Managing Radioactive Waste Safely

A Framework for Implementing Geological Disposal

June 2008

A White Paper by Defra, BERR and the devolved administrations for Wales and Northern Ireland

Llywodraeth Cymru
Welsh Assembly Government

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Managing Radioactive Waste Safely

A Framework for Implementing Geological Disposal

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Executive Summary

The purpose of this White Paper

1 Published as part of the Managing Radioactive Waste Safely (MRWS) programme, this White Paper sets out the UK Government's framework for managing higher activity radioactive waste in the long-term through geological disposal, coupled with safe and secure interim storage and ongoing research and development to support its optimised implementation. It also invites communities to express an interest in opening up without commitment discussions with Government on the possibility of hosting a geological disposal facility at some point in the future.

Background

2 On 25 June 2007, UK Government, in conjunction with the devolved administrations for Wales and Northern Ireland, published a MRWS consultation document covering:

- the technical programme and aspects of design and delivery of a geological disposal facility for the long-term management of higher activity radioactive waste
- the process and criteria to be used to decide the siting of that facility, including:
  - development of a voluntarism/partnership approach; and
  - the assessment and evaluation of potential disposal sites including the initial screening-out of areas unlikely to be suitable for geological disposal.

3 The consultation closed on 2 November 2007. One hundred and eighty-one responses were received. These responses were analysed, reported in a Summary and Analysis of Responses that was published on 10 January 2008, and have been taken into consideration in the development of the way forward set out in this White Paper.

Coverage of White Paper

4 This White Paper sets out the framework for the future implementation of geological disposal, including:

- the approach to compiling and updating the UK Radioactive Waste Inventory (UKRWI) and using it as a basis for discussion with potential host communities
- the Nuclear Decommissioning Authority's (NDA's) technical approach for developing a geological disposal facility, including the use of a staged implementation approach and ongoing research and development to support delivery
- the arrangements to ensure sound regulation, scrutiny and control of the geological disposal facility development
- how relevant planning processes might be addressed as the programme proceeds
- the definition of 'community' for the purposes of the site selection process.
- the process for issuing invitations and providing information to communities
- how a partnership arrangement can be used to support a voluntarism approach
- the use of affordable and value for money Engagement and Community Benefits Packages as part of the voluntarism and partnership approach
- the initial sub-surface screening criteria and the way in which Government will apply these criteria
- a refined set of criteria for assessing and evaluating candidate sites and details of further consultation on the way in which these criteria should be applied.

The amount of waste for disposal

5 The United Kingdom Radioactive Waste Inventory (UKRWI) provides regular updates of the amounts of existing and expected holdings of radioactive waste in the United Kingdom. The 2007 UKRWI, for the first time, contains radioactive materials not currently classified as waste. This change in the scope of the UKRWI will allow it to be used to track the latest estimates in waste and materials that will potentially need to be treated as waste at some future point. This will allow a Baseline Inventory estimate of the higher activity wastes requiring geological disposal to be produced and regularly updated.

6 The amount of radioactive waste that would arise as a result of a new nuclear build programme would depend on such issues as the number and type of reactors. Updates of the Baseline Inventory using the UKRWI would also take into account any additional arisings from future new nuclear build.

Preparation and planning for geological disposal

7 **Interim Storage** – A robust programme of interim storage will play an integral part in implementing geological disposal. The Nuclear Decommissioning Authority (NDA) is reviewing UK waste storage arrangements. The regulators and Government are closely involved in this work. The review will be completed in 2008 and the results will be reflected in the next NDA Strategy.

8 **Facility design** – The detailed layout and design of the geological disposal facility, both above and below ground, will be tailored to the Baseline Inventory and the characteristics at the site in question.

9 The issue of retrievability of the waste has been a subject of discussion. Government's view is that the decision about whether or not to keep a geological disposal facility (or vaults within it) open for an extended period of time can be made at a later date in consultation with the independent regulators and local communities. In the meantime the planning, design and construction can be carried out in such a way that the option of extended retrievability is not excluded.

10 In principle the UK Government sees no case for having more than one geological disposal facility if one facility can be developed to provide suitable, safe containment for the Baseline Inventory.

11 **Research** – The NDA has statutory responsibility under the Energy Act 2004 for carrying out research to support the activities for which it is responsible. The NDA will undertake further research during the geological disposal facility development process to, for example: refine facility design and construction; improve understanding of the chemical and physical properties and interactions of emplaced waste; address specific issues raised by regulators; and support the development of site-specific safety cases.

12 **NDA as implementing body** – The NDA has established a new Radioactive Waste Management Directorate (RWMD), incorporating resources from United Kingdom Nirex Ltd, which it will develop into an effective delivery organisation to implement geological disposal. It is envisaged that the RWMD will evolve under the NDA into the organisation responsible for the delivery of the geological disposal facility. In due course, management of the organisation can then be opened up to competition in line with other NDA sites.

Protecting people and the environment: regulation, planning and independent scrutiny

13 **Regulation** – The geological disposal facility will comply fully with the standards required by the independent regulators. The environment agencies (the Environment Agency, and the Environment and Heritage Service of the Department of the Environment, Northern Ireland) will be providing updated guidance on the requirements for authorisation of geological disposal facilities.

14 **Planning arrangements** – In May 2007, the UK Government published the Planning White Paper, "Planning for a Sustainable Future". This proposed the introduction of a new single consent regime and an independent commission to determine applications for nationally significant infrastructure projects in England. Whilst not having yet taken a final decision, Government is currently inclined to look towards applying the new planning system if the location of geological disposal facility is in England.

15 **Environmental impacts** – European legislation requires that certain plans and programmes likely to have significant effects on the environment are subject to a process of 'strategic environmental assessment' (SEA). It is good practice to integrate SEA within a wider sustainability appraisal (SA) which also considers social and economic factors. European legislation also requires 'environmental impact assessment' (EIA) of certain individual projects.

16 Following the publication of this White Paper, NDA, working closely with Government, will prepare and publish for consultation proposals on the scope and nature of its environmental assessment and sustainability appraisal.

17 **Public engagement** – Public consultation is a requirement both of the planning permission process, where the public will be consulted on the planning application and the accompanying environmental statement, and as part of the environmental regulator's decision on whether to grant an authorisation to dispose of radioactive waste. The SEA, SA and EIA processes will also provide opportunities for public engagement.

18 **Committee on Radioactive Waste Management** – Government is committed to ensuring strong independent scrutiny of the proposals, plans and programmes to deliver geological disposal. Accordingly, the Committee on Radioactive Waste Management (CoRWM) has been reconstituted, with modified terms of reference and expertise. The Committee will provide independent scrutiny and advice to UK Government and devolved administration Ministers on the long-term radioactive waste management programme, including storage and disposal. CoRWM will undertake its work in an open and consultative manner.

Site selection using a voluntarism and partnership approach

19 **Voluntarism and Partnership** – Following the MRWS consultation, Government remains of the view that geological disposal and an approach based on voluntarism and partnership as a means of siting of a geological disposal facility is the right way forward (see Chapter 6). Government does not wish to be over-prescriptive about the way that the voluntarism and partnership arrangements should work at the outset as individual local circumstances differ and, to a degree, a tailored approach to any discussions will need to be taken. This flexibility does not apply to the way in which technical issues, such as geology, are assessed, where there will be objective and consistent assessment.

20 In carrying forward a voluntarism/partnership approach, the White Paper identifies three types of community;

- **Host Community** – the community in which any facility will be built. This will be a small geographically defined area and include the population of that area and the owners of the land. For example, it could be a town or village.
- **Decision Making Body** – the Local Government decision-making authority for the host community.
- **Wider Local Interests** – other communities that have an interest in whether or not a facility should be built in the Host Community. Such as the next village, a neighbouring district or a community on the local transport routes to the Host Community.

All three levels of community, will need to liaise closely with one another as the process is taken forward. Both Government and the NDA will engage with all three 'communities'.

21 **Early Process** – During the early stages of the process there will be two key local decision points:

- **Expression of Interest** – the decision point at which local communities register their without commitment interest in discussions with Government about potential involvement in the siting process.
- **Decision to Participate** – the decision point at which a Decision Making Body/ies makes a formal commitment to participate in the geological disposal facility siting process, but without commitment to host the facility.

Chapter 6 explains the steps that will be involved in arriving at these two decision points.

22 **Community Siting Partnerships** – Following a Decision to Participate, the site selection process and in particular the development of the facility, will require considerable engagement with communities. Government favours a **partnership approach** to this, as followed in other countries.

23 Government expects a Community Siting Partnership to be a partnership of local community interests. The NDA's delivery organisation would be a member but would not be directly involved in decisions on community-related issues. Government could participate in the work of the Community Siting Partnership as and when required. Further details are given in Chapter 6.

24 **Right of Withdrawal** – The Right of Withdrawal (RoW) is an important part of the voluntarism approach intended to contribute to the development and maintenance of community confidence. Up until a late stage, when underground operations and construction are due to begin (see paragraph 7.20), if a community wished to withdraw then its involvement in the process would stop. As with other key local decisions in the siting process, the Decision Making Body will be responsible for exercising the RoW, based on advice and recommendations from the local Community Siting Partnership. All parties in a Partnership would be expected to work positively to seek to avoid the need to exercise the RoW. Proposed arrangements for this are explained in Chapter 6.

25 **Engagement Packages** – Communities that have taken a decision to declare an Expression of Interest and subsequently a Decision to Participate will incur costs in considering the issues and in setting up and operating a Community Siting Partnership. Government will assist communities in either partly or wholly meeting these costs through the provision of an Engagement Package. The level, coverage and the point at which funding is available, will be considered as part of the initial discussions between the community and Government.

26 **Benefits Packages** – Construction and operation of a geological disposal facility will be a multi-billion pound project that will provide skilled employment for hundreds of people over many decades. It will contribute greatly to the local economy and wider socio-economic framework. There could be spin-off industry benefits, infrastructure benefits, benefits to local educational or academic resources, and positive impacts on local service industries that support the facility and its workforce. It is also likely to involve major investments in local transport facilities and other infrastructure, which would remain after the facility had been closed. In addition there may be other benefits which may be commensurate with developing the social and economic wellbeing of a community that has decided to fulfil such an essential service to the nation.

