.25 The Department of Transport, Local Government and the Regions is currently carrying out consultation on the process for considering planning applications for major infrastructure projects. The proposals include making some major projects subject to new Parliamentary procedures. RWMAC believes that these proposals need to be judged against the same spirit of openness, transparency, and public involvement advocated by MRWS. RWMAC agrees with the conclusions of the House of Commons Environment, Food and Rural Affairs (EFRA) Select Committee report “Radioactive Waste: the Government’s Consultation Process” that issues concerned with siting long-term management facilities for radioactive waste need to be subject to public debate throughout the whole process of policy formulation and implementation. Parliamentary procedures should complement, not replace, public participation. Like the Select Committee, therefore, RWMAC would be unable to support any changes to the planning system that prejudiced the open, staged, approach recommended in this response.”
MANAGING RADIOACTIVE WASTE SAFELY

The Government and the devolved administrations for Scotland, Wales and Northern Ireland have considered the results of the consultation exercise *Managing radioactive waste safely* which we launched last September, and have now decided the way forward. In our consultation, we proposed a rigorous assessment of long term waste management options – including surface storage and underground disposal – and active public involvement in this process. We proposed a new independent body to advise Government, and a programme of public debate backed by research. We have now decided to go ahead. This decision came too late to be announced before the Recess, but the issue is of such importance that I wanted to bring it to the attention of every Member of Parliament.

The consultation ended on 12 March and today we are publishing a summary of the 330 responses received by the UK Government and the devolved administrations. We have considered the many comments made on the specific issues on which *Managing radioactive waste safely* sought views, and the other comments which some recipients offered, and are now outlining the next steps which we have agreed will be taken in the policy process.

We now propose to press ahead with a review of waste management options. The review will seek the views of interested stakeholders, the public and government departments. We will appoint an independent body to oversee the review process which will make recommendations on the option, or combination of options, for managing radioactive waste which would achieve long-term protection for people and the environment. We will review all options and revise the timetable to a four rather than five stage process. We, the UK Government and the devolved administrations, will continue to be responsible for taking the ultimate decision on the management option.

We propose that the new body will be in place by the end of the year. We will advertise widely for members of this new body and they will be appointed jointly by Ministers form the UK Government and the devolved administrations. We will be seeking people who will bring technical expertise and people who will bring a wider perspective of environmental, health, social or ethical issues. We will also want to ensure that its membership is drawn from across the UK. Further details will be announced later. This new body must win public confidence and operate in an open, transparent and inclusive manner. The review process must engage with stakeholders and the public.
The first step of the review will be to set the framework for debate by establishing broad agreement on the wastes to be considered, the range of management options for each of them, and the criteria against which these options should be assessed.

The second step will be to assess each option including commissioning any new research required. The final step will draw up recommendations for Ministers to consider.

The consultation was the first stage in our programme. The appointment of the new body will signal the beginning of Stage 2, and the process of assessing options, and it will end when we publish and explain our decision. Stage 3, around 2006, will be a public debate on how the decision should be implemented including any site selection criteria. Stage 4, around 2007, will be the start of the implementation process including any necessary legislation. In making these changes we have taken account of views received and research undertaken. We believe that this approach will result in a more dynamic and extensive process of public engagement as the review progresses, rather than the series of public consultation exercises originally envisaged. We shall not set rigid timetables and deadlines. But we shall go faster if we can.

Our priority is to reach the decision which achieves long-term protection of people and the environment, which inspires public confidence, and which is practicable. This approach, coupled with regular reports to the UK and Scottish Parliaments and the Welsh and Northern Ireland Assemblies, will reach far more people and encourage active involvement in decision making, rather than occasional opportunities to react to consultation papers.

The waste from our existing nuclear facilities will arise over the next century or so. So we intend, in our assessment of waste management options, to include not only materials currently classified as waste but also to consider the consequences of providing for other materials which may have to be managed as waste during the period, such as some separated plutonium, and uranium, as well as certain quantities of spent nuclear fuel. The future management options for the UK’s civil plutonium include its possible use as a fuel. However, up to 5% of this stock may be so contaminated that, even though it may also be technically possible to treat and use this amount for fuel, it might prove uneconomic to do so. The Government is currently undertaking a study of the possible options for the future management of UK owned civil stock and will want to consider the results of that exercise before reaching its own conclusions on this issue. More generally, the Government urges the other owners of these materials, on a voluntary basis, to put in hand procedures now which would allow them to identify those materials which may become not economically reusable.

The review of options will not consider potential radioactive waste sites. Our priority is to assess the management options and decide how to manage the waste. But we need to recognise that the assessment of some options will raise siting issues – including, as some consultees have suggested, whether local communities should have a veto or be encouraged to volunteer, and whether they should be offered incentives. It is important to ensure that we are clear and open when drawing up any criteria which might eventually be needed to identify sites in the option assessment process, and the issues which they raise.

Over the summer and autumn, we shall public more detailed proposals. These will include details of the new body and its terms of reference, and more detailed proposals for Stage 2. They will also address pressing issues such as arrangements for managing waste safely in the short-term and an announcement on waste substitution. We shall report progress on the other issues covered in the consultation, including decommissioning nuclear sites, the powers of the Environment Agencies, managing spent sealed sources of radioactivity, and waste classification. We will also
set out how the policy process relates to other programmes, particularly the UK Government’s proposals for *Managing the nuclear legacy* published on 4 July.

A summary of the consultation responses has today been placed in the Library of this House, and those of the devolved administrations. Copies of individual responses are available in my Department’s Library, and in those of the relevant Departments in the devolved administrations.

We have responded separately to the recommendations from the Environment, Food and Rural Affairs Select Committee and the House of Lords Select Committee on Science and Technology.

I enclose a copy of a news release issued by my Department. This gives further details including information about research reports published and where they can be obtained.

**MARGARET BECKETT**
Executive Summary

1. In September 2001, the Department for Environment, Food and Rural Affairs (Defra) and the Environment Departments of the devolved administrations for Scotland, Wales and Northern Ireland issued a consultation paper ‘Managing Radioactive Waste Safely’ (MRWS)\(^{29}\). The paper proposed a programme of action for deciding how to manage UK solid long-lived radioactive waste in the long term. It also identified the need for research into the potential options for managing the wastes, including an assessment of the current knowledge base and an identification of gaps in knowledge.

2. This project, called the Information Needs Research Project, which is reported here, was commissioned to provide a broad-brush view of current knowledge about long-term management options for such wastes. It is anticipated that this final report of the Information Needs Research Project will assist with further stages in the MRWS programme.

3. In the specification for this current project the contractor was required to satisfy a number of specific objectives:

   - Identify the range of radioactive waste management options for UK solid long-lived radioactive wastes;
   - Identify, for these options, the detailed information which will be required by the Government, after due consultation, in order to select, with confidence, practical management options;
   - Identify, for these options, those where we currently have the information and those where at least some information is currently lacking or imprecise;
   - Outline the future studies necessary, with estimates for staff and time resources required, to obtain the lacking information and improve the precision of uncertain information before the decision point is reached;
   - Assess the importance of what will not be known and may remain unknown.

4. The Project was undertaken by Wilkinson Environmental Consulting Ltd. It was peer reviewed and guided by a group of experts appointed as a Steering Group. While this report identifies major issues that need to be addressed during the full implementation of an option, it does not endorse one option over another but identifies potential weaknesses in one option compared to another. The final endorsement of option(s) is for Ministers, whilst most of the research needed to implement the option(s) will be specific rather than generic, and carried out during the implementation period, which could last for decades.

This report advises what information needs to be obtained and how this might be done during the review and implementation phases.

5. In Section 2 of this report the properties of five UK waste or potential waste types, namely high level waste (HLW), intermediate level waste (ILW), spent fuel, plutonium, and reprocessed and depleted uranium are reviewed. Then the UK radioactive waste inventory and the risks posed by radiation are examined so as to provide the context for the work on long-term management. Section 3 identifies 14 potential waste management options, giving a general overview of each and highlighting key points to be considered during the assessment of the information needs of the options. The report in Section 4 provides a broad examination of the interaction between radioactive waste management policy and other areas of Government policy, environmental principles and societal concerns. Additional sections cover legal aspects (national, European and international law in Section 5), general scientific and technical aspects (Section 6), public perception (Section 7), and perspectives of environmental interest groups (Section 8).

6. Having reviewed the principal areas relevant to radioactive waste management policy making and having defined the options to be considered, the report presents in Sections 9 and 10 and associated Appendices an analysis of work packages that would need to be carried out to meet the information needs and related activities for each option. Section 11 comments on responses to the MRWS consultation programme. In Section 12 a manageable process for taking forward the information-gathering element of the programme announced by the Government on 29th July 2002 is suggested. Full details of the key questions and the 630 potential work packages derived to cover all 14 options are provided in Appendices. The word ‘potential’ is important as, when taking the MRWS process forward, it should be possible in later stages to remove some options, and hence work packages, from consideration at an early stage. Most work packages will be for the implementation stage and could take many decades to complete.

7. The project commenced with a literature survey and information gathering phase, followed by a general review of the long-term waste management implications of Government policy and principles, law, science and technology, and public acceptability. Subsequently, the project examined the parameters describing individual management options and their information needs.

8. All the fourteen waste management options were reviewed for the five waste or potential waste types set out in paragraph 2 above. The options were: -

1. Above ground storage
2. International above ground storage
3. Underground storage
4. International underground storage
5. Underground disposal
6. International underground disposal
7. Direct injection – injection of waste as liquid into deep geological strata.
8. Disposal at sea – disposal onto the sea bed
9. Sub-seabed disposal - disposal in sediments beneath the sea bed
10. Disposal in ice sheets
11. Disposal in subduction zones - disposal at tectonic plate boundaries.
12. Partitioning and Transmutation – the transformation of long-lived substances into shorter-lived or more stable forms.
13. Disposal in space
14. Dilute and Disperse - diluting and dispersing into the general environment

It is accepted that there are other options / variations but that the information needs are likely to be very similar to those already identified.

9. In the second phase a methodology was developed to define the information needs of all these management options. This was based on the similar task performed in the 1997-99 project ‘An R&D Strategy for the Disposal of High-Level Waste and Spent Fuel’. That project had identified the information needs for one management option (geological disposal) of one waste (HLW) and one potential waste type (Spent Fuel), together with some consideration of plutonium, uranium and ILW. That project identified more than 60 work packages to meet the policy and technical milestones of completing this scenario i.e. to the point of closure of the repository, a process of many decades duration. It should be emphasised that though that earlier project acted as a framework, the current project team considered all 14 waste management options equally within its methodology.

10. In order to arrive at a point where information needs could be identified, the project team assembled a set of generic questions that could be addressed across the range of options. The questions included, either directly or indirectly, all the criteria suggested by the Government’s Radioactive Waste Management Advisory Committee (RWMAC) in their recent review. The questions were grouped into four sets covering

- Laws, Treaties and Obligations
- Principles and Government Policy
- Scientific and Technical Aspects
- Public Acceptability

This process generated 47 questions. These were then posed for all 14 options.

11. In addition to the 658 answers to the generic questions, key points from each option were separately identified. Sets of key questions were also generated from the literature survey and information gathering phase. All these answers, key points and key questions, (collectively called “attributes”) were then assigned to individual work packages derived from the relevant HLW and Spent Fuel Project work packages. Some attributes were not covered by the scope of these earlier work packages and so new work

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packages were devised to satisfy these. This led to a complete work package and attribute listing for all options and to the identification of 630 potential work packages.

12. One important purpose of the INRP work packages is to identify ‘areas of learning’ needed for the selection of practical options ‘with confidence’. Identification alone is not enough, however. It is also necessary to ensure that the information gained becomes part of an integrated process design, which involves relevant stakeholders and the public, so that it becomes a credible step towards having ‘sufficient knowledge to proceed with confidence’. The issue of confidence is particularly important in the case of radioactive waste management because of the extremely long timescales involved. It is as much related to the confidence in the institutions involved in the decision making process as it is to the science and technology to be deployed.

13. For any option to be implemented, it must necessarily meet appropriate national and international safety and legal requirements. The activities necessary to achieve this are contained in the work packages. The current Government policy review may only need to establish that on balance an option or combination of options is clearly ahead of other options/combinations and that there is a strong enough probability that it will meet the necessary standards to proceed with confidence. This is because all the waste- and site-specific circumstances cannot be known in advance of a specific scheme being defined. Much further work on meeting all appropriate requirements must then be done while the chosen policy is being implemented, possibly over a period of 25 years or more.

14. Safety is a key factor in undertaking any human activity including waste management. Safety might be thought of as a potential ‘show stopper’ where the generic safety case for a chosen option cannot be made with sufficient confidence. Other areas, such as technology, cost, legal restrictions, or political and diplomatic difficulties provide additional hurdles for the various options, some of which may be insurmountable.

15. During the course of the current project, at the suggestion of contractor, and with the agreement of the Steering Group, Defra asked the contractor to modify the project objectives and to extend, for completeness, the work packages to include all options e.g. including even those ruled out by international agreements. While the earlier HLW and Spent Fuel project produced work packages with outline timescales, and classification was into broad work content bands, it did not estimate the effort required or the cost of the work packages. The project team also felt unable to estimate effort and costs, given the breadth and complexity of the current potential work packages related to generic options. This project has also not considered the possibility of different waste management options being adopted for the various waste streams, as the number of permutations becomes unwieldy. This added complication should, however, be addressed as part of the ongoing process of policy formulation.

16. The 630 potential work packages and the complexities and uncertainties outlined above, suggests to the team that pursuing all waste management options in parallel to the same level of detailed consideration would not produce a practical or manageable programme. The effort and expertise required cannot be delivered against the programme envisaged in the Government's MRWS consultation. Additionally it must be
questionable whether most stakeholders and the general public would view it as good value for money to spend several £ millions and decades assessing, for example, some options which have no serious prospect of being implemented.