27 The Government acknowledges that siting of the facility raises other issues, some of them intergenerational, and an approach needs to be identified that recognises and addresses the potential impact on a community over the long timescales involved. Accepting that delivery mechanisms to achieve this will be developed as discussions progress, the following could be some of the overarching objectives for the investment that a community might benefit from as a result of hosting a geological disposal facility:

- Improved local training/skills development/education investment
- Increased business for local service industries
- Improved public services/infrastructure/housing/ recreational facilities
- Improved transport infrastructure
- Better local healthcare to meet the increased needs of the community
- Local environmental improvement

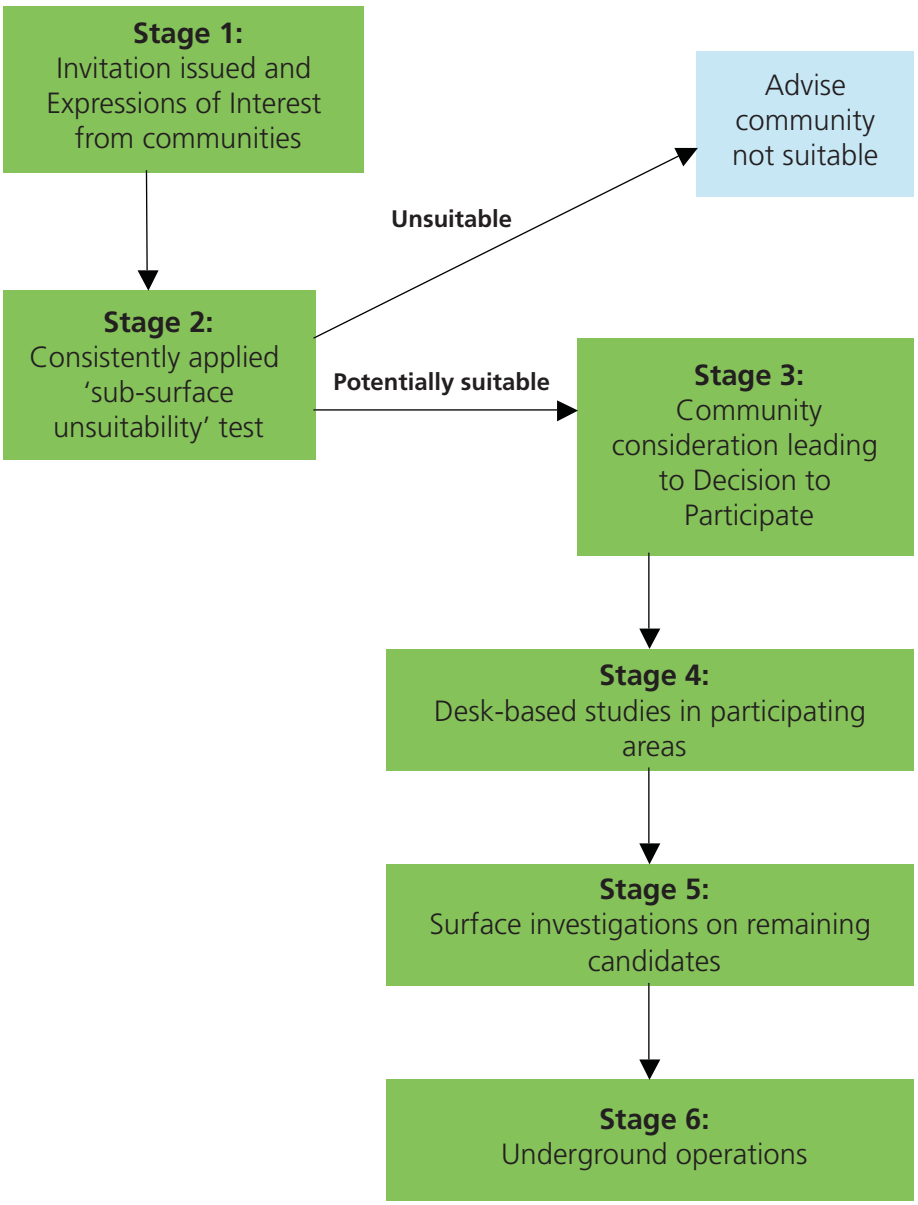
28 This list is illustrative rather than exhaustive as short and long term local needs may vary depending on the community that hosts the facility. As potential host communities and Community Siting Partnerships work with the NDA's delivery organisation and Government they will begin a dialogue about the local needs arising from hosting a geological disposal facility. Ultimately the community and Government will need to agree between them on the final arrangement.

The site assessment process

29 The site assessment process will be conducted in parallel to discussions between Government, the NDA and a local community from the point at which a community has made an Expression of Interest in opening up discussions with Government.

30 It will be a staged process, allowing all those involved to take stock before deciding whether or not to move to the next stage at a particular site. It may be represented diagrammatically as follows and is explained further in Chapter 7.

Figure 1: Stages in the site selection process



Timing

The programme for developing a facility needs to be flexible and able to incorporate both robust technical site investigations and ongoing interactions between the project and the Host Community. This may mean accommodating longer discussion periods and more research to address stakeholders' concerns. There is nevertheless, the need to maintain momentum in taking forward this important programme to ensure the safe and secure long-term management of higher activity radioactive waste in the UK.

Next steps

With publication of this White Paper, Government invites communities to express an interest in opening up without commitment discussions on the possibility of hosting a geological disposal facility at some point in the future.

To support consideration of this invitation, a dedicated website has been set up with several layers of background information on radioactive waste and its long-term management. This website provides, or links to, detailed information which is intended to be accessible and helpful to people with all levels of background knowledge from non-technical readers to experts. Further details are given in Chapter 8.

Chapter 1:
Introduction

This White Paper

1.1 Published as part of the Managing Radioactive Waste Safely (MRWS) programme, this White Paper sets out the UK Government's framework for managing higher activity radioactive waste in the long-term through geological disposal, coupled with safe and secure interim storage and ongoing research and development to support its optimised implementation. It also invites communities to express an interest in opening up without commitment discussions on the possibility of hosting a geological disposal facility at some point in the future.

1.2 The position of the Welsh Assembly Government (WAG), the Department of the Environment in Northern Ireland (DoENI) and the Scottish Executive (SE) is explained in paragraphs 1.9 – 1.14.

1.3 In this White Paper the term "Government" refers to the UK Government unless the context indicates otherwise.

Background

1.4 In 2001 the UK Government and devolved administrations initiated the Managing Radioactive Waste Safely (MRWS) programme with the aim of finding a practicable solution for the UK's higher activity wastes that:

- achieved long-term protection of people and the environment
- did this in an open and transparent way that inspired public confidence
- was based on sound science
- ensured the effective use of public monies.

1.5 In October 2006, following recommendations made by the independent Committee on Radioactive Waste Management (CoRWM) (Ref. 1), the UK Government and the devolved administrations published a response (Ref. 2) accepting CoRWM's recommendations that geological disposal, preceded by safe and secure interim storage, was the best available approach for the long-term management of higher activity radioactive wastes. The response committed to consulting on a framework for implementing geological disposal as the next stage of the MRWS programme.

Box 1 Key points of Government policy in its response to CoRWM

- Geological disposal is the way higher activity radioactive waste will be managed in the long-term
- this will be preceded by safe and secure interim storage until a geological disposal facility can receive waste. This period will include contingency planning to cover any uncertainties associated with implementation. Storage is a proven, safe and secure technology for the interim management of higher activity radioactive waste
- there will be ongoing research and development to support optimised delivery of the geological disposal programme, and the safe and secure storage of the radioactive waste in the interim
- Government will pursue an approach to geological disposal site selection based on voluntarism and partnership
- the Nuclear Decommissioning Authority (NDA) is the body responsible for planning and implementing geological disposal. The NDA has statutory responsibility under the Energy Act 2004, for the disposal and safe and secure interim storage of its waste in designated circumstances, and this is being provided for in its Strategy (Ref. 3) and Business Plan (Ref. 4)
- the arrangements will be subject to strong independent regulation by the statutory regulators
- scrutiny and advice to Government on the implementation programme will be provided by the independent CoRWM
- an open and transparent approach which enables the public and stakeholders to be involved throughout the implementation process
- implementation will be undertaken on a staged basis, with clear decision points allowing progress to be reviewed and costs, affordability, and value for money, safety, and environmental and sustainability impacts to be assessed before decisions are taken on how to move to the next stage.

1.6 On 25 June 2007, UK Government, in conjunction with the devolved administrations for Wales and Northern Ireland, published a MRWS consultation document (Ref. 5). This covered:

- the technical programme and aspects of design and delivery of a geological disposal facility; and
- the process and criteria to be used to decide the siting of that facility, including:
  - development of a voluntarism/partnership approach; and
  - the assessment and evaluation of potential disposal sites; including the initial screening-out of areas unlikely to be suitable for geological disposal.

The consultation closed on 2 November 2007.

1.7 One hundred and eighty-one responses to the Government's consultation document proposals were received. These responses have been analysed and the Summary and Analysis of Responses was published on 10 January 2008 (Ref. 6), and taken into consideration in the development of the way forward set out in this White Paper.

1.8 This White Paper covers the management of any higher activity waste arising in the UK, which is not covered by the SE's policy for higher activity waste, currently interim near-surface, near-site storage as announced on 25 June 2007 (Ref. 7). With this exception the framework set out in this White Paper complements UK Government and devolved administration policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom published in March 2007 (Ref. 8).

Devolved administration positions

1.9 Devolved administration positions in respect of this White Paper, at the time of its publication, are as follows.

Welsh Assembly Government (WAG)

1.10 Following the MRWS consultation with the people of Wales on proposals for taking forward geological disposal of higher level radioactive wastes, WAG has noted the proposals and has decided to reserve its position (Ref. 9).

1.11 The Assembly Government recognises the work by CoRWM leading to the Committee's recommendations supporting geological disposal and the use of a voluntarist approach to seeking potential host communities. The Assembly Government also attaches particular importance to ensuring the safe and secure interim storage of waste, maintaining the security of such storage against terrorist attack, and the need for research and development to support the optimised management and disposal of waste, as recommended by CoRWM. For Wales, the Assembly Government does not accept that any decision on legacy waste should necessarily set a precedent for the disposal of waste from any new nuclear power stations, and considers that it would be unproductive at this stage to ask Welsh communities to consider accepting waste from new nuclear power stations at this time. The Assembly Government supports the proposal by the UK Government that the full costs of waste disposal from any new nuclear power stations should be met in full by the operators.

1.12 The Assembly Government will continue to play a full part in the Managing Radioactive Waste Safely programme in order to secure the long term safety of radioactive wastes, to ensure the implementation of a framework appropriate to the needs of Wales and to ensure that the interests of Wales are taken into account in the development of policies in this area.

Northern Ireland

1.13 The Department of the Environment in Northern Ireland (DoENI) supports the Managing Radioactive Waste Safely programme, in recognition that it is in the best interests of Northern Ireland that the UK's higher activity radioactive waste is managed in the safest and most appropriate manner.

Scottish Executive (SE)

1.14 The SE was not a sponsor of the 2007 MRWS consultation on the framework for geological disposal. It continues to support long term interim storage and an ongoing programme of research and development. It continues to endorse the low level waste policy (LLW) published in March 2007 (Ref. 8).