17. The project team, therefore, recommends that any process embarked on should be able to prioritise work packages in an open and transparent manner so as to produce a more sensible and manageable overall programme. The work done under the project and the team’s background knowledge leads to the view that many potential work packages for some options either involve disproportionate resources or have limited prospects for a successful outcome or both.

18. The process of prioritisation might usefully start by identifying those options likely to produce extreme results such as very high costs, inadequate safety assurance, or incompatibility with key national policies or international agreements. Options could be legitimately excluded if a broad agreement were achieved that such outcomes preclude further detailed study of the option. Extracts from Appendix 17, which provides an example of how this might be done, are included below.

<table>
<thead>
<tr>
<th>Key Generic Question</th>
<th>Option A</th>
<th>Option B</th>
<th>Option C</th>
<th>Option D</th>
<th>Option E</th>
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</thead>
<tbody>
<tr>
<td>2g Is the predicted safety or environmental detriment in line with regulatory standards? Safety assurance difficult</td>
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<td>2r Is current waste policy and practice precluding or reducing the scope for selection of this option? Timescale and current waste conditioning practices limit applicability</td>
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<td>2k Is the cost likely to be a determinant? High cost options</td>
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<td>3f Does the option crucially depend on future technological innovation? Challenging/high risk technology</td>
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<td>1d If the option is prohibited by international treaty, is it feasible to contemplate renegotiation? Extreme political/diplomatic challenge</td>
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<td>3q Does the option apply to all wastes? Applicable to limited number of waste types – implies the need for more than one option to be adopted</td>
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<tr>
<td>2a Does the option rely on institutional survival? Not deemed an ethical solution</td>
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</table>
3r Are there examples in other countries or natural analogues that can increase assurance?  
UK ‘go it alone’ not feasible

3h Does the option allow the long-term retrievability of the waste?  No

19. This table presents a selection of the 47 generic questions applied to an undefined selection of the 14 waste management options. The shaded boxes indicate that the amount of work required is likely to be disproportionately large, or that the ‘answers’ arrived at are very probably to be unfavourable to the option. Example ‘answers’ are shown in italics. This allows an initial view to be taken of the relative feasibility and practicability of each option.

20. From this analysis it is suggested the following process stages could be included in any review of options:

i. Identify a few questions (and therefore a few potential work packages) where it can be easily demonstrated that the answer is highly disadvantageous to one or more of the options

ii. Seek transparent and sufficient agreement that these particular factors are sound reasons to exclude one or more options.

iii. Reduce the number of options being evaluated.

iv. Review remaining potential work packages with a view to providing enough information to justify further decision points and option reductions.

21. Once this prioritisation process is underway, it should be possible to review those work packages that remain relevant, with a view to grouping them and refining the level of definition and timing appropriate for having the work performed. Many of the work packages for the chosen options will fall to be undertaken over an extended period of time once the decision is made to implement them.

Additional commentary

22. The process by which the policy for the long-term management of long-lived wastes is developed will not take place in a vacuum. In the meantime, ILW is being conditioned to Nirex specifications predicated on storage followed by geological disposal, while the HSE Nuclear Installations Inspectorate anticipates waste producers managing wastes for interim storage periods of up to 150 years. There is therefore a need to ascertain whether this timeframe for interim storage is an acceptable background to the process of choosing ‘practical management options for solid long-lived radioactive wastes.’ In particular:

- Is an emphasis on moving as soon as is reasonably possible to passive, safe, monitorable and retrievable interim storage a suitable policy for untreated waste?
- Is an overall period of interim storage of up to 150 years a suitable planning basis for radioactive waste being placed in storage now?
• Should deep geological disposal still effectively define the specification for ILW to be treated for storage or could a more general specification covering a number of options be found?

23. These questions need to be answered well in advance of the policy envisaged by MRWS being defined, and present an urgent area for policy decision.

24. Other policy and regulatory developments will interact with the process. In addition to the plans for the Liabilities Management Authority, there are a number of key regulatory consultations and outstanding policy issues which will impact upon the technical implementation and therefore the public acceptability of the various options outlined in this report. On July 29 2002 the Government announced\(^2\) the outcome of the MRWS consultation and what it intended to do next. There should therefore be a work stream to determine the interaction between these various statements and consultations and any additional information requirements that could emerge.

\(^2\) Defra News Release 315/02, 29 July 2002
Aims for the Working Paper

1. This paper is one of three prepared as background for the Managing Radioactive Waste Safely (MRWS) Participatory Methods Workshop to be held on 10-11th March 2003. Of these papers, the first (DEFRA, 2003a) provides an overview of the Managing Radioactive Waste Safely programme announced by Ministers, the outline structure set for it and the role of the new Committee on Radioactive Waste Management (CoRWM, pronounced CORUM), which will be charged with overseeing the process up to the point where recommendations on policy for long-term management of the UK’s radioactive waste can be delivered. The second paper (DEFRA, 2003b) provides background on the nature and quantities of radioactive waste held in the UK and its current management.

2. This, the third paper, concerns methods of public and stakeholder engagement, the use of which stands to be a cornerstone of the MRWS process, in order to arrive at a choice of policy that can ultimately command wide public confidence and legitimacy. The purpose of this paper is to provide a foundation for the workshop through ensuring that all those attending have a common understanding of the various approaches to public and stakeholder engagement and how they might relate to the MRWS process. In particular, the paper:
   - introduces key terms and concepts that might be useful when considering issues of public and stakeholder engagement in radioactive waste management;
   - describes a range of methods that can be used to engage both public and stakeholder groups, and organises these into seven potential engagement strategies for radioactive waste management;
   - draws together a brief overview of UK and international experience of the application of such methods in the area of radioactive waste management to date;
   - suggests a framework that might assist the design of a programme of public and stakeholder engagement that ‘fits the purpose’ of different phases in the Managing Radioactive Waste Safely process.

3. Generic participatory methods that might be of relevance to the MRWS process have been comprehensively described over the last few years (e.g. Renn et al. 1995; Warburton, 1998; Democracy Network, 1998; Lowndes et al. 1998; NEF, 1998; Audit Commission, 1999; Petts & Leach, 2000; IEMA, 2000). Specific reviews in relation to nuclear waste management have been published by Hunt & Wynne (2000), RAWMAC
(2001), DEFRA (2001), Atherton & Hunt (2002) and the Scottish Council Foundation (2002). In addition, current experiences of participatory practice in the area of radioactive waste management, both internationally and in the UK, have been reviewed recently (NEA, 2000; Hunt et al. 2001; NEA, 2003).

4. The authors thank those workshop participants that have provided valuable feedback on an earlier draft of this working paper. Around a third of workshop participants responded to the request for feedback, with ten participants providing in-depth responses. Overall, feedback has been very positive with most participants stating that the paper provides a good basis for the workshop. The present version of this working paper is a final draft that has been amended in light of feedback from participants in the following ways.

- A select number of participants considered the adequacy of descriptions, definitions and concepts offered in the paper. Changes have been made to the main body of the paper where comments from a number of participants converge on specific points. These changes are not numerous, although the intention is to consider comments during the workshop that have not been directly incorporated into the paper or where significant disagreement exists.

- Most responses from workshop participants highlighted the key issues and concerns, relating to the engagement programme of the MRWS policy options review stage, to be considered in the workshop. Some participants further elaborated the issues and concerns outlined in the earlier draft, and a number of additional issues and concerns were raised by participants (see para 30).

- The majority of workshop participants responding to the paper provided further information relating to Appendices 1, 2, and 3. This represents the main body of changes to the paper in response to participant feedback.

- Workshop participants provided very little in the way of evaluative judgements of existing UK processes in the radioactive waste area (Appendix 2), or the advantages or disadvantages of available methods (Appendix 1). The high level of effort needed to provide evaluative judgements, and the limited evaluation of existing processes, were cited by participants as reasons for the limited response. Issues of effectiveness and evaluation will be directly addressed in the workshop.

- Very little information was provided on the costs of existing processes and available methods. Such information was seen by some as particularly sensitive or confidential, while others believed that the provision of useful figures would demand considerable effort. Estimated costings of available methods are to be provided in the workshop.

What constitutes an appropriate and effective programme of public and stakeholder engagement in the Managing Radioactive Waste Safety processes?

5. The central aims of the MRWS Participatory Methods Workshop are:
to scope how the public and stakeholders can be most appropriately and effectively engaged at each phase of the policy options review stage of the MRWS process;

- to consider how any chosen mix of participatory approaches should be managed or coordinated to inform the MRWS decision process;

- to assess the extent to which public confidence and legitimacy will be secured for the MRWS decision-process and resultant outcomes through the proposed programme of public and stakeholder engagement.

6. The formal output of the workshop will be a Report providing recommendations on the way forward to the Committee on Radioactive Waste Management. An Independent Assessor (Professor Jim Skea) will assist the UCL team in ensuring that the Report faithfully represents the degree of consensus and difference between the views of participants.

7. In order to be effective it is essential that any proposed programme of public and stakeholder engagement is appropriate to, and closely integrated with, the MRWS decision process. UK Government and devolved administration Ministers outlined in July 2002 how they wish to see the Managing Radioactive Waste Safely policy formulation process conducted. The specific focus of the Participatory Methods Workshop is the initial policy options review stage of the MRWS process, i.e. up to the point where CoRWM provides its recommendations to Government on the option(s) to be used for the long-term management of the UK’s radioactive waste. The three main phases that Ministers have outlined for this policy option review process are described in Box 1, indicating the steps in the process where the public and stakeholder groups might be engaged. The intention is for the process to provide a logical, focussed and transparent means to reach an eventual choice on generic policy. It is reassuring that this proposed policy option review stage closely resembles emerging good practice in terms of conceptualising when and how the public and stakeholders might fit into technical policy processes (see for instance Burns & Ueberhorst, 1986; Stern & Fineberg 1996; RCEP, 1998).

8. An additional point to note concerning Ministerial statements is that the stated aim of the initial policy options review stage (Box 1) is to identify the generic long-term waste management policy that should be taken forward for implementation. It is not intended to consider specific siting issues, although it might raise generic implementation or siting issues relating to the choice of policy options. If new wastes sites are required once the generic policy has been decided, the criteria for selecting them will be subject to a similar programme of public and stakeholder engagement prior to implementation.

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30 For further information, workshop participants are referred to the letter from the Secretary of State for Environment, Food and Rural Affairs to MPs on 29th July 2002 explaining the next steps in the MRWS process in the light of responses to the September 2001 MRWS consultation document. (http://www.defra.gov.uk/environment/radioactivity/waste/pdf/radwaste_sofs-letter.pdf)

31 The three phases of this policy options review stage of the MRWS process are outlined in more detail in the accompanying paper, DEFRA, 2003a.
Box 1. The three phase policy options review stage of the Managing Radioactive Waste Safely process (expected to take two and a half years).

**Phase 1: Framing the review**, through engaging the public and stakeholder groups in:
- defining the inventory of wastes to be managed;
- developing an appropriate set of criteria against which all potential waste management options should be assessed;
- identifying the range of options available for the long-term management of the wastes;
- identifying as early as possible the management options which have no realistic prospect of being implemented in the reasonably foreseeable future, so as to focus assessment on those that do.

**Phase 2: Options assessment**, through engaging the public and stakeholder groups in:
- deciding how the remaining waste options should be assessed;
- arranging for the assembly of supporting information necessary for the assessment (e.g. research, reviews, “expert” events and inputs);
- carrying out an initial draft assessment;
- compiling a final options assessment report.

**Phase 3: Recommendations to Ministers**, where CoRWM will draw on the final option assessment report to produce recommendations on:
- the option(s) to be used for the long-term management of the UK’s radioactive waste;
- any views regarding implementation of the recommended policy.

9. Engaging the public and various stakeholder groups in questions about the long-term management of radioactive waste in the UK has rapidly progressed over the last 6 years. There remain significant differences in the views (and underpinning philosophies) of process experts working in the area as to what is appropriate and effective participation. What is the respective emphasis that should be placed on securing the views of the public on the one hand and stakeholders on the other, or should equal effort go into engaging the public and stakeholder groups? Is it public or stakeholder views that should carry more weight in decision-making? Given the complexity of the issues, where might it be preferable to develop “deep and narrow” and where might it be preferable to use “broad and shallow” strategies for public and stakeholder engagement? To what extent can
existing structures already in place throughout the UK provide the best way forward in terms of engagement? Such differences of view are clearly represented in the recent MRWS consultation (DEFRA, 2002). The Workshop will deliberate on these and other relevant questions in reaching its judgement on the elements of a public and stakeholder engagement process that will be offered to CoRWM to assist its work.

*Fitness-for-purpse: an overview of public and stakeholder engagement*

10. Figure 1 represents a framework to aid the design of a programme of public and stakeholder engagement for the policy options review stage of the MRWS decision process. The key principle underlying the framework is that the (mix of) method(s) of public and stakeholder engagement used at each phase of the process should be fit-for-purpose (*i.e.* be appropriate) to the decision situation (partly outlined in Box 1) and its particular context. Analysis of the decision situation and its context frames questions of who should be involved in an engagement process and how they should be involved. In an ideal world, questions of resource (time, money, expertise) would be decided last. In reality, fitness-for-purpose must be negotiated within existing constraints suggesting a methodology which (i) analyses the decision situation in its context; (ii) identifies resource constraints; (iii) prioritises which stakeholders and publics are to be represented; and (iv) designs an engagement process.

*Figure 1.* A framework for assisting the design of appropriate public and stakeholder engagement strategies in radioactive waste management (adapted from Clark *et al.* 2001).
The context of the MRWS policy options review stage

11. The wider context of the radioactive waste issue in the UK currently frames the MRWS decision process and any programme of public and stakeholder engagement within it. Key contextual characteristics include:

- **institutional decision-making procedures and statutory frameworks.** The ‘hard’ and ‘soft’ infrastructure supporting the governance of radioactive waste sets the boundaries for the decision-situation. Important here are current (and anticipated) European and international legislation and guidelines on the disposal of radioactive wastes; the existing (and anticipated) institutional arrangements for the management of radioactive waste; the future role of Nirex; Ministerial demands on the MRWS process nationally and in the devolved administrations; and institutional arrangements for CoRWM.