Chapter 2:
Summary of the way forward

The framework

2.1 In light of the Managing Radioactive Waste Safely (MRWS) consultation (Ref. 5), the Summary and Analysis of Responses to it (Ref. 6) and careful consideration of the points raised, this White Paper sets out the framework for implementing geological disposal, including:

- the approach to compiling and updating the UK Radioactive Waste Inventory (UKRWI) and using it as a basis for discussion with potential host communities (see Chapter 3, in response to Question 1 of the MRWS consultation document)
- the Nuclear Decommissioning Authority (NDA's) technical approach for implementing geological disposal, including the use of a staged implementation approach and ongoing research and development to support delivery (White Paper paragraphs 4.1 – 4.35, in response to Question 2 of the MRWS consultation document)
- the approach to public and stakeholder engagement (White Paper paragraphs 4.36 – 4.40, see Question 3 of the MRWS consultation document)
- the arrangements to ensure sound regulation, scrutiny and control of the geological disposal facility development (White Paper paragraphs 5.1 – 5.21, see Question 4 of the MRWS consultation document)
- how relevant planning processes might be addressed as the programme proceeds (White Paper paragraphs 5.23 – 5.37, see Question 5 of the MRWS consultation document)
- the definition of 'community' for the purposes of the site selection process (White Paper paragraphs 6.6 – 6.9, see Question 6 of the MRWS consultation document)
- the process for issuing invitations and providing information to communities (paragraphs 6.10 – 6.11, see Question 7 of the MRWS consultation document)
- how a Partnership arrangement can be used to support a voluntarism approach (paragraphs 6.27 – 6.37, see Question 10 of the MRWS consultation document)

- the availability of an Engagement Package and a Community Benefits Package which addresses intergenerational needs, as part of the voluntarism and partnership approach, subject to being affordable and offering good value for money (paragraphs 6.46 – 6.61, see Questions 11 and 12 of the MRWS consultation document)
- the initial sub-surface screening criteria and the way in which Government will apply these criteria (paragraphs 7.4 – 7.12, see Question 8 of the MRWS consultation document)
- a refined set of criteria for assessing and evaluating candidate sites and details of further consultation on the way in which these criteria should be applied (paragraphs 7.23 – 7.31, see Question 9 of the MRWS consultation document).

2.2 In carrying forward the policy of geological disposal preceded by safe and secure interim storage, Government recognises the need to take account of developments in disposal and storage options, as well as possible new technologies and solutions.

Roles and responsibilities

2.3 The key roles and responsibilities for implementing geological disposal are:

Box 2 Roles and responsibilities for implementing geological disposal

- **Government** is responsible for the policy, will take final decisions and engage with stakeholders to ensure that the objectives of the MRWS programme are met
- **The NDA** is the implementing organisation, responsible for planning and delivering the geological disposal facility and, as part of this process, will engage with communities and other stakeholders. NDA already provides interim storage of waste on its sites and will continue to do so for as long as it takes to site and construct a geological disposal facility. The NDA will also undertake a programme of research and development to support optimised delivery of geological disposal and interim storage. The role of the NDA as implementing organisation is discussed in Chapter 4
- **Communities** with a potential interest in hosting a geological disposal facility will have the opportunity to work with the NDA and others in a partnership approach during the process. The role of communities is discussed further in Chapter 6
- **Local government** will be fully engaged in a partnership approach and will play a part in local decision-making during the site selection process. The role of local government is discussed in Chapter 6
- **Independent regulators** will ensure robust, independent regulation in relation to statutory responsibilities for ensuring that national, EU and international safety, security and environmental legislation and standards are met. The role and responsibilities of the regulators is discussed in Chapter 5
- **Committee on Radioactive Waste Management (CoRWM)** will provide independent scrutiny and advice to Government on the plans and programmes for delivering geological disposal including interim storage. The role of CoRWM is discussed further in Chapter 5.

Chapter 3:
The waste to be managed

Introduction

3.1 Responses to the Managing Radioactive Waste Safely (MRWS) consultation on this issue raised points such as coverage of the UK Radioactive Waste Inventory, factors that affected the magnitude of the Inventory, whether spent nuclear fuel, plutonium and uranium would be included for disposal, how changes to the Inventory would be dealt with in facility planning and development and how the issue of new build wastes might be addressed. This chapter explains what is meant by higher activity radioactive waste that needs to be managed in the long-term through geological disposal and also addresses the above points. The Government will use the UK Radioactive Waste Inventory (UKRWI) to provide a record of UK radioactive wastes and materials to be managed in the long-term through geological disposal.

The waste to be managed

3.2 The higher activity radioactive waste to be managed in the long-term through geological disposal are those that:

- cannot be managed under the "Policy for the Long-term Management of Solid Low Level Radioactive Waste in the United Kingdom" published in March 2007 (Ref. 8)
- are not managed under the Scottish Executive's (SE's) policy for higher activity waste, currently interim near-surface, near-site storage as announced on 25 June 2007 (Ref. 7).

3.3 Higher activity waste is composed of all radioactive material that has no further use. It includes the following categories of radioactive waste:

High level waste (HLW): Defined in the UK as waste "in which the temperature may rise significantly as a result of their radioactivity, so that this factor has to be taken into account in designing storage or disposal facilities" (Ref. 10). HLW arises in the UK initially as a highly radioactive liquid, which is a by-product from the reprocessing of spent nuclear fuel. By 2015, the majority of HLW will have been made 'passively safe' by converting the liquid HLW into solid form using a treatment process called 'vitrification'. This involves adding treated HLW to glass forming materials and pouring the mixture into 150 litre capacity stainless steel containers and allowing the waste to solidify. Current plans are that vitrified HLW be stored for at least 50 years, to allow a significant proportion of the radioactivity to undergo a natural decay process, for the waste to become cooler, and so make it easier to transport and dispose of.

Cutaway showing simulated vitrified HLW in a stainless steel container (courtesy BNFL)

Intermediate level waste (ILW): Defined in the UK as waste "with radioactivity levels exceeding the upper boundaries for low-level wastes, but which do not require heating to be taken into account in the design of storage or disposal facilities" (Ref. 10). ILW arises mainly from the reprocessing of spent fuel and from general operations and maintenance at nuclear sites, and can include metal items such as fuel cladding and reactor components, and sludges from the treatment of radioactive liquid effluents. As decommissioning and clean up of nuclear sites proceeds, more ILW will arise. Like other radioactive waste, ILW needs to be contained to protect workers and the public from radiation. Typically, ILW is packaged for disposal by encapsulation in cement in highly-engineered 500 litre stainless steel drums or in higher capacity steel or concrete boxes.

Cutaway showing simulated conditioned ILW in a stainless steel container (courtesy BNFL)

3.4 Higher activity waste also includes a small fraction of the following type of waste –

Low level waste (LLW): LLW is the lowest activity category of radioactive waste, and was defined in the recently updated Government LLW policy statement (Ref. 8) as:

> "Radioactive waste having a radioactive content not exceeding four gigabecquerels per tonne (GBq/te) of alpha or 12 GBq/te of beta/gamma activity"

LLW currently being generated consists largely of paper, plastics and scrap metal items that have been used in hospitals, research establishments and the nuclear industry.

Although LLW makes up more than 90 per cent of the UK's waste legacy by volume, it contains less than 0.1 per cent of the total radioactivity (Ref. 11). Most operational LLW is super-compacted to reduce its volume and sent for disposal at the LLW repository (LLWR) near the village of Drigg in West Cumbria, where it is encapsulated in cement and packaged in large steel containers. These are then placed in an engineered vault a few metres below the surface. A small fraction of the total volume of LLW cannot be disposed of in this way, due principally to the concentration of specific radionuclides[1] and so will need to be disposed of in a geological disposal facility.

Drum of raw LLW of miscellaneous materials (courtesy BNFL)

Other materials

3.5 In addition to existing wastes, there are some radioactive materials that are not currently classified as waste but that may, if it were decided at some point that they had no further use, need to be managed through geological disposal. These include:

Spent fuel: Fuel that has been used to power nuclear reactors is not currently classified as waste, because it still contains large amounts of uranium (and some plutonium) which can potentially be separated out through reprocessing and used to make new fuel. Most of the UK's spent fuel from civil reactors has been reprocessed in this way, producing separated plutonium and uranium and HLW, ILW and LLW as waste by-products. Spent fuel need not be reprocessed, however, and could instead be packaged and disposed of directly in a geological disposal facility, as is planned in Finland and Sweden. Some spent fuel from existing UK Advanced Gas-cooled Reactor (AGR) power stations and all the spent fuel from Sizewell B Pressurised Water Reactor (PWR) is not currently destined for reprocessing and may ultimately need to be managed in this way.

The recent Government White Paper 'Meeting the Energy Challenge: The Future of Nuclear Power', (Ref. 12) explained that in the absence of any proposals from industry, the Government has concluded that any new nuclear power stations that might be built in the UK should proceed on the basis that spent fuel will not be reprocessed and that plans for, and financing of, waste management should proceed on this basis. We are not currently expecting any proposals to reprocess spent fuel from new nuclear power stations. Should such proposals come forward in the future, they would need to be considered on their merits at the time and the Government would consult on them.

Plutonium: Plutonium is created in nuclear reactors as a result of irradiating the uranium in nuclear fuel. Like uranium it can be extracted from the spent fuel after it leaves the reactor by means of reprocessing (see above). The majority of it, like spent fuel, is not currently classified as waste, because it can still have a use, for example in the manufacture of some reactor fuels (Ref. 13).

[1] For example those with very long half-lives.

Uranium: Uranium is found naturally in many parts of the world. UK stocks of uranium, which are not classified as waste, come mainly from refining uranium ore (to make fuel), and from reprocessing spent fuel. The UK stocks include small quantities of 'enriched' uranium (which like plutonium is suitable for making fuel for modern nuclear reactors), but the vast majority of the UK's uranium stocks (around 70 per cent) consist of 'depleted' uranium, which is less radioactive and has more commonplace uses, such as counterweights in aircraft.

3.6 Currently waste owners place a zero asset value on these radioactive materials meaning that they are neither classed as waste nor a commercial asset.

3.7 Government asked the Nuclear Decommissioning Authority (NDA) to undertake a macro-economic study of its civil nuclear materials and its findings were submitted to Government in March 2007. A public version of the results was published in June 2007 (Ref. 13) and further work is now being carried out as a follow-up to this.

3.8 Government will decide, in conjunction with the radioactive material owners, whether or not any of these holdings should be declared as waste. In the meantime the NDA will factor possible inclusion of all these materials into the design and development of the geological disposal facility.

Waste ownership

3.9 The management of higher activity radioactive waste in the long-term through geological disposal will apply to all wastes owned by:

(i) the NDA

(ii) private companies which produce higher activity waste, including both the nuclear and non-nuclear sectors

(iii) Ministry of Defence (MoD).