- **the technical complexity, uncertainty and indeterminacy** of the radioactive waste issue inherent in the long technical trajectories under consideration and lack of control raises important challenges for information needs; risk communication; and the linkages between technical/analytic and cultural/political processes.

- **the history of the issue.** As the accompanying paper highlights (DEFRA 2003b), over the last 40 years or so, the problem of what to do with radioactive waste has been confounded by scientific, technological, economic, political and institutional failures. Recognition of the seriousness of these has played a major role in stimulating programmes of public and stakeholder engagement since the late 1990s.

- **public perceptions of radioactive waste.** Evidence from statistically representative questionnaire surveys and more in-depth qualitative research with small numbers of citizens reveal a similar picture. Risk perceptions of radioactive waste are characterised by strong feelings of dread and fear; a widespread lack of public information and understanding about the issue; and mistrust of radioactive waste institutions. Research by Market Research Services for DEFRA in 2002 included a comparison of social research carried out between 1983-6 and 2002. As Kelly and Finch comment: “the most striking feature is how little seems to have changed in public awareness, understanding or attitudes – surprisingly little over nearly 20 years in such a high technology field.” (Kelly & Finch, 2002: p.85).

12. In scoping public and stakeholder engagement for long-term radioactive waste management, uncertainties and indeterminacies about future states cannot be avoided. At the very least, the decision context itself may well change over the course of policy options review stage of the Managing Radioactive Waste Safety process, which will run until 2006.
The Decision Situation

13. The decision situation represented by the policy options review stage of the MRWS process has been briefly outlined above, with further detail being provided by DEFRA (2003a). Current thinking has been shaped to an extent by consultations and advice in response to the September 2001-March 2002 consultation (DEFRA, 2002). The decision-situation is constrained by scale issues and by resource issues.

- **Scale:**
  - **Geographical Scale:** represents inherent challenges associated with the need to encompass local, regional and national scales in terms of the representativeness of participants and their inputs into the policy options review process;
  - **National variations:** demands comparison between the four nations of the UK to ensure that significant differences in awareness, knowledge and understanding, which may be a consequence of specific economic, cultural and socio-political characteristics, are captured.

- **Resources:**
  - **Time:** represents an important resource in any participatory process, not least because many participatory methods take a long time period to design, plan and carry out. The policy options review stage (Box 1) has tightly defined timings that any proposed programme of engagement has to adhere to. It has to ensure that outputs from phase one of the policy options review process are available for phase two when required by CoRWM; and that outputs from phase two are available for phase three when required.
  - **Costings:** the policy options review stage of the MRWS process will have to work under a defined budget. A preliminary budget for the public and stakeholder engagement programme is currently being agreed and will be communicated to participants at a later date. The workshop seeks to design an engagement programme against a mid-point indicative total cost figure, and then consider additional programmes based on upward and downward cost adjustments relative to this mid-point programme.

Characterising participants in the programme

14. The technological risks, uncertainties and indeterminacies associated with the long-term management of radioactive waste demand an engagement process which pays particular attention to questions of representation. To gain political and ethical legitimacy, an engagement process must be able to justify its selection of participants through their capacity to speak on behalf of others; and their contributions must be able to withstand a test of public accountability in some sense. As recent authors have pointed out (O’Neill, 2001; Bohman, 2000), in societies characterised by cultural plurality and social inequalities, it is important to be clear about the epistemic (knowledge) and ethical (value) claims which allow participation.
15. In terms of epistemic claims, it is possible to distinguish between three different kinds of knowledge of relevance in the selection of participants:

- **specialist knowledge** - specialist expertise in scientific, technical, socio-economic, ethical, social/cultural areas, etc.;
- **procedural knowledge** - knowledge of how institutions work; knowing ‘the rules of the game’;
- **local/lay knowledge** - experiential or common sense knowledge, gained especially from experience of a particular locality or situation.

When put into relationship with questions of what or whom they ‘represent’, and the context or scale at which they usually act, it is possible to identify 3 (ideal) types of participant in the MRWS process – professional stakeholders; local stakeholder groups; and the public or citizens (Clark et al. 2001).

- **Professional stakeholders** encompass public and private sector organisations, and professional voluntary groups. Professional stakeholders include Government departments and agencies, local authorities, business, industry, academia/research, and NGOs. Professional stakeholders tend to possess specialist (expert) knowledge and procedural knowledge about radioactive waste management. They often lack specific local or experiential knowledge relevant to the problem. They work at (or are well linked into) the national level, as well as local and regional levels. When engaged in participatory processes, professional stakeholders will normally represent their organisational perspectives and strategic/tactical interests.

- **Local stakeholder groups** are non-professional, organised groups that operate within specific localities. It is possible to distinguish between three types of local stakeholder group: (i) people who come together around a common interest (such as autonomous local environmental groups, cyclists, football clubs); (ii) people who have an attachment to a particular place (such as resident associations, amenity groups, parish councils); and (iii) people who are united by feelings of a common identity (such as Women’s Institutes, church groups; youth clubs). Local stakeholders may lack specialist (expert) and procedural knowledge(s), but posses rich understandings of local or experiential knowledge through their active engagement with others in their collective interest. Individual members of local stakeholder groups are usually enrolled in participatory processes to represent the views of their group and, often, to act as surrogates for ‘the general public’.

- **The public**\(^{32}\) or citizens is by far the largest category of potential participants, that covers individuals who represent no-one else other than themselves in an institutional sense but who are representative of the diverse elements which constitute civil society as a whole. No prior assumptions can be made about their

\(^{32}\) Although we generally refer to publics and citizens as the ‘public’ throughout this paper it is important to acknowledge that in reality ‘the general public’ is highly heterogeneous and individual perspectives and understandings vary widely.
specialist, procedural or local knowledges, although qualitative approaches to public engagement often recruit individuals into focus groups characterised by one or more shared demographic features (e.g. mothers with children under five; Muslim men in financial services, etc). More commonly, quantitative surveys will test ‘public opinion’ through statistically representative samples of citizens who are then aggregated by socio-demographic characteristics.

16. In sum then, stakeholders represent different knowledges and interests, we differentiate between professional and local types of stakeholder that represent different sorts of knowledge and interest. A member of the ‘public’ – the person in the street – represents no one other than his/herself, but is representative of the diverse elements that constitute civil society. While we propose three types of participant it is important to acknowledge that in reality this situation is complex. One person could be identified as all three types in a different time or place. For example a local authority officer (professional stakeholder) who is a member of a local allotment society (local stakeholder) might also be recruited in a health survey (as a member of the public) on the basis that she is a young mother. Given the above classification it might be important to highlight another type of participant that tends to be included in participatory processes not because they have a stake in the issue but because they offer specific knowledge, information or expertise on a certain subject. Such participants might be termed ‘specialists’ or expert witnesses, and tend to adopt a more independent role in specific participatory processes.

Methods of public and stakeholder engagement in radioactive waste management

17. As suggested in para. 3, a considerable literature on participatory approaches in environmental decision-making now exists. Some consensus is emerging as to the theoretical bases for participation and the meanings of key terms used by academics and practitioners. In the broadest sense, participation varies along a continuum from the provision of information by a responsible authority through to delegation of decision-making power by a responsible authority to the public and stakeholders.

18. A number of experts are working with a 3-4 stage model of participatory processes based on different communication strategies. For example, Wilcox (1994), Petts & Leach (2000) and IEMA (2000) identify 4 levels of participation:

   i. **Education and information provision** – communicative materials produced and disseminated through different media with no specific mechanism for response that: inform people about what is going to happen, is happening, or has happened (Warburton, 1998); and create awareness of activities or issues (IEAM, 2000);

   ii. **Information provision and feedback** – processes by which the public and stakeholders are invited by the decision maker to comment on information, pre-formed proposals and related questions.
iii. Involvement and consultation – communicative action operating over different temporal and spatial scales, which tends to occur in one-off or discrete situations. Processes may involve face-to-face interaction within and between professional stakeholders, local stakeholder groups, and citizens to identify issues of concern.

iv. Extended involvement – deliberative processes that occur over an extended period where the public and stakeholders may play a more active role in policy formulation and influencing decisions.

19. These levels of communicative activity map onto different styles of decision-making (DETR, 1998):

- **Informing**: about decisions already made;
- **Listening and learning**: to input into a decision to be made;
- **Exchanging**: exchanging ideas and views to make the decision together.

As the body of experience with participatory processes has grown over the last decade, a significant number of academics, practitioners and decision-makers have turned towards more interactive processes of exchange. These **deliberative processes** may assist in the resolution of complex issues where knowledge claims are contestable and normative values diverge strongly between different social groups. **Deliberation** is a decision-making strategy based on weighing reasons for and against a course of action. A succinct definition for deliberation is offered by Bohman (2000): ‘deliberation is a joint social activity, embedded in the social action of dialogue – the give and take of reasons… (with the goal being) to solve a problem together with others who have distinct perspectives and interests.’

20. A fundamental purpose of participatory activity (from the perspective of the sponsor) and the participants if they are committed to co-operative social action, is to **build consensus** – to achieve ‘agreement by consensus’, with the end result of such agreements being commitment both to the agreement and to its purpose (Environment Council; cited in Petts & Leach, 2000). However, this is not to assume that divergence between the knowledge claims and value positions of participants in a process should be ignored or downplayed. If a process has been conducted fairly and the reasoning used to arrive at a decision is recognized as being valid in the public sphere, then dissenters should be expected to continue to co-operate (Bohman, 2000; Hunt and Wynne, 2000; Stern & Fineberg, 1996).

21. The range of public and stakeholder engagement methods that might be applicable to radioactive waste management are reviewed in Appendix 1, which briefly describes each method, the scale(s) at which it usually operates, and (if appropriate) gives example processes where the method has been applied. It is important to note that this is a highly

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33 The review also drawn upon methods, developed in other (analogous) science-intensive policy contexts in the UK, that might not have been used in the area of radioactive waste management specifically.
simplified picture that only describes the major structural differences between methods that are already established. There exists a massive variety of structural designs both within and between the methods described in Appendix 1 (for instance some would list over 20 different types of community advisory committee alone). In reality no matter what method is used no two participatory processes are likely to be the same when applied in specific contexts, given wide differences in the process and performance (including factors such as who participates, the range of contextual factors in operation, information provision throughout the process, the competence of those designing and facilitating the process).

It is important to note that established methods described in Appendix 1 are often tweaked, given the need to be ‘fit for purpose’. For instance consultation methods, such as consultation workshops or focus groups, take on a very different format when used in the ‘front-end’ framing stages of policy processes as opposed to when considering proposals, options, or evaluations already formulated by the decision maker. To complicate matters further, methods are often fused with others to make hybrid types, or a mix of methods are used in conjunction to fit the purpose of specific contexts or different stages of a decision-making process. In such situations the quality of the planning, management, and coordination of a range of methods can be just as important as the performance of the individual methods employed. It is an increasing trend for large multifaceted participatory processes to be overseen by a steering group of process experts and other practitioners representing a range of interests, in order to ensure quality in the design, conduct and evaluation of the programme of participation. For example, in the area of radioactive waste management, steering committees have been used to oversee the National Radioactive Waste Consensus Conference, and the ISOLUS and PASCALEA consultation processes.

22. In order to make the vast array of methods described in Appendix 1 more manageable for the workshop process, and to highlight the key distinctions between them, we have developed the proposed typology (or classification), shown in Table 1. Methods are grouped into seven engagement strategies based on three key distinguishing features that have been shown to be important to the MRWS decision situation and its context.

- **Level of engagement:** where we draw on the useful categorisations of Wilcox (1994) and DETR (1998) described above to define three levels of engagement that distinguish between engagement methods described in Appendix 1:
  - Level 1: Education and information provision (informing);

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34 Other important generic characteristics that underlie the typology but are not central to its organisation include: the nature of interaction – i.e. whether engagement is at distance (remote) or in-person (face-to-face); the type of deliberation: i.e. whether engagement is with individuals or groups of individuals; duration: i.e. whether engagement is a one-off activity or occurs over an extended period; decision making link: i.e. whether the link to decision making is indirect through the researcher/facilitator reporting findings (various forms of social intelligence), or whether participants provide a direct link to experts or decision makers; information provision and communication: a key distinction being between one-way communication and two-way (‘deliberative risk communication’), although the degree and type of information provision can sometimes vary as much within method as between methods; the degree of interaction or contestation between knowledges or worldviews; the degree to which processes aim for consensus or divergence (explore difference); the degree to which processes are analytic/evaluative, allowing participants to contest existing knowledge, contribute their own knowledges, and play an ‘active’ role in evaluation and assessment.

35 For the purpose of workshop we define ‘engagement’ as levels 1-3, encompassing information provision; and ‘participation’ as levels 2-3, where participants have an input into the decision process.
Level 2: Consultation (listening and learning), where participants consider proposals, options, or evaluations already developed by a decision-maker;

Level 3: Deliberation / dialogue (exchanging views), where participants actively develop and contribute to proposals, options, or evaluations during periods of extended involvement.

• **Representation and knowledges**: where methods differ in terms of who they engage (*i.e.* professional stakeholders, local stakeholders or members of the public), and as a result who or what participants actually represent and the knowledges they bring to the process.

• **Scale**: where methods differ in terms of the geographic scale or the level of policy at which they operate (*i.e.* national, regional, local).

Table 1: A proposed typology of methods for public and stakeholder engagement in radioactive waste management, outlining seven possible engagement strategies 36.