3.10 It will be for operators in categories (ii) and (iii) above to negotiate appropriate commercial contracts with the NDA for emplacement of their waste in the geological disposal facility. In the case of operators of new nuclear power stations the Government would expect to set a fixed unit price for geological disposal of the operator's waste based on the operator's projected full share of waste disposal costs at the time when the approvals for the station are given, prior to construction of the station. The price will be set at a level over and above expected costs and will include a significant risk premium. Government is undertaking further work to establish the costs in the context of ensuring that new operators make sufficient and secure financial provision to cover their full costs of decommissioning and their full share of costs of waste management (see paragraph 4.30). Further information can be found in the Government's consultation on Funded Decommissioning Programme Guidance for New Nuclear Power Stations (Ref. 23).

Indicative amounts of waste

The UK Radioactive Waste Inventory (UKRWI)

3.11 Since 1984, the UK has published 12 'snapshots' of the current UKRWI, which includes both existing and expected waste volumes from ongoing nuclear operations. The last published Inventory has a stock date of 1 April 2007 (Ref. 11). The UKRWI is currently updated every three years.

3.12 Following careful consideration of responses, Government considers that the approach proposed in the MRWS consultation to compiling and updating the UKRWI and using it as a basis for continued open and transparent discussions with potential host communities for a geological disposal facility, is the right approach.

3.13 The 2007 UKRWI (Ref. 11), for the first time, contains radioactive materials not currently classified as waste. This change in the scope of the UKRWI will allow it to be used to track the latest estimates in waste and materials that will potentially need to be treated as waste at some future point.

Baseline Inventory

3.14 As part of its work the Committee on Radioactive Waste Management (CoRWM) put together a "Baseline Inventory" (Ref. 14) of higher activity wastes for geological disposal using data from the 2004 UK Radioactive Waste Inventory (Ref. 15). CoRWM took a prudent approach including the total amounts of radioactive wastes and other materials that could, possibly come to be regarded as waste in the future.

3.15 Using information from the 2007 UKRWI (Ref. 11) the Baseline Inventory has been updated in Table 1.

Table 1 : 2007 Radioactive Waste and Materials Inventory (Ref. 11)

Materials	Notes	Packaged volume		Radioactivity (At 1 April 2040)	
		Cubic Metres	%	Terabequerels	%
HLW	1, 2, 3, 5	1,400	0.3%	36,000,000	41.3%
ILW	1, 2, 5	364,000	76.3%	2,200,000	2.5%
LLW (not for LLWR)	1, 2, 5	17,000	3.6%	<100	0.0%
Spent nuclear fuel	1, 4, 5	11,200	2.3%	45,000,000	51.6%
Plutonium	1, 4, 5	3,300	0.7%	4,000,000	4.6%
Uranium	1, 4, 5	80,000	16.8%	3,000	0.0%
Total		**476,900**	**100**	**87,200,000**	**100**

Notes

1. Quantities of radioactive materials and wastes are consistent with the 2007 UK Radioactive Waste Inventory (Ref. 11).
2. Packaging assumptions for HLW, ILW and LLW not suitable for disposal at the existing national LLWR are taken from the 2007 UKRWI. Note that they may change in the future.
3. The HLW packaged volume may increase when the facility for disposing the canisters, in which the vitrified HLW is currently stored, has been implemented.
4. Packaging assumptions for plutonium, uranium and spent nuclear fuels are taken from the 2005 CoRWM Baseline Inventory [Ref. 14]. Note that they may change in the future.
5. Radioactivity data for wastes and materials was derived using the 2007 UK Radioactive Waste Inventory. 2040 is the assumed start date for the geological disposal facility.
6. It should be noted that at present the Baseline Inventory is based on UK Inventory figures, and as such, currently contains waste expected to be managed under the Scottish Executive's policy of interim near-surface, near-site storage as announced on 25 June 2007 (Ref. 7)

3.16 These figures are calculated on a number of detailed assumptions and can only be taken as indicative because legacy waste amounts will change over time due, for example, to changes in planned operations and ability to reduce the amounts of waste for disposal through application of the waste hierarchy[2]. In practice, there may also be some types of waste – for example, the graphite cores from Magnox nuclear reactors – where alternative management options could alter the inventory of waste destined for geological disposal. NDA competitions will introduce international expertise in decommissioning and waste management that could lead to other options being proposed and implemented in due course.

3.17 Changes in the UKRWI, and hence the Baseline Inventory, will occur. The estimated quantity and the types of waste to be consigned to a disposal facility needs to be visible and regular UKRWI updates will ensure transparency and indicate the nature of these changes. Any final agreement with a community on a preferred site for the geological disposal facility will need to address possible changes to the Inventory in future years.

[2] Use of a hierarchical approach to minimise the amounts of waste requiring disposal. The hierarchy consist of; non-creation where practicable; minimisations of arisings where the creation of waste is unavoidable; recycling and reuse; and, only then disposal.

Waste from new nuclear reactors

3.18 CoRWM's recommendations to UK Government were about existing and committed waste arisings (Ref. 1). CoRWM considered that "should a new build programme be introduced… it would require a quite separate process to test and validate proposals for the management of wastes arising". The nuclear consultation (Ref. 16) document set out the Government's views on the feasibility and desirability of disposing of new build waste in a geological disposal facility including the balance of ethical considerations in relation to any decision to create new waste.

3.19 Following that consultation, the UK Government issued a White Paper on Nuclear Power (Ref. 12). In this, the UK Government set out the following conclusion:

> "Having reviewed the arguments and evidence put forward, the Government believes that it is technically possible to dispose of new higher-activity radioactive waste in a geological disposal facility and that this would be a viable solution and the right approach for managing waste from any new nuclear power stations. The Government considers that it would be technically possible and desirable to dispose of both new and legacy waste in the same geological disposal facilities and that this should be explored through the Managing Radioactive Waste Safely programme. The Government considers that waste can and should be stored in safe and secure interim storage facilities until a geological facility becomes available.
>
> Our policy is that before development consents for new nuclear power stations are granted, the Government will need to be satisfied that effective arrangements exist or will exist to manage and dispose of the waste they will produce.
>
> The Government also believes that the balance of ethical considerations does not rule out the option of new nuclear power stations."

3.20 Through the Generic Design Assessment process (Ref. 17) the nuclear regulators – Health and Safety Executive (HSE), Environment Agency and the Office for Civil Nuclear Safety (OCNS) – will assess the safety, security and environmental impact of power station designs, including the quantities and types of waste (gaseous, liquid and solid) that are likely to arise, their suitability for storage and their disposability (Ref. 18). The NDA will be involved in this work specifically to consider disposability of wastes being proposed at an early stage. The nuclear power station designs that are currently available have simpler structures (Ref. 19) than most existing facilities, use fewer materials and produce less waste than earlier generations of nuclear reactors.

3.21 It is not possible to provide at this time a definitive inventory of radioactive waste that would arise as a result of a new nuclear build programme. This is because it will depend on aspects such as the reactor type, how many new reactors there are and how long they operate. The size of any programme of new nuclear power stations might impact on whether all of the new waste could be accommodated in the same geological disposal facility as legacy waste. It is the government's policy that the owners and operators of new nuclear power stations must set aside funds over the operating life of the power station to cover the full costs of decommissioning and their full share of waste management and disposal costs.

3.22 Through agreed mechanisms for updating the Baseline Inventory, inclusion of new waste will be taken forward in discussion with host communities as the programme proceeds. Geological disposal facility design activities will consider the necessary features to safely accommodate particular waste types if that proves necessary.

Chapter 4:
Preparation and planning for geological disposal

Introduction

4.1 Geological disposal involves isolating radioactive waste deep inside a suitable rock formation to ensure that no harmful quantities of radioactivity ever reach the surface environment. It is a multi-barrier approach, based on placing wastes deep underground, protected from disruption by man-made or natural events. Geological disposal is internationally recognised as the preferred approach for the long-term management of higher activity radioactive waste.

4.2 Many of the responses to the Managing Radioactive Waste Safely (MRWS) consultation made specific comment on the proposed technical approach for developing a geological disposal facility. These are summarised in the Summary and Analysis of MRWS responses (Ref. 6) and covered the design of a facility, the additional research and development necessary to support its delivery, the feasibility of co-location of wastes, the issue of retrievability and the need for planning and costing of the implementation programme. There were also comments on the need for greater clarity on how interim storage would be dealt with.

4.3 This chapter addresses these responses to the MRWS consultation document. It sets out how geological disposal of higher activity radioactive waste will be implemented, including safe and secure interim storage up until disposal. It also acknowledges the need for ongoing research and development to support safety case development and explains the generic design features that a disposal facility would need to include, outlining the Nuclear Decommissioning Authority's (NDA's) role in implementing the programme and how the NDA will engage with stakeholders and the public, throughout. Some of the more detailed aspects of facility design will have to be addressed in more detail over future years and could depend to a degree on discussions with potential host communities.

Box 3 Geological disposal internationally (Ref. 20)

- As of 2006 at least 39 countries (including the UK) had significant arisings of radioactive waste.
- Of those countries, 25 have taken final decisions on a long-term policy and all had opted for geological disposal. These include Belgium, Canada, Finland, France, Germany, USA and Sweden.
- A further six have expressed a preference for geological disposal with the remainder yet to decide.
- The USA has an operational facility which is disposing of transuranic wastes (broadly equivalent to Low Level Waste (LLW) – Intermediate Level Waste (ILW)) and Germany is planning to have its geological facility for non-heat generating wastes operational by 2013.
- A number of countries (including Finland and Sweden) are already investigating their preferred sites for a geological disposal facility for spent fuel. Finland and Sweden already have shallow geological facilities for disposal of ILW and LLW. Sweden has been operating the deep geological research facility, testing techniques for disposal of spent fuel, for a number of years.
- France is investigating a site at Bure with a view to it becoming the final disposal facility and Canada is developing a deep repository for LLW and ILW at Kincardine.
- All countries also have some form of interim storage. But no country has indicated that it has chosen, or is considering, indefinite storage as its long-term waste management policy.

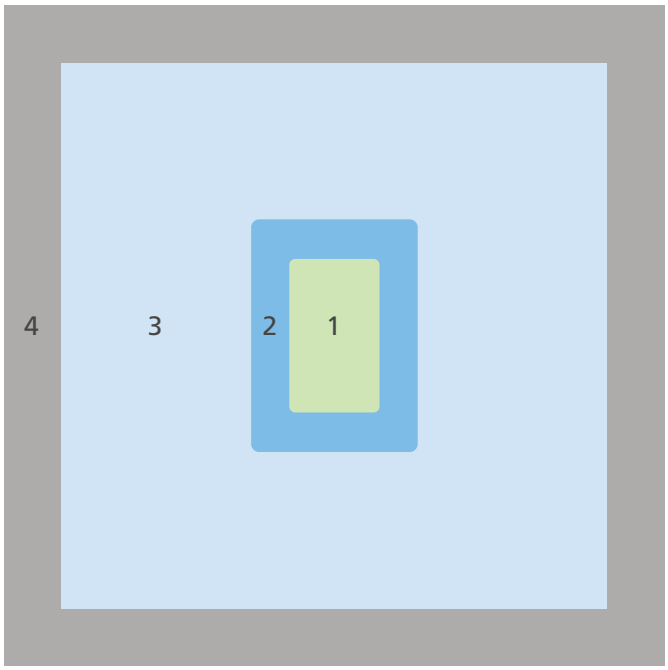
Interim storage

4.4 It will be many years before a geological disposal facility could be completed. Government accepted CoRWM's recommendation that a robust programme of interim storage must play an integral part in the long-term management strategy and believes this will provide an extendable, safe and secure means to hold waste for as long as it takes to identify a site and to construct a geological disposal facility.

4.5 Interim stores provide safe and secure protection for waste packages, although for a period much shorter than the half-life of the radioactive materials which require management. In terms of preventing hazardous releases to the outside environment, a number of engineered barriers are provided to complement safety management arrangements, for example:

- the waste form
- the container
- shielding (either of the package or of the store structure)
- the external store structure.

Figure 2: Interim Storage – physical and environmental layers of protection (courtesy NDA)



1 The passivity of the wasteform is the primary barrier.

2 The waste container is the secondary barrier.

3 Control of the store environment is the tertiary barrier and is important in maintaining integrity of the wasteform and waste container.

4 The store structure is the final layer of protection.

4.6 Shielding of the waste packages reduces the radiation emitted. To assure passive safety the focus of these engineered barriers is on the waste form first, then the container and finally, the store. The store building itself represents the final barrier of a series of barriers between the waste and the wider environment.

4.7 The emphasis is on early immobilisation of operational and legacy waste materials to reduce their hazard. Such packaged wastes need to be placed into appropriate interim storage until they can be disposed of in the geological disposal facility. Packaging requirements are kept under review by the NDA's Radioactive Waste Management Directorate (RWMD), under arrangements scrutinised by the regulators so as to minimise the possibility that waste will have to be repackaged prior to receipt in the repository whilst in storage. Wastes will be made passively safe as soon as practicable, consistent with the objective of avoiding future repackaging and the attendant double handling of wastes.

4.8 Existing stores for waste packages are typically designed to provide a service life of 50 to 100 years. These stores will have their service lives extended as required, in order to provide sufficient safe and secure interim storage throughout the geological disposal facility development programme. The replacement of stores will be avoided wherever possible, but the NDA will ensure that its strategy allows for the safe and secure storage of the waste contained within them for a period of at least 100 years.

4.9 The security of all stores is of paramount importance. NDA sites are operated under contract by site licensee companies (SLC)[3]. These SLCs, and other operators of interim waste stores such as British Energy, are regulated and advised by the Office for Civil Nuclear Security (OCNS). Account is taken of matters including the design and engineering of new stores and the refurbishment of existing stores, in light of the risks to the security of their contents, now and into the future.

4.10 Following the Committee on Radioactive Waste Management's (CoRWM's) recommendation (Ref. 1) that a robust programme of interim storage must play an integral part in implementing geological disposal, the NDA is reviewing UK waste storage arrangements. The review covers legacy facilities containing unpackaged waste as well as more modern stores for packaged waste. The review also extends to consideration of British Energy and MoD wastes not managed by the NDA. The regulators and Government are closely involved in this work and the results will be reflected in the next NDA Strategy. The NDA review focuses on the ongoing provision of storage for packaged wastes pending the availability of a geological disposal facility and also considers the storage of unconditioned wastes currently held in legacy facilities. The review will be completed in 2008.

Encapsulated product store, Sellafield (courtesy NDA)

4.11 Similar arrangements to those above apply to the safe and secure storage of other radioactive materials such as spent fuel, uranium and plutonium.

4.12 Radioactive wastes owned by the Ministry of Defence (MoD) and held at MoD owned or related facilities are stored safely and securely in accordance with MoD regulations. MoD Intermediate level waste (ILW) is currently stored at AWE Aldermaston until a geological disposal facility becomes available. The MoD has no high level waste (HLW).

[3] An SLC is a corporate body to whom a nuclear site licence to install or operate a nuclear reactor or other prescribed nuclear installation (such as a geological disposal facility) has been granted. An SLC has legal responsibility for the safe operation of the installation, and liability for injury to persons or damage to property resulting from occurrences involving nuclear matter or emissions of ionising radiations. It is the SLC and not the NDA who will be subject to regulatory control.

Disposal facility design and delivery

4.13 Some of the waste to be placed in a geological disposal facility will remain radioactive and thus potentially hazardous for hundreds of thousands of years. The principle of geological disposal is to isolate the waste deep inside a suitable rock formation to ensure that no harmful quantities of radioactivity reach the surface environment. Meanwhile the process of radioactive decay will continue reducing the hazard of the waste until it eventually presents no further danger.

4.14 To achieve this, the waste will be placed in an engineered underground containment facility – the 'geological disposal facility'. The facility will be designed so that natural and man-made barriers work together to minimise the escape of radioactivity. It is inevitable that some radioactivity from the facility will eventually reach the surface. But the disposal facility will be designed to ensure that risks arising from such release would be insignificant compared to the levels of radioactivity all around us in the environment from natural background sources. The natural process of radioactive decay over time will assist this aim.

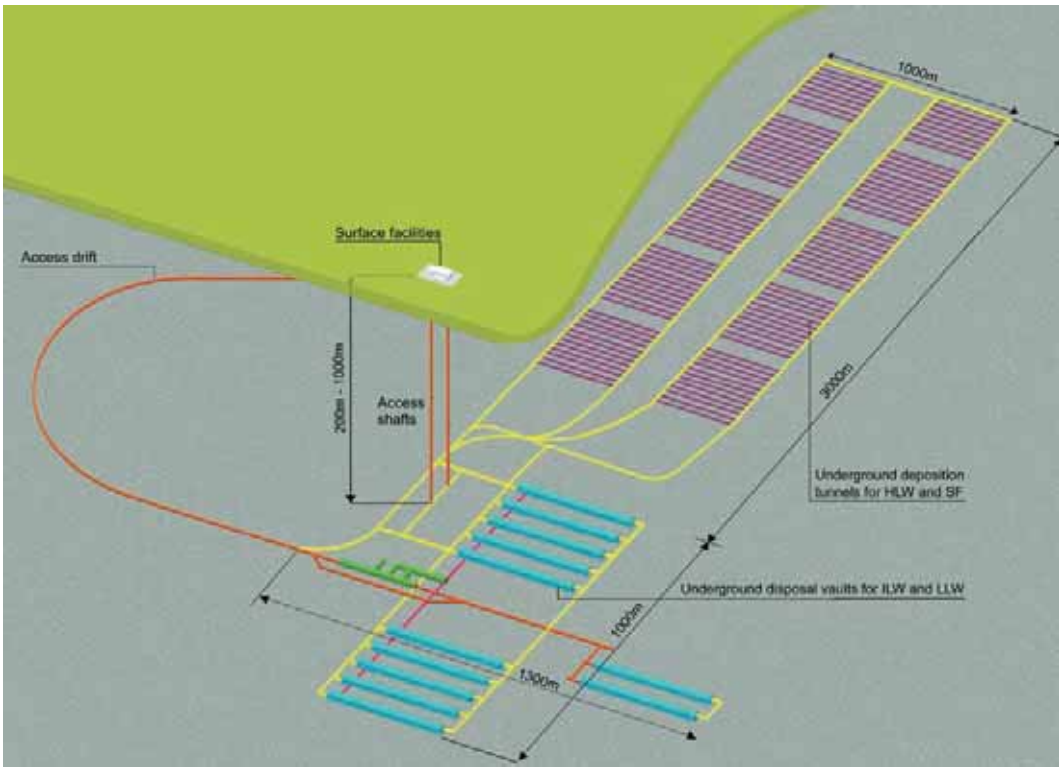
4.15 As noted earlier, the UK Government policy is aligned with countries such as Finland, France, Sweden and the USA who have already made good progress towards implementing geological disposal. The UK is therefore well-placed to benefit from international experience in this field, while using and maintaining domestic capabilities. Close scrutiny of international best practice and exchanging experience with other countries will be a key part of a geological disposal facility development process over the coming decades.

Underground facilities at the Waste Isolation Pilot Plant (WIPP) in New Mexico USA (courtesy WIPP information centre)

4.16 The detailed layout and design of the basic geological disposal facility, both above and below ground, will be tailored to the Baseline Inventory and the geography and specific geological characteristics at the site in question. An illustrative co-located facility structure is shown in Figure 3 (it should be noted that the underground areas need not necessarily be constructed on a single level but can be layered to take account of the most advantageous local geology).

4.17 During the course of 2008-9, the NDA will undertake early planning for the implementation of a geological disposal facility. This will include provision for a staged implementation approach, with clear decision points, that allows design and development, cost, affordability and value for money, safety, and environmental and sustainability impacts to be reviewed at the end of each stage before a decision to move on to the next stage is agreed with Government. This planning will be progressively refined and costed as the implementation programme proceeds.

Figure 3: Generic co-located geological disposal facility



4.18 Some of the more detailed aspects of the design of a geological disposal facility are discussed in Annex A.

4.19 Construction and operation of a geological disposal facility will be a long-lived, multi-billion pound engineering project. It will draw on the skills of both the underground construction and nuclear industries, and will provide skilled employment for hundreds of people over many decades. As such, it will have significant positive economic and social impacts on the surrounding area. How these can be managed are discussed in Chapter 6.

Retrievability of waste

4.20 Government acknowledges that there is a divergence of views on the issue of waste retrievability, but on balance considers that CoRWM's conclusion was correct, i.e. that "leaving a facility open, for centuries after waste has been emplaced, increases the risks disproportionately to any gains" (Ref. 1). Closure at the earliest opportunity once facility waste operations cease provides greater safety, greater security from terrorist attack, and minimises the burdens of cost, effort and worker radiation dose transferred to future generations.

4.21 CoRWM noted that it is likely to be at least a century from publication of their recommendations in July 2006 until final closure of an entire facility is possible Ref. 1). In practice it could be longer. This timescale provides sufficient flexibility for further research to be undertaken.

4.22 Hence Government's view is that the decision about whether or not to keep a geological disposal facility (or vaults within it) open once facility waste operations cease can be made at a later date in discussion with the independent regulators and local communities. In the meantime the planning, design and construction can be carried out in such a way that the option of retrievability is not excluded. Any implications for the packaging of wastes will be kept under review.