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<th>Engagement Strategy</th>
<th>Description</th>
<th>Methods</th>
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| 1. Education & Information Provision | At distance communication of information and educational material to individual members of the public and stakeholders with no feedback mechanism. Main purpose is to raise awareness and increase understanding. Equally applicable to local through to national scale levels. On its own informing is a form of engagement but not participation. Information provision often provides essential support to other forms of consultation and participation however. | • Leaflets, brochures, information pack, video, newsletters  
• Exhibitions/displays (non-staffed)  
• Advertising  
• Media (TV, Radio, Newspapers)  
• Internet (information provision) |
| 2. Consultation (predominantly open to all) | Various approaches to providing information and receiving feedback that are potentially open to all types of participant (*i.e.* professional and local stakeholders, and the public). Engagement can either be at distance or face-face (with individuals or groups) and tends to be in the form of one-off events or initiatives. Face-to-face approaches are limited to the local scale (but can be reach national coverage if repeated), where as at distance approaches can cover all scales from national through to local. | • Site visits  
• Exhibitions/displays (staffed)  
• Open House  
• Public Meeting  
• Consultation Workshops  
• Consultation Document  
• Internet (information/feedback)  
• Free telephone line (automated or staffed)  
• Teleconferencing  
• Public inquiry |

36 A number of additional strategies / categories were identified in producing this typology. The intention, however, was to keep the typology as simple as possible for use within the workshop process, while ensuring that strategies are inclusive of the full range of practice that currently exists within the UK and the key distinctions within it. One omission that we were particularly conscious of, that has since been highlighted in feedback from some workshop participants, is the strategy ‘Consultation (targeting stakeholders)’. Examples of methods that fall into this strategy include: Consultation Workshops that include invited stakeholders only; or Questionnaire, Telephone or Interview Surveys with targeted stakeholders. This strategy is situated between strategies 2 and 3 within the typology.
| 3. Consultation (targeting the public / citizens) | Citizens are targeted through statistically representative samples to take part in quantitative surveys to test ‘public opinion’, or are recruited to participate in qualitative approaches based on shared demographic features. Quantitative surveys can be at distance allowing wide national coverage, but lack in-depth reasoned responses. In-depth qualitative approaches allow face-face individual or group deliberation and thus tend to be locally situated (but can reach national coverage through multiple processes throughout the country). These methods can be used in front-end framing to benchmark public opinion and underlying values, issues and concerns; or employed to gauge responses to developments or proposals as the decision process evolves. The researcher provides the link to the decision maker in the form of a report. | • Questionnaire Survey (postal, web)  
• Telephone Survey  
• Interview Survey  
• Focus Groups  
• Discussion Groups  
• Deliberative Opinion Poll |
| 4. Deliberation / Dialogue (Groups of citizens & specialists) | Innovative deliberative approaches that engage citizens, often recruited to be representative of the wider public, in panels over extended periods of responsive information provision, considering issues, and providing recommendations to decision makers. Citizens interact with specialists (or experts) at various points throughout the process – available methods differ in the degree and nature of this interaction and thus the extent of mutual learning and capacity building between panellists and specialists. Some methods have been developed for national level policy, while others are only established at local geographic scales (but have the potential to be scaled up). | • Research Panels  
• Interactive Panels  
• Citizens’ Juries (Citizens’ Panels; Planning Cells, etc.)  
• Consensus Conference  
• Deliberative Mapping |
| 5. Deliberation / Dialogue (Groups of predominantly local stakeholders) | Methods that seek to engage (predominantly) local stakeholders, selected to represent the interests of others or as surrogates of the ‘general public’, over extended periods in group deliberation and dialogue. Participants identify local issues and concerns, set priorities and agree on recommendations for action. Some approaches involve stakeholders in framing and actively engaging in technical-analytic aspects of decision processes (e.g. Joint Fact Finding; Participatory Research), while others involve local stakeholders in the evaluation and prioritisation of policy options. In most cases participants form interactive relationships with decision makers and specialists. | • Community Advisory Committees (CACs)  
• Planning for Real  
• Visioning  
• Workshops  
• Stakeholder Dialogue  
• Joint Fact Finding (and other forms of collaborative analysis)  
• Stakeholder Decision Analysis  
• Participatory Research / Participatory Appraisal  
• Internet Dialogue |
| 6. Deliberation / Dialogue (Groups of predominantly professional stakeholders) | Approaches that seek to engage (predominantly) professional stakeholders, selected to represent the interests of others, over extended periods in group deliberation and dialogue. The most common approaches for this strategy are Stakeholder Workshops and Stakeholder Dialogue. This strategy also includes approaches that involve stakeholders in framing and actively engaging in technical-analytic aspects of decision processes, and/or the evaluation and prioritisation of policy options. In the simplest cases, participants form direct relationships with decision makers and specialists. | • Workshops  
• Stakeholder Dialogue  
• Joint Fact Finding (and other forms of collaborative analysis)  
• Stakeholder Decision Analysis  
• Multi-criteria mapping  
• Internet dialogue  
• Delphi process |
prioritisation of policy options. Participants predominantly draw on their own information and specialist knowledges. In most approaches participants form interactive relationships with decision makers and specialists. This strategy might also include techniques that seek to identify areas of consensus and difference on issues or proposals between groups of professional stakeholders at distance.

7. Existing engagement processes initiated & carried out by others

Existing engagement structures already in place at the local authority, regional and national levels could be used to engage the public and/or stakeholders in radioactive waste issues. The nature of processes would depend on existing structures, meaning limited control over who participates and how. It might be necessary to provide funds and resources to assist those undertaking engagement processes.

- Local Agenda 21 processes
- Regional sustainable development frameworks
- Community planning networks
- Scottish Civic Forum

Descriptions of each proposed engagement strategy for the Managing Radioactive Waste Safely Process, and the range of methods that they encompass, are provided in Table 1. It is likely that a mix of these seven engagement strategies will be employed during each phase of the MRWS policy options review stage. Higher level strategies of deliberation and dialogue (strategies 4, 5, and 6) often depend on the support of other strategies described in Table 1. Education and information provision (strategy 1) is likely to be used in support of all other strategies, and will vary in form depending on nature of the specific methods it supports.

UK experience of public and stakeholder engagement processes in radioactive waste management

23. Prior to the late 1990s wider participation in radioactive waste management issues did not occur in the UK, and engagement practice was limited to traditional consultation documents and public inquiries. As highlighted earlier in this paper, a considerable body of practice and experience in engaging the public and stakeholders in issues over the long-term management of radioactive waste has built up rapidly in the UK over the past half a decade. This has included the introduction of innovative consultation techniques, and various innovative deliberative and dialogue based approaches. It is essential that this learning and experience is drawn upon in designing an effective public and stakeholder engagement programme for the MRWS process. In order to aid this processes, Appendix 2 provides a framework within which to map the range of recent UK experience. We have made a start in reviewing current experiences by outlining the objectives and describing process design aspects of a number of existing initiatives. We are not in a position however to make evaluative judgements as to the effectiveness or otherwise of particular cases.

24. Table 1 and Appendix 1 have attempted to map the range of engagement methods currently used in the UK through drawing on experiences in other science-intensive policy contexts, in addition to the radioactive waste area specifically. It is testament to
the intensive development of participatory practice in the area of radioactive waste management over the past few years that the range of experiences outlined in Appendix 2 encompass all possible engagement strategies defined in Table 1. The ISOLUS project (CSEC, 2001) is probably the most interesting in this regard as it employs multiple engagement methods in a single process - through stakeholder workshops, a citizens panel, focus groups and a website consultation (encompassing engagement strategies 1, 2, 3, 4, 5/6) - and has received very favourable reviews as a result. A second phase of the ISOLUS consultation is now being planned and is due to run from September-December 2003. The intention of the project's Consultation Steering Group is for the next phase to deliver some form of assessment of outline proposals for dealing with submarine radioactive wastes, which can then inform the MoD's shortlisting process. It is anticipated that this phase will combine open access and deliberative methods at national and, possibly, local levels (Barker, 2003). The recent PASCALEA project has drawn on the ISOLUS experience to similarly employ a mix of methods in a single engagement process – including stakeholder workshops, public meetings, focus groups, a website providing information and consultation mechanisms, and a postal consultation (engagement strategies 1, 2, 3, 5/6) - in a process that contributes to the Atomic Weapons Establishment’s decision making at the organisational level, and around specific sites (NNC/CSEC, 2002). The only other UK radioactive waste engagement process other than ISOLUS that has facilitated citizen deliberation at the national policy level is the UKCEED National Radioactive Waste Consensus Conference (NRWCC) held in 1999, and the recently reconvened panel (UKCEED, 1999; 2002). This highlights the difficulty of, and limited UK experience in, engaging citizens at the national policy level. One other form of citizen deliberation taking place over an extended period, this time contributing to organisational decision-making, is the citizen’s panel on partitioning and transmutation commissioned by Nirex (Hunt & Thompson, 2001). This citizen’s panel and the NRWCC provide powerful evidence to suggest that citizens are highly capable of engaging with complex technical issues such as radioactive waste, and should not be excluded on this basis.

25. The involvement of (predominantly) professional stakeholders in dialogue over an extended period (engagement strategy 6, Table 1) is probably best illustrated by the BNFL National Stakeholder Dialogue (Environment Council, 2000, 2002, 2003) which is a large multifaceted process, encompassing a range of participatory techniques derived from consensus building approaches (including joint fact-finding and strategic action planning), that works at the organisational decision making level. Nirex has also developed professional stakeholder engagement as input into organisational decision making through a range of stakeholder workshops on monitoring and retrievability (see UKCEED, 2000; 2001; 2002b), partitioning and transmutation (Hassrad and Naji, 2001), long-term waste management options (Forth Road Limited, 2002a), reference case inventory and radiological protection criteria, (Forth Road Limited, 2002b), meeting with Trade Union representatives (Forth Road Limited, 2002c), evaluation measures (Forth Road Limited, 2002d), strategic environmental assessment (Forth Road Limited, 2002e), the preview process, long term records (Nirex, 2002a) and social science research (Manor Resources, 2002). For the most part these professional stakeholder processes relating to Nirex more often take the form of consultation (i.e. consultation workshops, engagement strategy 2) rather than extended forms of involvement. Processes that involve
(predominantly) local stakeholder groups in dialogue over extended periods appear less
developed, with the Cricklewood Dialogue (Environment Council, 2001) and the Magnox De-commissioning Dialogue, being the main examples. Local Liaison Committees (LLC’s) at UK nuclear sites might have the potential to fulfill this role but are currently regarded as inadequate in their present form, mainly limited to engagement strategy 1. Work is currently ongoing to update and reform LLC’s which may enable the engagement of local stakeholders in forms of consultation and deliberation.

26. By far the largest number of initiatives undertaken under any one UK radioactive waste management engagement strategy to date are consultations that specifically target citizens or the public (engagement strategy 3, Table 1). Existing processes variously use focus groups (Kelly & Finch, 2002, Scottish Council Foundation, 2002; Future Foundation, 2000, 2002b; Hunt & Simmons, 2001; Lennie & Davies, 2001; Simpson Carpenter Ltd., 2000), face-to-face interviews (Future Foundation, 2000, 2002a; Scottish Council Foundation, 2002) and telephone interviews (Scottish Opinion Ltd., 2002; Lennie & Davies, 2001; Simpson Carpenter Ltd., 2000), to understand wider ‘public opinion’ and more in-depth perspectives about underlying values, issues and concerns held by the UK public in relation to radioactive waste management. This builds on work conducted in the 1980s (Prescott-Clarke & Hedges, 1983; 1987) and is supplemented by recent public opinion surveys commissioned by DG Energy and Transport of the European Commission (INRA, 2002), conducted by MORI for the Leverhulme Trust Programme on Understanding Risk (Poortinga & Pidgeon, 2003), and a survey of public environmental attitudes in Scotland commissioned by The Scottish Executive (Hinds et al. 2002). This large body of work represents a wealth of ‘social intelligence’ on how the public perceive, understand and react to radioactive waste issues. Given that national UK policy on the management of long-term radioactive waste is currently at the front-end or framing stage, such work is invaluable in benchmarking public opinion, monitoring changes in opinion, helping define and frame the problem, and developing a better understanding of what public acceptability and legitimacy means in relation to the MRWS process. Importantly, these studies, undertaken at different times in various contexts, are providing very similar insights into public perceptions, understandings, reactions and concerns, some of which have already been highlighted in para. 11 above.

27. In terms of consultations that are open to all types of participant (engagement strategy 2, Table 1), traditional consultations where a document is published and made available to stakeholders and the wider public are the most prevalent in the area of radioactive waste management (see footnote 9 in Appendix 2 for a range of recent examples). The Magnox consultation by the Environment Agency is an advanced example of such processes, in that it supported traditional consultation methods with public meetings, surgeries, and internet provision. So to is the initial September 2001 to March 2002 consultation of the Managing Radioactive Waste Safely process. In addition to the initiatives already mentioned, the initial MRWS consultation was supported by a public seminar (QMW Public Policy Seminars, 2002), and various public meetings (conducted by various local authorities and others). An alternative consultation strategy used in the first and second phase consultations with environmental groups on Proposals for Liabilities Management Authority has been to target individual stakeholders and meet with them face-to-face (Barker, 2002a; 2002b). Increasing recognition of the role and
potential importance of the internet as a consultation mechanism is being recognised in
the area of radioactive waste management with important experiences being provided
through the ISOLUS project (CSEC, 2001), the PASCALEA project (NNC/CSEC, 2002),
the RADIALe project currently conducted by CSEC for DEFRA/HSE/EA, the Young
Scot website run by the Napier University Teledemocracy Network for The Scottish
Executive, and experimental work in the form of the schools website as part of the
RISCOM II project (O’Donoghue & Szerszynski, 2001) and work commissioned by
Nirex (University of Leeds, 2000). It is clear that information provision and education
(engagement strategy 1, Table 1) plays a fundamental role, and varies considerably in the
form it takes, in relation to almost all of the processes outlined in Appendix 2.

28. In comparing Appendix 2 with Table 1, it appears that methods seeking to involve
the public and/or stakeholders in structured deliberation to evaluate policy options are not
well developed in the area of radioactive waste management at present. One exception is
the Spent Fuel Management Options Working Group of the BNFL National Stakeholder
Dialogue (Environment Council, 2002), where professional stakeholders have been
involved in a deliberative multi-criteria approach based on the MADA technique adapted
for use in the dialogue process. Another example where steps are being taken to involve
stakeholders in the discussion of option evaluations is provided by the Dounreay BPEO
stakeholder panels. This situation stands to change, however, as the second phase of the
ISOLUS consultation is likely to develop processes that engage participants in structured
deliberation using a multi-criteria assessment of outline proposals for dealing with
submarine radioactive wastes (Barker, 2003). One of the visioning processes developed
in the RISCOM II research project has also used a form of stakeholder decision analysis
(Hunt, 2001; Hunt & Thompson, 2002).

International Experience

29. A thorough review of international experiences of public and stakeholder
engagement in radioactive waste management is beyond the scope of this paper, and
would not be feasible in any case given space constraints. Appendix 3 provides a very
broad brush overview of 15 countries, giving a simple indication of the types of public
and stakeholder engagement that have been undertaken to date and how practice within
each county might relate to the seven levels of engagement outlined in Table 1. We are
aware that the information given is incomplete, and in part quite dated. For a more
comprehensive treatment of international experience workshop participants are referred
to two recent reviews of international experiences by Hunt et al. (2001) and NEA (2003),
from which Appendix 3 is drawn.

Issues for consideration

30. This paper has attempted to offer information and concepts that will provide the
foundation for an effective workshop process. As facilitators of this process it is not our
position to begin suggesting definitive answers or solutions to the question of what an
effective programme of public and stakeholder engagement should look like at each
phase of the MRWS policy options review stage. This is the specific aim of the Workshop. In order to ensure that this question is comprehensively answered it is important that the workshop addresses the key issues or themes relating to public and stakeholder engagement in the MRWS process. Throughout this paper we have identified the following key issues and themes.

- **Scale issues** both in terms of the representation and input of participants over a large geographical scale, and the national variations in social, political and cultural contexts in each of the devolved administrations.

- **Decision making link**: How will the outputs and outcomes of the public and stakeholder engagement programme be integrated and used in decision-making at each phase of the MRWS policy options review stage?

- Providing *evidence and feedback* to the public and stakeholders of what decisions have been made and how their input has been considered when making decisions, in order to ensure wider public legitimacy, credibility and confidence in the MRWS decision process and outcomes.

- **Relationships between stakeholder and citizen processes**: should citizen and stakeholder engagement processes occur in separate strands or be integrated? Whose views should be given more weight, or should citizen and stakeholder views be equally represented, in decision making?

- **Integrating the participatory and technical processes**: how will the participatory (deliberative) process and technical (analytic) process feed into and inform each other in a responsive, iterative and analytic-deliberative manner?

- The *technical complexity* of the radioactive waste issue, and what this means for information provision and risk communication in terms of: what are the information needs of public and stakeholder engagement processes and the form that information provision should take (given complexity, uncertainties, indeterminacies)? How should information be communicated and presented to participants with different knowledges and understandings?

- How will the various components of the public and stakeholder engagement programme be *coordinated and managed*, and who will undertake this role (CoRWM, Defra, a main contractor, an inclusive process steering group made up of process experts, or another party)?

Further issues and concerns relating to the engagement programme of the MRWS process have been identified as important in participant feedback to an earlier draft of this paper.

- What are the underlying principles that should guide the design and implementation of a programme of public and stakeholder engagement for the MRWS policy options review stage for it to be effective?
• It is important to be clear about the goals and objectives of the MRWS policy options review stage and engagement programme, whilst acknowledging that the various participants within the process will have different goals. To what extent will the MRWS process be sufficiently inclusive of this plurality of different goals/purposes?

• What structures, processes and behaviours are needed to ensure and maintain transparency and accountability throughout the MRWS process?

• Framing is fundamental to the success of the MRWS process. How narrow/bounded or flexible/open must the framing of the process be for it to be successful? What are the social conditions for the public acceptability of any waste management solution? Is it important for engagement processes to consider issues of equity, fairness and future risk prevention? What are the outcomes from recent initiatives to understand public concerns about radioactive waste and how should they be fed into the MRWS policy options review stage? Will decisions made in the MRWS process be accountable in showing that wider public framings have been considered and acted upon?

• Does the timing of the various phases of the MRWS policy options review stage allow enough flexibility and iteration for the engagement process to be successful? Will the process be responsive to changing circumstances and needs?

• Should issues associated with policy implementation and siting be considered in the design of a public and stakeholder engagement process for the MRWS policy options review stage? If so what mechanisms should be used to involve local communities who might subsequently become involved siting issues, to ensure that the process is seen as fair and legitimate by these communities?

• What level of effort/resource should be channelled into managing and coordinating the engagement programme – including planning and designing processes, maintaining communications, travelling to meetings and subsistence, etc. – for the engagement programme to be effective.

• Will the engagement programme take account of issues of stakeholder fatigue, and existing layers of participation and engagement that are already in place?

• How can experiences from engagement processes that have occurred in other analogous national level science-intensive policy contexts (such as the national debate on GM) inform the design of an effective engagement programme within the area of radioactive waste management?

• What do we currently know about the ability of public and stakeholder engagement processes to change the perceived credibility and legitimacy of government policies or institutions?
### Appendix 1: Methods for public and stakeholder engagement in radioactive waste management

<table>
<thead>
<tr>
<th>Form of engagement</th>
<th>Scale</th>
<th>Description</th>
<th>Example Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Leaflets, brochures, information pack, video, newsletters</td>
<td>National-Local</td>
<td>Various mediums through which information can be communicated in written or visual formats to a given target audience.</td>
<td>e.g. Nirex (2000) and Nirex information leaflets 2002a,b; 2003.</td>
</tr>
<tr>
<td>1 Exhibitions /displays (Non-staffed)</td>
<td>Local</td>
<td>Non-staffed exhibitions or displays set up in public areas or at conferences to convey information about specific aspects of the MRWS process.</td>
<td></td>
</tr>
<tr>
<td>1 Advertising</td>
<td>National-Local</td>
<td>Advertisement placed in local or national media to convey information and raise awareness about specific aspects of the MRWS process.</td>
<td></td>
</tr>
<tr>
<td>1 Media (TV, Radio, Newspapers, other printed media)</td>
<td>National-Local</td>
<td>The publishing of an article in a local or national newspaper (or other publications such magazines), or the production of a TV or radio programme, to convey information and raise awareness about specific aspects of the MRWS process.</td>
<td></td>
</tr>
<tr>
<td>1 Internet (information provision)</td>
<td>National-Local</td>
<td>Use of website to provide information only, either in written or visual form, to those who have access to the Internet.</td>
<td>In relation to major processes in Appendix 2; and websites of all relevant government departments / agencies, industry organisations, NGOs.</td>
</tr>
<tr>
<td>2 Site visits</td>
<td>Local</td>
<td>Organised meetings of individuals or groups who have the opportunity to look around a site and see activities and issues in real life.</td>
<td></td>
</tr>
<tr>
<td>2 Exhibitions/displays (staffed) (National coverage if repeated)</td>
<td>Local-</td>
<td>Exhibitions or displays set up in public areas or at conferences to convey information about specific aspects of the MRWS process. Staffed by specialists who can provide information, answer questions and receive comments.</td>
<td></td>
</tr>
<tr>
<td>2 Open house</td>
<td>Local-</td>
<td>Spaces where the public can view displayed information on relevant issues and ask questions of representatives from the relevant authority through out the day. Those participating are encouraged to provide written comments and take further information way with them.</td>
<td></td>
</tr>
</tbody>
</table>