Co-location of wastes in a geological disposal facility

4.23 It would be possible to build more than one geological disposal facility, for example one for ILW and LLW and one for HLW and spent fuel (or indeed two facilities that each took some of each waste type). This could be necessary if the geology at potential sites was not suitable for a 'co-located' (i.e. combined) geological disposal facility.

Waste being stacked in a disposal vault at the Waste Isolation Plant (WIPP) in New Mexico USA (courtesy WIPP information centre)

4.24 Some respondents to the MRWS consultation questioned whether different types of waste could be safely co-located in a disposal facility. Research will be required to support the detailed design and safety assessment for the disposal facility for each type of waste, and in relation to any potentially detrimental interactions between the different disposal systems. Previous studies and evaluations (Ref. 21) have identified the most important interactions and these will be kept under review in light of any new research findings. This includes the exchange of information with a number of international waste management programmes.

4.25 In principle the UK Government sees no case for having separate facilities if one facility can be developed to provide suitable, safe containment for the Baseline Inventory. This is because the sharing of surface facilities, access tunnels, construction support and security provision could lead to significant benefits, including major cost savings and lower environmental impacts. There is no reason why this should not be technically possible, in theory, although the final decision would be made in the light of the latest technical and scientific information, international best practice and site specific environmental, safety and security assessments.

Design implications of including waste from any new nuclear power stations

4.26 Government considers that it would be technically possible, and desirable, to dispose of any new waste in the same geological disposal facility as legacy waste and has committed to exploring this through the MRWS process (Ref. 12, paragraphs 3.18 – 3.22).

4.27 The fact that construction of a geological disposal facility has not begun will allow any necessary engineering features to be built into the design to accommodate particular types of waste if necessary. The size and timing of any programme of new nuclear power stations may have an impact on the amount of any new waste that could be disposed of in the same facility as the legacy waste. If new build waste were to be accommodated in the same facility as legacy waste, additional capacity would have to be provided and the design would need to be modified. The facility may also have to stay open longer, as new power stations could be decommissioned later than existing plants.

4.28 The issue of the disposability of waste will be specifically considered as any applications for new nuclear build come forward. Through the Generic Design Assessment process (Ref. 17) the nuclear regulators will assess the safety and security, and the environmental impact, of power station designs, including the quantities and types of waste (gaseous, liquid and solid) that are likely to arise, and the ability to store and dispose of solid wastes (Ref. 18). The NDA will be involved in this work specifically to consider disposability of wastes being proposed at an early stage.

Costs of geological disposal facility development

4.29 The exact cost of a geological disposal facility development will be influenced by many different factors, including the Baseline Inventory of waste, the geology at the site in question and the design of a geological disposal facility. The NDA is currently developing a parametric cost model which will allow the implications and costs of different scenarios to be assessed. Indicative figures will be published in the NDA's Annual Report and Accounts.

4.30 The UK Government is undertaking further work to establish the costs of managing waste from new nuclear power stations. This work is in the context of ensuring that the operator of any new power station makes sufficient and secure financial provision to cover their full decommissioning costs and their full share waste management costs. Further information can be found in the Government's consultation on Funded Decommissioning Programme Guidance for New Nuclear Power Stations published on 22 February 2008 (Ref. 23).

Research and development (R&D) to support implementation

4.31 The need for more research and development was raised in a number of MRWS consultation responses. The NDA has statutory responsibility under the Energy Act 2004 for carrying out research to support the activities for which it is responsible. The UK Government believes, in the light of CoRWM's work and wider international experience, that there is already sufficient research work available to be confident that geological disposal is technically achievable. In line with CoRWM's recommendation 4 (Ref. 1) and responses to the MRWS consultation, the NDA will undertake further research during the geological disposal facility development process in order to refine concepts, improve understanding of chemical and physical interactions in a disposal facility, address specific issues raised by regulators, support development of site-specific safety cases (see Chapter 5) and to optimise facility design and delivery.

Part of a Geological disposal facility under construction in Finland (courtesy Posiva)

Copper cylinder for spent fuel disposal in Finland (courtesy Posiva)

4.32 Whilst Government policy is to pursue the geological disposal of higher activity radioactive waste, Government recognises the need to take account of developments in storage and disposal options, as well as possible new technologies and solutions. Future research and development may identify new options for dealing with some wastes, which under application of the waste hierarchy (see footnote 2, pg 20), could reduce the amounts of waste requiring disposal. The NDA will also keep options such as Borehole Disposal of certain types of waste under review. The cost implications of the various options explored will be estimated by the NDA as part of its work programme and Government will look to CoRWM (Ref. 24) to provide independent scrutiny and advice on the NDA research programme.

4.33 The NDA's Radioactive Waste Management Directorate already has a focused research and development programme in support of geological disposal and a document setting out these proposals has been issued for wide-ranging review (Ref. 25). This sets out the key drivers, a proposed programme and potential arrangements for carrying out the work.

4.34 Furthermore, to ensure a world class scientific programme, combined with cost effectiveness and value for money, the NDA has a number of partnerships and strategic alliances. These include:

- strategic relationships with universities
- bi-lateral agreements with overseas waste management organisations for joint research work and information exchange
- participation in European Commission funded research projects alongside overseas waste management organisations
- involvement in research projects with the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD)
- links with learned societies and professional bodies.

4.35 Review and scrutiny of NDA's research and development programme supporting geological disposal will be undertaken by the NDA's Research Board and Research Forum, the independent regulators and CoRWM.

Public and stakeholder engagement

4.36 MRWS consultation responses (Ref. 6) were broadly in favour of proposals set out in the consultation document for public and stakeholder engagement. There were comments on the overall approach that would be adopted, which bodies should be viewed as stakeholders and the means by which they would be engaged. These points have been carefully considered and reflected in the approach below. A key element will be the NDA framework for public and stakeholder engagement and communication which will be subject to further stakeholder consultation. This will include all those who responded to this aspect of the MRWS consultation.

4.37 In light of responses, the UK Government's proposal is that the NDA and its delivery organisation should work in partnership with potential host communities throughout the process of geological disposal facility siting, development and operation. This will enable engagement with those stakeholders and members of the public who would be most affected by development of a geological disposal facility. It is also likely that some high level engagement with Host Communities and their Decision Making Body/ies will need to be led by central Government.

4.38 The NDA already engages widely with the public and with its current stakeholders, consulting on the work covered by its Strategy (Ref. 3) and Business Plans (Ref. 4), using various mechanisms including a National Stakeholder Group and Site Stakeholder Groups at its sites.

4.39 During the development of the geological disposal facility, the NDA will seek views from CoRWM and stakeholder forums established by various interest groups as well as using a range of engagement mechanisms to involve stakeholders. This will include a range of activities at national, regional and local level in order to increase transparency, raise awareness of the issues and enable interested parties to provide input to proposed arrangements for delivery of a geological disposal facility. These are likely to include workshops and seminars on specific aspects of geological disposal in response to demand; posting information on the NDA website and distributing it to interested parties; providing briefings and presentations; and working with the media. At a local and regional level much of this engagement will be through the NDA's involvement in the Community Siting Partnership (see paragraph 6.29).

4.40 Following publication of this White Paper, the NDA will set out its framework for public and stakeholder engagement and communication during development of the geological disposal facility. Stakeholders will be invited to comment on the framework to allow an engagement and communications strategy to be developed. Views will be sought on what stakeholders want from engagement with the NDA, the timing of that involvement and their preferred means of engagement. The

resulting strategy, which must be agreed by Government, is likely to include the following three elements:

- formal consultations required under statutory or regulatory requirements
- engagement as part of the NDA's wider community engagement activities, including Site and National Stakeholder Groups
- meeting the specific requirements of local communities which are participating in the site selection process (see Chapter 6).

Revised governance of the NDA

4.41 Revised governance arrangements for the NDA have been set in place to recognise the existing joint statutory responsibilities of the Secretary of State for Business, Enterprise and Regulatory Reform and the Scottish Ministers, but also acknowledge the radioactive waste management policy interests of Defra, the Welsh Assembly Government (WAG) and the Department of the Environment in Northern Ireland (DoENI).

4.42 The Waste Management Steering Group (WMSG) has been established to augment existing governance arrangements. The Group is made up of officials from:

- Defra, BERR, WAG and DoENI (as sponsors of the MRWS programme)
- HM Treasury
- SE
- NDA

It monitors all of the NDA's long-term waste management planning and development programmes to ensure a coherent approach to the management of all radioactive wastes, including both higher activity and low level waste. The development of a geological disposal facility for higher activity waste will be the main focus of the Steering Group's work.

4.43 As part of its work, the WMSG will consider CoRWM's advice to Ministers on the NDA's long-term waste management planning and implementation programmes. The Steering Group may make proposals to Ministers on how Government, in conjunction with the NDA should respond to such advice. It also provides advice to UK Government and devolved administration Ministers on progress with implementation of geological disposal, and on the decisions that will need to be taken as the staged implementation programme proceeds. The Chair and appropriate members of CoRWM will be invited to attend Steering Group meetings, as necessary.

The NDA as the implementing body

4.44 The Government's response to CoRWM in October 2006 (Ref. 2) gave responsibility for planning and implementing geological disposal to the NDA, so as to enable the NDA to take an integrated view across the waste management chain, with both long and short term issues addressed in planning and strategy development. Since then the NDA has established a new Radioactive Waste Management Directorate (RWMD), incorporating resources from the former United Kingdom Nirex Ltd, which it will develop into an effective delivery organisation to implement geological disposal.

4.45 It is envisaged that RWMD will evolve under the NDA into the 'NDA's delivery organisation'. This organisation will be responsible for the delivery of the geological disposal facility and in due course its ownership can be opened up to competition in line with other NDA sites. Further dialogue with Government, the regulators and the supply chain will be required before this step is taken to determine whether this is the appropriate implementation approach.

4.46 Key objectives for the RWMD are set out in the NDA Business Plan, which has recently been revised and published following public consultation (Ref.4).

Chapter 5:
Protecting people and the environment: regulation, planning and independent scrutiny

Summary

5.1 Managing Radioactive Waste Safely (MRWS) consultation responses generally regarded existing regulation as satisfactory. Responses stressed the need for clarity of responsibilities, the need for regulators to work together in an integrated manner, the need for staged regulation and also the possible need for new, or an update to current, legislation to support regulatory delivery. These points have been addressed in this chapter.

5.2 The Government's arrangements to ensure sound regulation, scrutiny and control of the Nuclear Decommissioning Authority's (NDA's) geological disposal facility development programme are summarised in the box overleaf.