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37 The engagement strategies (as described in Table 1) to which each method relates to are indicated in the far left column.
<table>
<thead>
<tr>
<th>Number</th>
<th>Category</th>
<th>Location</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><strong>Public meetings</strong></td>
<td>Local-</td>
<td>Local meetings which are open to any member of the public. Usually take on a question and answer format where the relevant authority or decision-making body provides information and members of the public have the opportunity to ask questions.</td>
<td>Local authority meetings to discuss MRWS consultation document (see DEFRA 2002).</td>
</tr>
<tr>
<td>2</td>
<td><strong>Surgeries</strong></td>
<td>Local-</td>
<td>Face-to-face conversations between specialists (or representatives from decision making body) and stakeholders or members of the public. Have been used in conjunction with public meetings allowing people to discuss their issues and concerns in advance of, and after, the meetings in more detail and in a less confrontational setting.</td>
<td>Environment Agency Magnox consultations (see Appendix 2).</td>
</tr>
<tr>
<td>2</td>
<td><strong>Free telephone lines</strong></td>
<td>National-Local</td>
<td>A free telephone number for people to call in order to receive information, ask questions or provide comments/feedback about specific aspects of the MRWS process.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><strong>Teleconferencing</strong></td>
<td>National-Local</td>
<td>Individuals that are geographically separated use digital cameras and the Internet to see and talk to each other (as if face-to-face) ask questions and deliberate on issues.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><strong>Consultation Document</strong></td>
<td>National-Local</td>
<td>The traditional mode of consultation where a consultation document is published and sent out (by post, electronic mail) or made available to stakeholders and members of the public (designated location, website). Comment and feedback is invited, usually in a written form.</td>
<td>See Appendix 2 for a range of examples in the area of radioactive waste management.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Consultation Workshop</strong></td>
<td>Local-National</td>
<td>A means of involving up to 50 targeted stakeholders or citizens to map their issues and concerns, help define a problem, and receive feedback on information or proposals. Usually takes the form of a one-off (one day) workshop that involves a presentation by the organiser and moves between plenary sessions and small facilitated groups. A report is produced to represent the content of discussions within the workshop.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><strong>Internet</strong></td>
<td>National-Local</td>
<td>Website used to provide information either in written or visual form, and as a means for providing written feedback, for those who have assess to the Internet.</td>
<td>RISCOM II schools website; RADIALe project; ISOLUS project (CSEC, 2001); PASCALEA (NNC/CSEC, 2002); Young Scot website; University of Leeds (2001); Finney (1999).</td>
</tr>
<tr>
<td>2</td>
<td><strong>Public inquiries / hearings</strong></td>
<td>Local-National</td>
<td>Formalised, judicial style proceedings where projects and issues are subject to rigorous scrutiny from interested parties.</td>
<td>Nirex RCF inquiry (see DEFRA, 2003b)</td>
</tr>
<tr>
<td>Step</td>
<td>Method</td>
<td>Scope</td>
<td>Description</td>
<td>References</td>
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<tr>
<td>3</td>
<td>Questionnaire survey</td>
<td>National-Local</td>
<td>Used to gauge public opinion about a specific issue. Administered remotely by post, web or e-mail to a random or quota selected sample designed to be representative of the wider public. Limited to closed questions or predefined categories. May involve very limited information provision.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Telephone survey</td>
<td>National-Local</td>
<td>Structured interviews conducted by researchers over the phone used to gauge public opinion about a specific issue, usually with a sample designed to be representative of the wider public. Open as well as closed questions allow interviewees to explore underlying values and reasonings behind responses. May involve information provision.</td>
<td>Scottish Opinion Ltd.; (2002); Simpson Carpenter Ltd (2000); Lennie &amp; Davies, 2001 (see Appendix 2).</td>
</tr>
<tr>
<td>3</td>
<td>Interview survey</td>
<td>National-Local</td>
<td>Face to face structured or semi-structured interviews, usually undertaken with a sample designed to be representative of the wider public, that allow values, attitudes, opinions and beliefs of interviewees to be explored more deeply. Open questions allow for in-depth responses that explore underlying values and reasonings. May involve information provision.</td>
<td>Future Foundation (2000; 2002a); Simpson Carpenter Ltd (2000); Scottish Council Foundation (2002) (see Appendix 2)</td>
</tr>
<tr>
<td>3</td>
<td>Focus Groups (or Discussion Groups)</td>
<td>Local-(National coverage if repeated)</td>
<td>6-8 people, usually chosen to represent certain demographic characteristics, come together in a group (usually one off) mediated by a facilitator / researcher to discuss attitudes, opinions, needs and concerns in relation to an issue or proposal. Usually involve information provision or the introduction materials that serve as of discussion prompts. Can also be used to encourage deliberation and reflection with minimal prior framings or prompts. Groups are usually taped transcribed, analysed, leading to the production of a report by the facilitator.</td>
<td>Kelly &amp; Finch (2002); Scottish Council Foundation (2002); Future Foundation (2000; 2002b); Hunt &amp; Simmons (2001); Simpson Carpenter Ltd (2000); ISOLUS (CSEC, 2001) (see Appendix 2).</td>
</tr>
<tr>
<td>3</td>
<td>Deliberative opinion poll</td>
<td>National-Local</td>
<td>A type of opinion poll that seeks the views of informed citizens. 250-600 participants are surveyed for opinions and demographics. Smaller groups recruited randomly (representative of larger group in terms of attitude and demographics) are provided with information and under go 2-4 days of group deliberation and expert questioning in plenary sessions. Views are measured before and after the process, and changes in opinion are represented in a report to the commissioning body.</td>
<td>Mainly used in research applications until now.</td>
</tr>
<tr>
<td>3/4</td>
<td>Research Panels</td>
<td>Local – National</td>
<td>Large sample of 500-5000 members of the public, which can be used flexibly to track changes in opinion over time using a number of techniques. The panel, recruited by post or telephone, is representative of the wider population and replaced periodically to avoid stagnation. The same panel can be subject to a range of participatory methods including: questionnaire surveys, focus groups, workshops, citizen’s juries, or consensus conferences.</td>
<td>The Cabinet Office’s Peoples Panel, a national panel designed to represent a cross section of the UK population.</td>
</tr>
<tr>
<td></td>
<td><strong>Interactive panels</strong></td>
<td>Local-Regional</td>
<td>Standing panels of 12 citizens that meet 3–4 times a year to deliberate on issues set by a commissioning body. Panel members are recruited by quota sampling to cover a range of demographic characteristics, with regular turnover to prevent stagnation. Participants receive information prior to panels, discussion is tape recorded and transcribed, and participants record views on a decision sheet. Panels are facilitated by an independent researcher, who prepares a report for the commissioning body.</td>
<td>Health panels provide the main example in the UK. Somerset Health Authority has been undertaking IPs since 1993, and Croydon HA since 1997.</td>
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<tr>
<td></td>
<td><strong>Citizens’ juries (and other variations including citizens’ panels, planning cells, etc.)</strong></td>
<td>Local</td>
<td>A panel of 12-16 citizens, recruited to be broadly representative of their local area, meet for 4 days to consider a particular issue. The process is independently facilitated and panel members receive evidence from selected specialist witnesses, and may have the opportunity to question and cross-examine them. The jury produce a report (setting out their views, recommendations, decisions and any differences of opinion between them) which is then submitted to the commissioning body.</td>
<td>Nirex Citizens’ panel on P&amp;T (Hunt &amp; Thompson, 2001); ISOLUS (CSEC, 2001); (see Appendix 2); Local municipal waste management planning (see Petts, 2001).</td>
</tr>
<tr>
<td></td>
<td><strong>Consensus Conference</strong></td>
<td>National</td>
<td>Involves a panel of 10-20 lay publics, usually recruited through advertisements, who select and ask questions of experts on a particular subject, assess responses, discuss issues, and produce report. The panel attend preparatory weekends where they receive information, select specialist witnesses and formulate questions. The conference lasts for 3-4 days and is mediated by a facilitator. A key feature of consensus conferences is that they take place in public and the audience have the opportunity to questions and discuss issues.</td>
<td>UKCEED National Radioactive Waste Consensus Conference (see Appendix 2); UK Biotechnology Consensus Conference 1994 (Joss &amp; Durant, 1995).</td>
</tr>
<tr>
<td></td>
<td><strong>Deliberative mapping</strong></td>
<td>National</td>
<td>Involves both citizens (in a series of citizen panels, each representative of certain demographic characteristics) and specialists/experts participating in parallel deliberative multi-criteria mapping processes. Citizens and specialists also interact in a workshop process. Participants explore issues relating to a subject, review policy options, develop criteria, and evaluate policy options against these criteria. Facilitators/ researchers report to commissioning body providing informed decision input, including recommendations on which policy options should be implemented.</td>
<td>See <a href="http://www.deliberative-mapping.org/">www.deliberative-mapping.org/</a></td>
</tr>
<tr>
<td></td>
<td><strong>Community Advisory Committees (CACs)</strong></td>
<td>Local</td>
<td>Small groups of 8-12 local stakeholders, representing particular interests or knowledges, which meet regularly (for 2-3 hours) over an extended period. The group discusses issues of concern (usually relating to a specific local project or plan), reflects on, and refines, their views from meeting to meeting. CACs are highly flexible as the group: discusses issues as they arise; responsively receives and accesses information appropriate to their needs; interacts with experts; and provides informed and timely input into decision making.</td>
<td>Belgium local partnerships (see Appendix 3); US superfund sites; Working groups in Sweden; UK municipal waste management planning (Petts, 1997).</td>
</tr>
<tr>
<td>5</td>
<td><strong>Planning for Real</strong></td>
<td>Local</td>
<td>A means of engaging local stakeholders in groups to identify local problems and issues through a community model (3D model or map) which is reviewed to identify what should be done to address them. Options can then be prioritised using visual hands-on techniques, and developed into an Action Plan.</td>
<td>Neighbourhood Initiatives Foundation - <a href="http://www.nif.co.uk">www.nif.co.uk</a> and <a href="http://www.nifonline.org.uk">www.nifonline.org.uk</a> Example available at <a href="http://www.pip.org.uk/methods">www.pip.org.uk/methods</a></td>
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<tr>
<td>5</td>
<td><strong>Visioning</strong></td>
<td>Local</td>
<td>Engages local stakeholders in workshops or meetings to consider the question ‘what sort of future do we want?’. Identifies issues and needs and develop a shared vision of a desirable future for a local community.</td>
<td>RISCOM II visioning process (Hunt, 2001; Hunt &amp; Thompson, 2002); Mendip County Council visioning processes <a href="http://www.greenchannel.com/iea/consulta.htm">www.greenchannel.com/iea/consulta.htm</a></td>
</tr>
<tr>
<td>6/5, 4</td>
<td><strong>Workshops (ongoing or part of a wider programme of participation)</strong></td>
<td>National-Local</td>
<td>Highly flexible group process that is often tailored to the specific needs or purpose of the exercise. Tend to be task driven and work towards specific outcomes. Can be used to provide information, discuss issues and solve problems for a small group of professional and local stakeholders. Can also bring together citizens, to consider issues with the potential to develop highly interactive relationships with specialists / experts.</td>
<td>ISOLUS (CSEC, 2001); PASCALEA (NNC/CSEC, 2002); Some of Nirex’s stakeholder workshops might be applicable to this category.</td>
</tr>
<tr>
<td>6/5</td>
<td><strong>Stakeholder Dialogue</strong></td>
<td>National-Local</td>
<td>A process where stakeholders (professional or local) are brought together in repeat meetings by a third party in facilitated dialogue to in order to find common ground between them, uncover what lies behind their different positions, and develop consensus on proposed actions. Allows stakeholders to build highly interactive relationships with decision makers and sponsors, and directly influence decision-making. Employs a range of methods, tools and techniques including consensus building approaches, surveys, workshops, panel formats, joint fact-finding, and so on.</td>
<td>BNFL National Stakeholder Dialogue (Environment Council, 2003); Cricklewood Stakeholder Dialogue (see Appendix 2).</td>
</tr>
<tr>
<td>6/5</td>
<td><strong>Joint fact finding (and other forms of collaborative analysis)</strong></td>
<td>National-Local</td>
<td>Engages professional and/or local stakeholders, selected to represent a wide range of interests, in a steering group or workshop processes to frame a study conducted by technical experts. The group works with technical experts to define the questions to be answered in analysis, the methodology used, how findings should be reported and interpreted.</td>
<td>Spent Fuel Management Options Working Group of the BNFL National Stakeholder Dialogue (Environment Council, 2002; ERM, 2001a); Cricklewood Stakeholder Dialogue.</td>
</tr>
<tr>
<td>6</td>
<td><strong>Strategic Action Planning</strong></td>
<td>National-Local</td>
<td>An approach that enables multi-stakeholder groups to: reach agreement on what information/research is required to enable a fair assessment of competing options; make underlying assumptions explicit; and plan contingencies based on alternate future possibilities.</td>
<td>Spent Fuel Management Options (Environment Council, 2002) and Plutonium Working Groups of the BNFL National Stakeholder Dialogue.</td>
</tr>
<tr>
<td></td>
<td>Stakeholder Decision Analysis (and other deliberative multi-criteria approaches)</td>
<td>Local-National</td>
<td>Between 10-15 professional stakeholders come together in a 4-5 repeat deliberative workshop processes to discuss issues and come up with planning, management or decision priorities. Participants go through a structured qualitative multi-criteria analysis process that identifies issues/options, develops evaluation criteria, assesses options, and reaches agreement on priorities. Participants draw on their own information or responsive information provision throughout the process. Can be used with local stakeholder groups (and possibly with citizens).</td>
<td>Spent Fuel Management Options Working Group of the BNFL National SHD has used a deliberative multi-criteria approach. Citizen and stakeholder panels in second phase of ISOLUS consultation. RISCOM visioning process. Local Environment Agency Plans (Clark et al. 1998).</td>
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<tr>
<td>6</td>
<td>Multi-criteria mapping</td>
<td>National</td>
<td>Professional stakeholders, representing different interests, take part in individual in-depth interviews where they review the range of policy options relating to an issue, define criteria with which to evaluate options, and assess the effectiveness of options (highlighting any uncertainties). The researcher feeds back analysis of results to the group of individuals who provide feedback. The individuals are then brought together to discuss results in a group discussion. Report is produced by the researcher. (MCM can also be used with citizens, see deliberative mapping).</td>
<td>Multi-criteria Mapping on GMOs (Stirling &amp; Mayer, 1999).</td>
</tr>
<tr>
<td>6/5</td>
<td>Internet dialogue</td>
<td>National-Local</td>
<td>Geographically separated group of individuals engage in written, verbal or visual communication and interaction that is mediated by a facilitator over the internet and structured to replicate a face-to-face dialogue process.</td>
<td>See for instance <a href="http://www.dialoguebydesign.com">www.dialoguebydesign.com</a></td>
</tr>
<tr>
<td>6/5</td>
<td>Delphi process</td>
<td>National-Local</td>
<td>Seeks to identify consensus and difference between professional stakeholders on issues either though a series of repeat questionnaires (postal, internet, telephone) creating a nominal group process, or a through face-face group process.</td>
<td>Individual Delphi (Rowe et al. 1991); Group Delphi (Renn et al. 1993).</td>
</tr>
<tr>
<td>7</td>
<td>Local Agenda 21 groups (and other local authority engagement processes)</td>
<td>Local</td>
<td>Local authority LA21 processes have existing partnership structures and involve the local community in the development of local sustainability action plans. LA21 provides existing processes for local groups and the public to engage in radioactive waste management where it is (and maybe where it is not) a local issue.</td>
<td>Throughout the UK.</td>
</tr>
<tr>
<td>7</td>
<td>Regional sustainable development frameworks</td>
<td>Local-Regional</td>
<td>The regional sustainable development framework process in the UK has set in motion an ongoing process of consultation and debate that could be used to access regional stakeholders to explore regional radioactive waste issues.</td>
<td>Throughout the UK.</td>
</tr>
</tbody>
</table>
Appendix 2: UK experiences of public and stakeholder engagement processes in radioactive waste management

In attempting to summarise existing UK experience of public and stakeholder engagement processes in radioactive waste management it might be useful to consider the questions outlined in Box A2.

**Box A2.** Key questions to ask of individual cases when reviewing UK experiences of public and stakeholder engagement processes in radioactive waste management.

What process, by whom, for whom, and when?

Why did the process happen?
- What was the objective or purpose of the process?
- Was the process research based or embedded within a real policy process? (Research / Experimental or ‘Policy-for-real’)
- What was scale or level of the decision situation? (National policy level; Regional level; Local level)
- At what stage in the decision process did engagement occur? (Framing/Scoping; Assessing; Decision/Action)

How was the process undertaken? (Description of process)
- Approach/method: Participatory method(s) or approach(es) used? How often (frequency) and for how long (duration)?
- Participants: Who involved? How many? How recruited? From where (geographical location)?
- Nature of process: Process design? Information needs / provision? Communication/consideration of uncertainty and indeterminacy? Degree to which agenda/framings were revised?
- How much did the process cost, and how long did it take (Cost/Time)?

What happened? (Outputs/outcomes)
- Formal outputs (reports, recommendations)? Who constructed formal outputs (e.g. facilitator/researcher or process participants) and how were they linked to decision-making?
- Outcomes: Influence on decision-making? Learning/capacity building (for participants, decision-makers, wider audiences)?
- Evaluation: was the participatory process evaluated? What criteria were used for evaluation?
- Effectiveness: what do we know about the effectiveness of the process, was it good or bad?
The following Table reviews recent radioactive waste management engagement processes that have occurred in the UK through summarising information relating to the questions in Box A2. Workshop participants did not provide evaluative judgements about what happened (outputs/outcomes) in relation to specific processes when providing feedback on a draft version of this paper. The column entitled ‘What happened? (outputs/outcomes)’ has therefore been removed from this final version. The far left column indicates the engagement strategy, as described in Table 1, which individual cases relate to.
<table>
<thead>
<tr>
<th>Engagement Process</th>
<th>Objective(s) / Purpose</th>
<th>Description of process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6/5, 4/3, 2/1 ISOLUS, February 2001-July 2001</strong> (CSEC, Lancaster; for MOD). (see CSEC, 2001)</td>
<td>To engage stakeholders at the front end of a process to find a way to manage and decommission nuclear submarines. (National policy level; Framing)</td>
<td>Multi-method programme of engagement including: 8 discussion groups representing a range of demographic characteristics held in areas both near to and distant from existing nuclear sites; 4 stakeholder workshops to discuss Project ISOLUS and articulate the concerns of participants who represented the interest of specific groups (MoD, contractors, regulators, local authorities, local environmental groups), held in London, Plymouth, Manchester and Edinburgh; a citizens' panel where 12 citizens met for four days over two weekends to receive information, examine the issue, question expert witnesses and produce a report; and a web consultation providing information, an open ended questionnaire, and discussion space for feedback. A steering group was convened to oversee the conduct of the process.</td>
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<tr>
<td><strong>6/5, 4/3, 2/1 ISOLUS second phase - Consultation on ISOLUS Outline Proposals (CIOP), September-December 2003. (contractor tbc; for MoD)</strong> (see Barker, 2003)</td>
<td>To enable public and stakeholder involvement in: the assessment of contractor proposals for dealing with submarine radioactive wastes; and informing MoD decision making on the management of submarine radioactive wastes.</td>
<td>The ISOLUS steering group have established that the consultation will work at the national and local levels and involve ‘open access’ and ‘deliberative’ dimensions. -Open access components at the national level include website, postal and telephone feedback and discussion facilities. -Local open access components might involve a form of public forum, drop-in, or surgery. -Deliberative components at the national level might include a structured discussion of different contractor proposals using a form of multi-criteria assessment by stakeholder panels and citizen panels.</td>
</tr>
<tr>
<td><strong>5/6, 3/2, 1 Project PASCALEA consultation, Sept-Nov 2002 (NNA Ltd. and CSEC Lancaster University for the Atomic Weapons Establishment)</strong> (see NNC/CSEC, 2002)</td>
<td>To provide members of the public and other stakeholders with the opportunity to express their views on the environmental aims for the AWE’s Aldermaston and Burghfield sites, in a consultation process that: involves an inclusive range of stakeholders; understands the views and reasoning of each stakeholder group; and, faithfully reports on the process (Organisational level)</td>
<td>The consultation process used a variety of different methods to try and ensure that as many people as possible have the opportunity to comment, including: -4 public meetings were held in Tadley, Newbury, Reading and Basingstoke involving presentations and an invitation for participants to comment. Meetings we open to anyone who wanted to attend, and were advertised through press releases to local media (press, television radio), placing public notices in the local press, and sending notices to the local liaison committee, schools and libraries. - Stakeholder workshops with AWE’s internal and external stakeholders where participants were invited to discuss and identify environmental aims for the two sites, to vote on these individually, and then rank them collectively. Stakeholders unable to attend workshops were offered to contribute by way of a face-to-face interview with a member of the project team. - Focus groups were held members of the lay public in relevant localities that shared demographic or other characteristics. Participants discussed wider environmental issues of importance to them before considering environmental issues relating to the AWE sites (prompted with pictures of the site and information from AWE presentations). Participants then voted individually on environmental aims and ranked them collectively.</td>
</tr>
<tr>
<td>No.</td>
<td>Event Description</td>
<td>Objectives</td>
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<tr>
<td>4</td>
<td>National Radioactive Waste Consensus Conference, 1999 (UKCEED; funded by POST, NERC, Nirex). (see UKCEED, 1999)</td>
<td>To contribute the views of informed citizens to the national policy process; identifying issues of public concern; and generate better informed public debate on the radwaste issue. (National policy level)</td>
</tr>
<tr>
<td>4</td>
<td>Reconvened panel from National Radioactive Waste Consensus Conference, Spring 2002 (UKCEED; for DEFRA). (see UKCEED, 2002)</td>
<td>To gain the views of ‘informed citizens’ on topics relating to Defra’s MRWS consultation paper. (National policy level; Framing)</td>
</tr>
<tr>
<td>4</td>
<td>Citizens panel on partitioning &amp; transmutation, 2001 (CSEC, Lancaster; for Nirex) (see Hunt &amp; Thompson, 2001)</td>
<td>To discuss/explore P&amp;T as a waste management option and consider Nirex’s review of the P&amp;T technique, (while experimenting with new innovative deliberative approaches to consultation on highly technical issues). (Organisational level; Framing/Assessing)</td>
</tr>
<tr>
<td>6/5</td>
<td>BNFL National Stakeholder Dialogue 1998-ongoing. Includes: Waste Working Group, 1999-2000, &amp; Spent Fuel Management Options Working Group, 2000-2002 (Environment Council; for BNFL) (see Environment Council, 2003; and accompanying reports at <a href="http://www.the-environment-council.org.uk">http://www.the-environment-council.org.uk</a>)</td>
<td>To inform BNFL's decision-making process about the improvement of their environmental performance in the context of their overall development. (Organisational level; Decision/Action)</td>
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<td>5</td>
<td>Cricklewood Stakeholder Dialogue 1998-2000, and JASM working group 2000-ongoing (Environment Council; for BNFL) (see <a href="http://www.the-environment-council.org.uk">http://www.the-environment-council.org.uk</a> and Environment Council, 2001)</td>
<td>To mediate dispute and conflict between BNFL and professional and local stakeholders that arose following the decision by BNFL’s rail freight subsidiary to martial trains carrying spent nuclear fuel at Cricklewood in North London, and to bring the various stakeholders together in dialogue to seek a solution to the problem. (Local level; Decision/Action)</td>
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<td>5</td>
<td>Decommissioning Magnox nuclear power stations (Environment Council; for BNFL) (Local level; Decision/Action)</td>
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<tr>
<td>3</td>
<td>Benchmarking public opinion, 2002 (Market Research Services; for DEFRA) (see Kelly &amp; Finch, 2002)</td>
<td>To provide the government with a benchmark of the general public’s views, understandings, knowledges, and reactions, in relation to radioactive waste management issues. (National policy level; Framing)</td>
</tr>
<tr>
<td>3</td>
<td>Managing Radioactive Waste Safely: Engaging Scotland, 2002 (Scottish Council Foundation; for Scottish Executive) (see Scottish Council Foundation, 2002)</td>
<td>To identify the key elements of public involvement in Scotland and elsewhere, and to gauge public and stakeholder awareness of and interest in issues of radioactive waste management in Scotland. (National policy level; Framing)</td>
</tr>
<tr>
<td>3</td>
<td><strong>Managing radioactive waste safely: awareness and attitudes of the Scottish public, 2002</strong> <em>(Scottish Opinion Ltd.; for Scottish Executive)</em> (see Scottish Opinion Ltd., 2002)</td>
<td>To gauge public awareness of, and assess attitudes towards, radioactive waste management in Scotland. <em>(National policy level; Framing)</em></td>
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<td>3</td>
<td><strong>Establishing the value of wider public consultation, April-Sept 2000</strong> <em>(Future Foundation; for Nirex)</em> (see Future Foundation, 2000)</td>
<td>To benchmark public awareness, issues and concerns about radioactive waste and Nirex as an organisation; determine public information / communication requirements; aid design of future communication. <em>(Organisational level; Framing)</em></td>
</tr>
<tr>
<td>3</td>
<td><strong>Survey on public views of radioactive waste management, 2002</strong> <em>(Future Foundation; for Nirex)</em> (see Future Foundation, 2002a)</td>
<td>To benchmark the public’s views of radioactive waste management, identify any change from work undertaken in 2000 <em>(Organisational level; Framing)</em></td>
</tr>
<tr>
<td>3</td>
<td><strong>Front end of the front end, July 2000 – February 2001</strong> <em>(CSEC Lancaster, for Nirex)</em> (see Hunt &amp; Simmons, 2001)</td>
<td>To clarify issues and concerns that the public have about radioactive waste management, to develop consultation mechanisms at Nirex, and to develop information appropriate to peoples needs. <em>(Organisational level, Framing)</em></td>
</tr>
<tr>
<td>3</td>
<td><strong>Focus group discussions on the phased disposal concept, 2002</strong> <em>(Future Foundation; for Nirex)</em> (see Future Foundation, 2002b)</td>
<td>To identify the public’s issues and concerns about the different phases of the Nirex Phased Disposal Concept. <em>(Organisational; Framing)</em></td>
</tr>
<tr>
<td>3</td>
<td><strong>HSE public perception study, 2000</strong> <em>(Simpson Carpenter Ltd, for HSE)</em> (see Simpson Carpenter Ltd, 2000)</td>
<td>To understand public perceptions about radioactive waste management in relation to the nature and extent of the concerns; risk perception and tolerability; control of the waste management industry; and how well informed</td>
</tr>
<tr>
<td>3</td>
<td>Public opinion survey on nuclear issues, 2000 (Taylor Nelson Sofres Harris; for Nuclear Installations Inspectorate) (Taylor Nelson Sofres Harris, 2000; Lennie &amp; Davies, 2001)</td>
<td>To establish the current level of public concern about nuclear related issues; identify specific issues of concern; and assess the ‘tolerability of risk’ in comparison with other industries. (National level policy; Framing)</td>
</tr>
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<td>2/6</td>
<td>Monitoring and Retrievability workshops, 2000 (CSEC Lancaster; for Nirex) (see UKCEED, 2000; 2001; 2002b)</td>
<td>To preview Nirex’s work programme on monitoring and retrievability. (Organisational level; Framing/Assessing)</td>
</tr>
<tr>
<td>2/6</td>
<td>Stakeholder workshop on partitioning &amp; transmutation, 2001 (Civic Net Ltd; for Nirex) (see Hassrad and Naji, 2001)</td>
<td>To consider the issues relating to Nirex’s investigation into P&amp;T as a radwaste management strategy, including the potential benefits of P&amp;T. (Organisational level)</td>
</tr>
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<td>2/3</td>
<td>Nirex Independent Stakeholder Review, 2001 (ERM; for Nirex) (see ERM, 2001)</td>
<td>To obtain stakeholder views on Nirex’s Mission Statement, Objectives, and policies on Transparency, Corporate Social Responsibility, and Environment. (Organisational level)</td>
</tr>
<tr>
<td>2</td>
<td>Nirex preview process 2000-ongoing.</td>
<td>Facilitate stakeholder input to Nirex research programmes at the planning/framing stage. (Organisational level; Framing)</td>
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<td>2</td>
<td>Nirex Social Science Research Workshop, 2002 (Manor Resources; for Nirex) (see Manor Resources, 2002)</td>
<td>To obtain stakeholders’ opinions about what social science research Nirex should conduct and how social and technical research can be integrated together. (Organisational level)</td>
</tr>
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<td>2</td>
<td>Nirex Workshop on Long-term Waste Management Options, June 2002 (Forth Road Limited, for Nirex) (see Forth Road Limited, 2002a)</td>
<td>To explore previous and current research on management options, and discuss what factors determine how much future research will be needed and what resources are required.</td>
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<td></td>
<td>Event Description</td>
<td>Purpose</td>
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<tr>
<td>2</td>
<td>Nirex Workshop on the Reference Case Inventory and Radiological Protection Criteria, September 2002 (Forth Road Limited, for Nirex)</td>
<td>To gain feedback on the production of the Reference Case inventory which forms a key input to the phased disposal concept design and the radiological criteria used in its assessment.</td>
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<tr>
<td>2</td>
<td>Nirex meeting with Trade Union representatives</td>
<td>To engage TU representatives in dialogue to obtain feedback on Nirex’s forward programme, to understand what issues are most important to the TU, and what on-going involvement they would favour.</td>
</tr>
<tr>
<td>2</td>
<td>Evaluation Measures Meeting, November 2002 (Forth Road Limited, for Nirex)</td>
<td>To develop evaluation measures (criteria against which options should be evaluated) to be fed into the new independent body in the second stage of the DEFRA &amp; Devolved administrations MRWS process.</td>
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<tr>
<td>2</td>
<td>Strategic Environmental Assessment / Environmental Impact Assessment Workshop, December 2002 (Forth Road Limited, for Nirex)</td>
<td>To preview the work Nirex is planning to undertake in relation to SEA/EIA. In particular, the workshop set out to discuss: the key aspects of SEA and EIA and how Nirex should approach its work to adhere to the frameworks set out in the SEA/EIA Directives.</td>
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<tr>
<td>2</td>
<td>Long term records seminar, March 2002 (Nirex)</td>
<td>To bring together interested parties from within the nuclear industry and outside to explore the issues influencing the successful long-term management of important information, such as waste package records.</td>
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<tr>
<td>2</td>
<td>BNFL Magnox Authorisation Consultations, 2000-2001 (Environment Agency)</td>
<td>To gain the views of stakeholders and the public for consideration in decision making on the consultation included: the publication of consultation documentation for each site with range of ways to access and feedback comments (web, post); a programme of</td>
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<td></td>
<td>Event Description</td>
<td>Key Details</td>
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<tr>
<td>1</td>
<td>Reauthorisation of 8 Magnox power stations as a result of a change in ownership. (Local level project; Decision / Action)</td>
<td>Public meetings (attendance varied between 20-600 people depending on site) and face-to-face surgeries with individuals for up to 2 hours (attended by an average of 20 people over a two day period) at each site during an extended consultation period. Participants: professional stakeholders and local stakeholder groups including local authorities, statutory consultees, members of the public, national and local public bodies, interested groups and organisations, the Agency’s relevant Advisory Committees and Groups, and Local Community Liaison Councils.</td>
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<tr>
<td>2</td>
<td>DEFRA Seminar on understanding &amp; addressing issues of radioactive waste, 2002 (QMW Public Policy Seminars; for DEFRA) (see QMW Public Policy Seminars, 2002)</td>
<td>To attempt to discuss issues relating to the 2001 MRWS consultation document with people who would not normally reply to the consultation. (National policy level) Seminar involving a series of presentations from prominent speakers and a limited amount of open discussion. The organisers encouraged diverse participation in terms of gender, age, ethnicity, occupation, and location in the UK, although the event was highly limited in terms of representation by members of the general public (with no prior knowledge of radioactive waste issues).</td>
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<tr>
<td>2</td>
<td>Public meetings organised by local authorities during DEFRA MRWS consultation.</td>
<td>To gain feedback to the DEFRA MRWS consultation through public meetings from those that who would not normally reply to the consultation (National policy level) A number of public meetings were organised by local authorities and others, involving several hundred people, including a public meeting in London during February 2002.</td>
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<tr>
<td>2</td>
<td>Safegrounds Learning Network (see <a href="http://www.safegrounds.com">www.safegrounds.com</a>)</td>
<td>To consult professional stakeholders on issues relating to the contamination of nuclear and defense sites. (Local/project level) Consultation undertaken in the form of questionnaires and stakeholder workshops with participants that primarily include nuclear liability holders, regulators, contractors and consultants to the nuclear industry (which might be extended to include wider stakeholders).</td>
</tr>
<tr>
<td>2</td>
<td>First and Second phase consultations with environmental groups on ‘Proposals for Liabilities Management Authority’ April – October 2002. (Fred Barker; for DTI) (Barker, 2002a; 2002b)</td>
<td>To identify the views and concerns of environmental groups about the setting up and operation of the Liabilities Management Authority (now the Nuclear Decommissioning Authority), including views on: future funding arrangements; issues of public confidence (including organisation and structure of the LMA, membership of the LMA Board, the way the Authority conducts its work). Both phases of the consultation individual stakeholders from environmental groups met with the contractor undertaking the consultation in a face-to-face meeting. Those not able to attend responded by phone or email. -The first phase (9 meetings, 4 phone and 1 email response; 23 individuals participated) sought the views and concerns of environmental groups in preparing the ‘Managing the Nuclear Legacy’ White Paper. -The second phase (14 meetings, 2 responses; 28 individuals participated) sought to involve stakeholder in reviewing the White Paper against the findings of the first phase, and identify further views and concerns which should inform the preparation of the Nuclear Reform Bill and the setting up of the LMA.</td>
</tr>
<tr>
<td>2</td>
<td>RADIALe project; (CSEC; for Defra/HSE/Ea)</td>
<td>The RADIALe project involves producing a website for national dissemination of information on radioactive waste management issues in schools, and providing opportunities for discussion. The site ties in closely to curriculum requirements.</td>
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</table>