Box 4 Regulation, scrutiny and control

Government is committed to strong and effective control and regulation of the geological disposal facility development process, and this will be enforced in the following way:

- The NDA and its delivery organisation will comply with the appropriate regulatory and planning processes
- Government will look to early and continued involvement of the safety, environmental, security, transport and nuclear safeguard regulators throughout the MRWS implementation programme
- The regulators will make clear their regulatory requirements to the NDA's delivery organisation at an early stage
- Government will expect the NDA's delivery organisation, in discussion with relevant planning authorities and the regulators, to develop a coordinated strategy for seeking the necessary planning permission and regulatory approvals, with roles, responsibilities and any 'hold-points' clearly identified
- Environmental impact and sustainability issues will be assessed through application of the Strategic Environmental Assessment (SEA), Sustainability Appraisal (SA) and Environmental Impact Assessment (EIA) processes
- Regulatory processes for granting any necessary licences or authorisations will provide opportunity for input and assessment of public and stakeholder views
- Regulatory reviews will be published, and regulatory decision-making processes will be open and transparent while taking account of necessary issues such as national security and commercial confidentiality.

Regulation

5.3 Robust, effective and independent regulation is vital for public confidence in a geological disposal facility programme which meets high safety, security and environmental standards based on comprehensive risk assessment and management.

5.4 The UK has a strong and effective regulatory regime for the management of radioactive waste, including storage. This is delivered principally through the following bodies in Box 5.

Box 5 Regulatory bodies

Health and Safety Executive (HSE)

The statutory body responsible for the enforcement of health and safety law on nuclear sites in Great Britain. HSE is the licensing authority for nuclear installations in Great Britain and, through its Nuclear Installations Inspectorate (NII), regulates the nuclear, radiological and industrial safety of nuclear installations.

Environment agencies

The Environment Agency is responsible in England and Wales for the enforcement of environmental protection legislation in the context of sustainable development. It authorises and regulates radioactive and non-radioactive discharges and disposals to air, water (both surface water and groundwater) and land. The equivalent body in Scotland is the Scottish Environment Protection Agency (SEPA) and in Northern Ireland this function is carried out by the Environment and Heritage Service within the Department of the Environment (DoENI)

Office for Civil Nuclear Security (OCNS)

This Division within HSE's Nuclear Directorate regulates security arrangements in the civil nuclear industry, including security of nuclear material in transit, exercising statutory powers on behalf of the Secretary of State for Business, Enterprise and Regulatory Reform (BERR).

Department for Transport (DfT)

Regulation of the safety of radioactive material transport by road, rail and sea in Great Britain is carried out by DfT, HSE, the Office of Rail Regulation (ORR) and the Maritime and Coastguard Agency (MCA). The DfT exercises its statutory powers of enforcement on behalf of the Secretary of State for Transport. In Northern Ireland, regulation of the carriage of radioactive material by road is the responsibility of the Department of the Environment. Responsibility for regulating the carriage of radioactive material by rail is the responsibility of the Department of Enterprise, Trade and Investment.

5.5 A number of Managing Radioactive Waste Safely (MRWS) consultation responses highlighted the need for clarity of responsibilities between the regulatory bodies in regulating the delivery of the geological disposal facility programme. Regulatory bodies will work closely together to ensure the regime as a whole is coherent, effective and efficient. Individual aspects of regulation will be carried out in accordance with the statutory responsibilities of each regulatory body and will be clearly delineated. Implementation of the geological disposal facility programme by the NDA will comply fully with relevant UK and international legislation and conventions, including:

- all relevant Euratom Treaty requirements as transposed into UK law, including Council Directive 96/29/Euratom laying down basic safety standards for the protection of the health of workers and the general public against the dangers of ionising radiation (Ref. 26, the Basic Safety Standards Directive)

- all relevant legislation, including the Radioactive Substances Act 1993 (RSA93) (Ref. 27), the Health and Safety at Work etc. Act 1974 (HSWA74) (Ref. 28), the Nuclear Installations Act 1965 (NIA65) (Ref. 29), the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2007 and the Nuclear Industries Security Regulations 2003
- the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, and the Convention on Physical Protection of Nuclear Material
- the principles of radiological protection established by the International Commission on Radiological Protection (ICRP) as reflected in European Union and UK legislation and standards, the latter based on independent advice from bodies such as the Health Protection Agency (HPA) and the Committee on Medical Aspects of Radiation in the Environment (COMARE).

5.6 Some comments from MRWS consultation responses included the suggestion that Government should enact bespoke legislation for these purposes, rather than relying on existing legislation. Government does not consider that bespoke legislation is required for implementation of geological disposal but it will keep this under review.

5.7 The NDA's delivery organisation will meet all relevant regulatory requirements in its delivery of the geological disposal facility. It will be the responsibility of the delivery organisation to ensure that its programme is appropriately coordinated as part of a staged application and approval process to ensure that permissions are obtained in the right order. The geological disposal facility will comply fully with the requirements of the independent regulators, who will work closely together. The environment agencies will be providing updated guidance on the requirements for authorisation of geological disposal facilities.

Transport cask in the reception area of Swedish central interim storage facility for spent nuclear fuel (courtesy SKB)

5.8 Early and ongoing engagement between the regulators, the NDA and its delivery organisation will inform and assist the subsequent formal regulatory stages. Regulatory scrutiny of early work will assist the process of site selection; provide information to stakeholders; build confidence in the safety, security and environmental performance of the proposed geological disposal facility; inform the work required during future stages; and help to avoid unnecessary and costly delays during the formal regulatory stages.

5.9 The paragraphs below are not intended as a detailed description of the regulatory requirements, but summarise the key requirements that will apply to the development of a geological disposal facility in the UK.

Nuclear site licensing – safety regulation

5.10 A geological disposal facility will require a Nuclear Site Licence under the Nuclear Installations Act 1965 (NIA65) (Ref. 29). Granting a licence is dependent on satisfactory assessment of a safety case for the facility by the Health and Safety Executive. Licence conditions cover all aspects of nuclear safety relating to the development of the facility and provide for a series of construction and operational hold points e.g. consent to start construction or excavation, consent to start commissioning, etc. Before work can proceed beyond a hold point, the Health and Safety Executive will need to be satisfied that the proposed activity following the hold point is backed by a satisfactory safety case submission[4].

5.11 After completion of operational and decommissioning activities on a nuclear licensed site, the site remains under the nuclear site licensing regime until the licence holder is able to demonstrate to the safety regulator that it is appropriate to end the 'period of responsibility'. As the criteria for ending this institutional control have only ever been applied to nuclear facilities operating at the surface these may have to be reviewed to ensure that there is appropriate consideration of the distinction between traditional surface facilities and a geological waste disposal facility.

5.12 In light of MRWS consultation responses and discussions with the Health and Safety Executive (HSE), Government will keep under review the legislative and regulatory provisions available to the safety regulator to ensure they are sufficient to enable it to undertake the necessary staged licensing of the NDA's geological disposal facility development.

Authorisation of waste disposal – environmental regulation

5.13 The disposal of radioactive waste is subject to authorisation under the RSA 93[5] (Ref. 27) by the appropriate environmental regulator[6]. The NDA's delivery organisation will be required to apply to the environmental regulator for authorisation. Before the environmental regulator grants any authorisation, the European Commission (EC) will also need to be satisfied that other countries will not be adversely affected by the proposed disposal facility. Within an authorisation for radioactive waste disposal, the environmental regulator has the right to impose additional controls on the NDA's delivery organisation to ensure protection of the environment from a non-radiological perspective.

5.14 The development of a geological disposal facility will be subject to staged authorisation by the environmental regulator. Following careful consideration of responses to the MRWS consultation, Government is looking to amend the legislative powers available to the Environment Agency to enable it to undertake a staged authorisation process more effectively.

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[4] Safety case submissions are documents required to be produced by applicants for nuclear site licenses and by existing licensees under their nuclear site licensing conditions to allow the safety regulator to assess, and thus ensure, the safety of their proposed operation practices and arrangements.

[5] Under the Better Regulation initiative, the Environmental Permitting Programme (EPP) is a joint Defra, Welsh Assembly Government and Environment Agency initiative to streamline waste management licensing and pollution prevention control regimes. UK Government is currently investigating whether RSA93 could be updated or any sections clarified under the EPP programme.

[6] See Box 6 : Regulatory bodies

5.15 Staged authorisation will bring in a series of important hold points each requiring decisions as the development programme progresses. At each hold point the NDA's delivery organisation will submit an updated environmental safety case to provide continuing assurance that the site will meet regulatory requirements. If satisfied with the updated safety case, the environmental regulator will grant approval, by means of an authorisation or amended authorisation. This will be subject to conditions and limitations considered appropriate at that time, for development of the facility to proceed beyond the hold point. As well as covering aspects such as management controls, disposal limits, monitoring and reporting, the authorisation conditions could also specify key actions such as specific research and development work that the environmental regulator requires the NDA's delivery organisation to undertake before the next hold-point.

5.16 Staged authorisation will support open and constructive engagement between the delivery organisation, the environmental regulator, stakeholders and the public throughout the facility development. This engagement will involve stakeholders and the public under the principles set out in Box 4 and will be underpinned by formal regulatory consultations at appropriate hold points to help provide assurances that an acceptable development path is being followed.

5.17 The environmental regulators are consulting on revised guidance on the regulatory requirements for authorisation of both deep geological disposal and near surface disposal facilities (Ref. 30 and 31). This will update the document "Disposal Facilities on Land for Low and Intermediate Level Radioactive Wastes: Guidance on the Requirements for Authorisation" published in 1997 (Ref. 32). The revised guidance will be finalised for publication later this year. It will cover environmental safety in the operational phase and long-term environmental safety after closure of the facility, and will have regard to the need for staged regulation.

Security

5.18 Civil nuclear installations must have a site-specific security plan approved by the OCNS, and any proposed changes to security plans must also be approved in advance by OCNS. The security plan must provide details on site security management, policing and guarding, and to describe in detail the site security measures and arrangements for managing and reporting incidents. OCNS approval of carriers and transport plans will also be required where movement of nuclear material to the facility is involved.

5.19 It is intended that the OCNS will ensure that security measures are included in plans for the construction of any new facility from the outset. Doing so will avoid the need to retrofit security measures once construction is under way. This will also enable regulators to make an early judgement on the most appropriate measures for any construction site (Ref. 33) and help ensure that security is ingrained into practices at a site from day one.

Non-proliferation of nuclear materials (nuclear safeguards)

5.20 Nuclear safeguards are international measures that assure individual states comply with their international obligations not to use civil nuclear materials (plutonium, uranium and thorium) for nuclear explosives purposes. The International Atomic Energy Agency (IAEA) can choose which civil nuclear material in UK facilities it verifies, but the EC must apply safeguards to all such material according to the requirements of Chapter 7 of the Euratom Treaty (Ref. 34) and Euratom Safeguards Regulation 302/2005 (Ref. 35). These requirements mean that preliminary information on the basic design and operation of a new geological disposal facility must be provided to the Safeguards Inspectorate of the European Commission at least 200 days before construction begins (Ref. 35). In practice, information would be available well in advance of this deadline. The information, and its subsequent updating, then provides a basis for agreement with the Safeguards Inspectorate on safeguard arrangements to be applied to the facility – both to fulfil the relevant reporting requirements of Commission Regulation (Euratom) 302/2005 (Ref. 35) and to enable the inspection activities necessary to verify these reports.