Agency on radioactive waste discharges; the DTI/UKAEA consultation on Dounreay spent fuel and the Dounreay Site Restoration Plan; the Environment Agency consultation on Sellafield Discharge Authorisations; the Environment Agency consultation on Sellafield MOX Plant authorisation; the Environment Agency consultation on Technetium-99 discharges from Sellafield.
<table>
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<th>2</th>
<th>Young Scot website project (Napier University Teledemocracy Network; for The Scottish Executive) (see <a href="http://www.youngscot.org/">http://www.youngscot.org/</a>)</th>
<th>To find out what young people in Scotland want to know about radioactive waste management. The Scottish Executive are undertaking a project with the Young Scot on its website asking young people what they want to know about radioactive waste management.</th>
</tr>
</thead>
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<tr>
<td></td>
<td>3</td>
<td>Discussion Group process as part of RISCOM II project Nov2002-Nov2003 (Environment Agency, Nirex, Galson Sciences, Lancaster University; for European Union) (see Hunt, 2001; Hunt &amp; Thompson, 2002)</td>
<td>To develop, test and evaluate experimental versions of selected processes to assess contribution to engaging the public in radwaste issues, and produce recommendations. (Research / Experimental) Discussion group with 9 members of the public (independently recruited in the street or by telephone, according to specific demographic characteristics) and one ‘official stakeholder’ (an Environment Agency site inspector), meeting twice over for two separate two hour session a week apart. The process focused on radioactive waste management options, specifically the criteria that should be taken into account when developing EIAs for nuclear waste storage facilities. Differed from standard focus group format in that the process involved specialist who offered knowledge and experiences, and that the group met over two repeat sessions. The provision of information was responsive to the needs of participants by way of pre-prepared information boards designed to be made available when required. The event was audio and video recorded and subject to participant evaluation. Participants completed a questionnaire or interview prior to the process.</td>
</tr>
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<td></td>
<td>4/2</td>
<td>Future Search process as part of RISCOM II project Nov2002-Nov2003 (Environment Agency, Nirex, Galson Sciences, Lancaster University; for European Union) (see Hunt, 2001; Hunt &amp; Thompson, 2002)</td>
<td>To develop, test and evaluate experimental versions of selected processes to assess contribution to engaging the public in radwaste issues, and produce recommendations. (Research / Experimental) Future Search process, adapted from standard future search model used in community development that draws together people’s own images of the future to produce plans for action. This process was not explicitly goal orientated and involved members of the public (independently recruited in the street or by telephone, according to specific demographic characteristics) and 5 stakeholders ( regulators, local authorities, other institutional stakeholders) over a residential weekend (1.5days). The process was ‘information light’ with limited prior framing beyond display boards, an information session, and the ability for members of the public to draw on the expertise of specialist stakeholders.</td>
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<td></td>
<td>5/4, 2</td>
<td>Scenario Workshop process as part of RISCOM II project Nov2002-Nov2003 (Environment Agency, Nirex, Galson Sciences, Lancaster University; for European Union) (see Hunt, 2001; Hunt &amp; Thompson, 2002)</td>
<td>To develop, test and evaluate experimental versions of selected processes to assess contribution to engaging the public in radwaste issues, and produce recommendations. (Research / Experimental) 1 day Scenario workshop involving a total of 40 participants including members of the public (groups of seven participants from four distinct local areas in the North West of England were independently recruited in the street or by telephone, according to specific demographic characteristics) and 12 ‘official stakeholders’ recruited to represent a variety of interests. The process focused on radioactive waste management options, specifically the criteria that should be taken into account when developing EIAs for nuclear waste storage facilities. Participants addressed two main storage option scenarios and applied these to a range of scenarios relating to their own locality, and generalised locations. The process was information rich with an initial information session, provision of official documents/reports, and the availability of</td>
</tr>
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<td>4/2</td>
<td>Alternative Public Meeting process as part of RISCOM II project Nov2002-Nov2003 (Environment Agency, Nirex, Galson Sciences, Lancaster University; for European Union) (see Hunt &amp; Thompson, 2002)</td>
<td>To develop, test and evaluate experimental versions of selected processes to assess contribution to engaging the public in radwaste issues, and produce recommendations. (Research / Experimental)</td>
<td>The RISCOM II Project is developing a further process designed as a possible alternative to the traditional public meeting. The process involves members of the public (recruited through newspaper advertisements) and stakeholders (government, regulatory/government agencies, nuclear industry, NGOs, local government, trade unions) in two 3-hour meetings, preceded by a preliminary meeting where the subject of radioactive waste management will be introduced. The focus of the meeting will be the plutonium issue, and the intention is for the process to move beyond ‘issue mapping’ to engage with aspects of options appraisal.</td>
</tr>
<tr>
<td>2.1</td>
<td>Schools Website as part of RISCOM II project Nov2002-Nov2003 (Environment Agency, Nirex, Galson Sciences, Lancaster University; for European Union) (see O’Donoghue &amp; Szerszynski, 2001; and other reports at <a href="http://csalt.lancs.ac.uk/riscom2">http://csalt.lancs.ac.uk/riscom2</a>)</td>
<td>To investigate the usefulness of the Internet for providing information and promoting discussion on nuclear waste issues among young people, and increase understanding of how information technology can be utilised to engage citizens in decision making (Research / Experimental)</td>
<td>A website for teenagers to investigate the usefulness of the Internet for providing information and promoting discussion on nuclear waste issues among young people.</td>
</tr>
<tr>
<td>2</td>
<td>Internet consultative mechanisms 1999-2000 (Leeds University; for Nirex) (see University of Leeds, 2000)</td>
<td>Research to evaluate effectiveness of the Internet in facilitating dialogue on spatial issues in radioactive waste (Organisational level; Research / Experimental)</td>
<td>Development and testing of an internet consultative mechanism comprising of a hierarchical information system and a question/task module. The study involved conducting the experiment with 6 focus groups (with staff and students from the University of Leeds), an online questionnaire using the prototype computer system (64 respondents made up of focus group participants and others – half received a ‘negative’ information framing and half received a ‘positive framing’), and interviews with 6 questionnaire respondents.</td>
</tr>
</tbody>
</table>
Appendix 3: International Experience of Engagement in Radioactive Waste Management

Recent summaries and reviews of the international experience with public and stakeholder engagement in radioactive waste management were made by Hunt, Day and Kemp (2001) as part of the multi-partner RISCOM project and the OECD’s Radioactive Waste Management Committee (NEA, 2002) as an initial step in gathering background information for a Forum on Stakeholder Confidence.

These reviews describe experience from some 15 countries, including 8 of the 15 current EU member states and 2 accession states.

They show a general growth in activity. This is attributed in part to the emergence of radioactive waste issues within the cycle of the nuclear industries as, for example, power stations approach the end of their lives and real schemes for waste management are brought into planning and consenting systems. It is also a consequence of requirements for public exposure of proposals for radioactive waste management within treaty and legal commitments to Environmental Impact Assessment. At a strategic level, there appears to be a growing awareness that without engaging the multiple interested constituencies, proposals fail. The OECD/RWMC, for example, explicitly recognises the importance of public perception and confidence as key strategic issues in effective management strategies for radioactive waste.

There is considerable diversity in the processes used. This reflects in part differences in legal systems or traditions of governance and in part the different motivations of the authorities involved. Most of the processes are current and have not run their course. It has not been possible, therefore to say much about the outcomes of these processes. There are, however, a few operating disposal schemes, mainly for low and intermediate level waste, which have been authorised under local planning provisions.

For the Workshop, the international context offers a range of experiences with different forms of public and stakeholder engagement processes. Although these may not fit comfortably within the EU or UK legal systems, they do provide examples from which some of the elements of an effective process can be drawn.

The following table draws on information provided in Hunt, Day and Kemp and in the OECD report to provide a summary of activities and methods of public engagement with an assessment of predominant Engagement Strategies, as described in Table 1.
<table>
<thead>
<tr>
<th>Country</th>
<th>Waste</th>
<th>Description</th>
<th>Methods</th>
<th>Engagement Strategy</th>
</tr>
</thead>
</table>
| Australia        |           | • Provide accurate information about radioactive waste management plans and practices.  
• Promote understanding of project amongst stakeholders, including local and Aboriginal Groups and their advisors. | • Expert briefings / presentations  
• Site visits  
• Reports, briefing papers, newsletter | 1, 2 |
| Belgium          | LLW & ILW | • Integration of RAW projects into local/regional plans.  
• Local partnerships, formed from representatives of all stakeholders and interest groups, encouraged in areas that might “host” facilities. | • Local partnerships  
• Working groups  
• Independently facilitated communications | 1, 4/5 |
|                  | HLW       | • Expert report  
• Peer review by OECD/NEA | • To be decided  
• Options described in strategy paper | - |
| Canada           | LLW (existing) | • Legislation requires public participation  
• Volunteer siting process  
• Independent Sitting Task force | • Open meetings with expert participation  
• Environmental review Panels  
• Workshops for owners of legacy sites | 1, 2, (3) |
|                  | Spent fuel | | • Stakeholder consultations under EIA provisions  
• Public participation in work with expert panel publicly funded. | 4, 5 |
| Waste Management Issues | Each nuclear site has a local liaison group who meeting regularly  
• They also meet in a national forum to discuss issues | • Canadian Association of Nuclear Host Communities | 4/5 |
| Czech Republic   | LLW & ILW | • Responsibility of Authority with public representatives on Board  
• Aim to achieve active cooperation with local communities | • Public representation at Board level  
• Communication initiatives (including meetings and website)  
• Local meetings  
• Site visits | 1, 2, 5 |
|                  | HLW       | • Strategy under development  
• Public relations exercise backed by opinion polls | • To be decided  
• Strategy document to be produced and exposed to public scrutiny under EIA procedures | 1, 2, 3 |
<table>
<thead>
<tr>
<th>Country</th>
<th>Type</th>
<th>Approach</th>
<th>Stakeholder Engagement</th>
<th>Process Details</th>
</tr>
</thead>
</table>
| Finland     | Spent fuel | • Local authority veto  
• Voluntary approach to site selection, backed by public information and a local stakeholder dialogue. | • Communication strategy, including briefings for public, dissemination of technical information.  
• Public hearings  
• Stakeholder participation through EIA process | 1, 2, (5)                                                                                          |
| France      | HLW      | • Plan to construct Underground Research Laboratories.  
• Voluntary approach to site selection with technical screening and an extended public process. | • Mediator appointed to manage public involvement prior to site selection  
• Public consultation on site selection to be managed by an Advisory Committee  
• Local information committees recommended by mediator | (1, 2, 5)                                                                                          |
| Germany     | LLW & ILW | • Licensing process within planning system.  
• Public hearing at Lander level to consider objections  
• Working Group Committee on site selection, criteria and international practice, at Federal level includes stakeholders and environment groups. | • Stakeholder and public participation in preparation for inquiry  
• Extended public inquiry | 1, 2, (6)                                                                                          |
|             | HLW      | • Site proposed by Federal Government following technical investigation.  
• Consultations with Lander continuing | • Information  
• Lectures  
• Public meetings | 1, 2                                                                                                  |
| Hungary     | LLW/ILW  | • Site selection for repository  
• Public consultation on exploration. | |                                                                                                      |
| Japan       |          | • Site selection for Underground Research Laboratories | • Public information strategy based on informatic technology | 1                                                                                   |
| The Netherlands | LLW    | • Candidate site selection for storage made by committee following technical investigation and consideration of willingness to host facility.  
• EIA process for selection. | • Public meetings  
• Workshops  
• Working groups | 1, 2, (5)                                                                                          |
| Norway      |          | • Repository provided under planning legislation | |                                                                                                      |
| Spain       | LLW/ILW  | • Repository approved under local planning legislation | • Information campaign  
• Technical visits  
• Meetings with local legislation and authorities | 1, 2                                                                                                  |
<table>
<thead>
<tr>
<th>Country</th>
<th>LLW/ILW</th>
<th>HLW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sweden</strong></td>
<td>• Government/Community negotiations for site</td>
<td>• Under development</td>
</tr>
<tr>
<td></td>
<td>• Local authority content with outcome</td>
<td>• To be decided</td>
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<tr>
<td></td>
<td>• Voluntary approach to site selection, guided by local referenda</td>
<td>• EIA forum</td>
</tr>
<tr>
<td></td>
<td>• Feasibility studies continue within EIA framework</td>
<td>• Working groups</td>
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<tr>
<td></td>
<td>• Comprehensive consultation expected</td>
<td>• Local reference groups</td>
</tr>
<tr>
<td></td>
<td>• Process has become a widely recognised model</td>
<td>• Public hearings</td>
</tr>
<tr>
<td><strong>Switzerland</strong></td>
<td>• Proposal by Federal Government based on technical screening</td>
<td>• Proposal subject to referendum</td>
</tr>
<tr>
<td></td>
<td>• Rejected by Canton</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Possible advisory liaison committee between Authority and local</td>
<td></td>
</tr>
<tr>
<td></td>
<td>community</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Under investigation by expert committee</td>
<td>• To be decided</td>
</tr>
<tr>
<td><strong>United Kingdom</strong></td>
<td>See Appendix 2</td>
<td></td>
</tr>
<tr>
<td><strong>United States</strong></td>
<td>• State responsibility</td>
<td>• Public Meetings</td>
</tr>
<tr>
<td></td>
<td>• Diversity of approaches across US</td>
<td>• Site visits</td>
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<tr>
<td></td>
<td>• Public/Stakeholder engagement varies</td>
<td>• Exhibitions</td>
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<tr>
<td></td>
<td>• Federal responsibility</td>
<td>• Toll free phone lines</td>
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<td></td>
<td>• One site under investigation</td>
<td>• Internet information provision</td>
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<tr>
<td></td>
<td>• Public process focussed on communications</td>
<td>• Dissemination of technical material and general information provision</td>
</tr>
<tr>
<td></td>
<td>• Plans for public participation unrealised</td>
<td>• Co-operative / participatory research</td>
</tr>
</tbody>
</table>

Notes:
- 1, 2, 5/6 indicate specific references or criteria.
- (2) denotes a particular context or condition.
References