Underground transport facilities at a disposal facility in Sweden (courtesy SKB)

Transport package approval

5.21 Waste will need to be transported safely from interim stores to the site of the geological disposal facility. The requirements for the safe transport of radioactive material by road, rail and sea stem from international agreements and European Directives. These requirements have been implemented in UK legislation setting out what types of transport package are allowed, how much radioactivity they are allowed to contain, and how they should perform against specified tests. Approval from the transport safety regulator is required for certain package designs and shipments (see Ref. 36 for a list of the provisions that apply). The transport safety regulator responsible for granting approvals is the DfT, and enforcement powers are allocated between DfT, HSE, DoENI and the Maritime and Coastguard Agency (MCA). These transport package approval requirements will apply to movements of waste required under the geological disposal facility development and operation programme.

Justification

5.22 European legislation (Ref. 26) requires that any new practice involving ionising radiation initiated on or after 13 May 2000 needs a justification decision from the Member State that the benefits of the practice outweigh any detriment to health that might be caused by exposure to radiation. However, guidance from the International Commission on Radiological Protection (ICRP) (Ref. 37) and Defra (Ref. 38) on behalf of the Justifying Authorities, states that waste management and disposal operations are an integral part of the practice that generates the waste and it is inappropriate to regard them as free-standing practices that require their own justification.

Planning arrangements

5.23 The NDA's delivery organisation will require planning permission for the development of a geological disposal facility. Under the current planning system, development is 'plan led'; that is, governed by the Development Plan. In England the Development Plan for any given area outside London comprises the Regional Spatial Strategy and any Development Plan Documents which have been adopted. A similar situation exists in Wales, with each local planning authority having regard to the Wales Spatial Plan and its adopted Development Plan. Different arrangements apply in other parts of the UK.

5.24 Under the current arrangements, applications would be determined by the relevant local planning authority, or by Ministers under powers to call in some planning applications.

Planning reform in England

5.25 By the time any application for a geological disposal facility is made, a new system is likely to be in place, implementing proposals in the May 2007 Planning White Paper, "Planning for a Sustainable Future" (Ref. 39). This proposed the introduction of a new single consent regime and an independent commission to determine applications for nationally significant infrastructure projects. This is intended to allow decisions to be taken in a way that is timely, efficient and predictable, to improve the accountability and transparency of the system, and to improve the ability of the public and communities to participate effectively in the process.

5.26 Under the proposed reforms, the UK Government would produce national policy statements for different categories of nationally significant infrastructure setting out the national need. Decisions on individual applications for development consent for nationally significant infrastructure would then be taken by an Infrastructure Planning Commission (IPC) composed of experts drawn from a range of fields.

5.27 In November 2007, the Government introduced a Planning Bill to implement the reforms set out in the Planning White Paper. Responding to concerns raised during consultation on the Planning White Paper, the Bill places public consultation and participation at the heart of all three key stages in the regime:

- by creating a clear duty to ensure effective public consultation on national policy statement. This consultation should include positive and proactive means of engaging citizens and communities. Where national policy statements identify locations or potential locations for development, there will be a duty to consult in those locations

- by placing clear legal obligations on developers to consult local communities before they submit a planning application, and ensure that this consultation is of high quality
- by making planning inquiries accessible and ensuring peoples' rights to be heard are protected. In particular the Bill will make it clear that any person who registers an interest can give oral evidence at relevant stages of the inquiry.

5.28 Ministers will have a duty to contribute to sustainable development in preparing national policy statements. The IPC must take account of all information specific to the case before it which it considers relevant and important to its decision, including local impacts.

5.29 In the MRWS consultation (Ref. 5), views were invited on whether the proposed planning reforms in England should apply to the development of a geological disposal facility. Responses to the consultation indicated that there was a clear majority in favour of the new arrangements applying, although some local authorities and their representative organisations suggested that this might be inconsistent with a voluntarism and partnership approach.

5.30 Whilst not having yet taken a final decision, Government is currently inclined to look towards applying the new planning system. Government considers that a geological disposal facility is likely to be regarded as a nationally significant infrastructure project and believes that the new arrangements could assist the delivery of agreements with local communities.

5.31 If it is decided in future that radioactive waste should be dealt with by the IPC, the Government will bring forward a statutory instrument to have it included. That would be subject to the affirmative resolution procedure, thus ensuring parliamentary debate and a decision from both Houses.

Planning in Wales

5.32 In Wales, the Wales Spatial Plan and Unitary and Local Development Plans have regard to various regional and topic-based strategies. In Wales, all local authorities as well as the three National Park Authorities are local planning authorities. Almost all planning functions in Wales are devolved and amendments to the Planning Bill will enable the Assembly to pass Measures (the equivalent to Acts of Parliament) in relation to development plans and the Wales Spatial Plan. The White Paper and Planning Bill are neutral in their approach to the devolution settlement. Whilst extension of the IPC's role to geological disposal facilities in Wales would therefore not be appropriate, the Welsh Assembly Government will continue to consider the issues raised by disposal facilities in the context of the existing statutory consenting regime in Wales.

Planning in Northern Ireland

5.33 The Planning Service in Northern Ireland intends to consider the implications of the English planning reforms in the context of any changes envisaged as a result of the Review of Public Administration in Northern Ireland.

Staging of planning permissions

5.34 Over the duration of a geological disposal facility development programme, it is envisaged that more than one planning permission will be needed. For example, in the earlier stages permission will be needed for some surface-based site investigations. Following completion of surface-based site investigations, a further permission will be required before work on underground-based investigations and facility construction can begin.

5.35 Underground-based investigations would only be undertaken if surface-based investigations generate sufficient information to provide confidence that the location is likely to be appropriate for facility construction. Advances in surface-based characterisation techniques over the past decade, supported by experience from overseas programmes, are expected to ensure the level of information that could give this confidence.

5.36 Past experience has indicated that, even for a planning application solely for underground-based investigations, it would be necessary to demonstrate that the location was likely to be appropriate for facility construction. NDA, as the implementing organisation, is therefore exploring whether a single planning application covering underground-based investigations and the construction of the disposal facility could be possible. NDA is considering the merits of a 'parameter-based' approach where the characteristics of the facility would be defined in such a way to allow the environmental and other impacts of the proposal to be described, and any appropriate mitigation measures to be identified.

5.37 Whether sufficient information can be obtained from surface-based investigations to enable this 'parameter-based' approach to be followed will not be known until site data is available. If sufficient information cannot be obtained from surface-based investigations, then it may be necessary to consider separate planning applications for underground-based investigations and facility construction.

Assessment of environmental effects and sustainability

5.38 European legislation requires that certain plans and programmes likely to have significant effects on the environment are subject to assessment during their preparation to ensure that these effects are fully taken into account before the plan or programme is adopted. This process is known as 'strategic environmental assessment' or 'SEA' (Refs. 40 and 41). It is good practice to integrate SEA within a wider sustainability appraisal (SA) which also considers social and economic factors and tests the effects of plans and programmes against sustainability criteria (Ref. 42).

5.39 European legislation (Refs. 43 – 45) also requires 'environmental impact assessment' (EIA) of certain individual projects. For proposals requiring EIA, the developer is required to prepare an environmental statement on the impacts of the project, which must be considered when deciding whether to grant planning permission.

5.40 Government is committed to ensuring that the NDA's geological disposal facility programme fully assesses and accounts for environmental impact and sustainability issues through the application of SEA, SA and EIA. The Government expects the NDA to undertake sustainability appraisal, meeting the requirements of the SEA Directive. The Government and the NDA will undertake work on the scope of that sustainability appraisal following publication of the White Paper. There will be close co-ordination and integration of this work and it will continue after candidate communities have been identified to enable local issues and views to be integrated into the sustainability appraisal.

5.41 Following the publication of this White Paper, NDA will prepare and publish for consultation its proposals for sustainability appraisal and environmental assessment.

Opportunities for public engagement

5.42 Public consultation is a requirement both of the planning permission process, where the public will be consulted on the planning application and the accompanying environmental statement, and as part of the environmental regulator's decision on whether to grant an authorisation to dispose of radioactive waste. Many of the required regulatory and SEA, SA and EIA processes also provide opportunities for public engagement. Copies of application documents will be made publicly available, and comments made by members of the public will be taken into account during the decision-making processes. Over and above this, Government has asked the NDA to prepare and consult on its proposals for public and stakeholder engagement in the context of its geological disposal development programme.

Committee on Radioactive Waste Management's (CoRWM's) role – independent scrutiny and advice

5.43 The UK Government and the devolved administrations' statement of October 2006 (Ref. 2) made clear that Government will ensure strong independent scrutiny of the proposals, plans and programmes to deliver geological disposal.

5.44 Accordingly, CoRWM has been reconstituted with modified terms of reference (Ref. 24) and expertise. The role of the Committee is to provide independent scrutiny and advice to UK Government and devolved administration Ministers on the long-term radioactive waste management programme, including storage and disposal. CoRWM's primary task will be to provide independent scrutiny of the Government's and NDA's proposals, plans and programmes to deliver geological disposal, together with robust interim storage, as the long-term management for the UK's higher activity wastes.

5.45 CoRWM will undertake its work in an open and consultative manner. It will engage with stakeholders and it will publish advice (and the underpinning evidence) in a way that is meaningful to the non-expert. CoRWM will undertake ongoing dialogue with UK Government and the devolved administrations, the NDA, local authorities and stakeholders, and will liaise with appropriate advisory and regulatory bodies to provide annual reports of its work.

5.46 Governance and monitoring arrangements of the NDA have been reviewed and amended to reflect the NDA's new role. Government will engage with the NDA regarding CoRWM's advice, including Government's response to it and any actions that are necessary and will take account of NDA views through the forum of the Waste Management Steering Group (see Chapter 4). CoRWM's advice, and the response of UK Government and relevant devolved administrations, will be made available to Parliament and Assemblies. Parliamentary and Assembly committees will also have the opportunity to engage directly with CoRWM and may propose work for inclusion in the Committee's work programme to sponsoring Ministers.

5.47 These arrangements reflect the fact that, to maintain its independent position, CoRWM cannot be part of the implementation machinery itself. Neither should it assume any of the constitutional roles of Government or the statutory roles of the NDA or the independent regulators.

Chapter 6:
Site selection using a voluntarism and partnership approach

How a voluntarism and partnership approach would work

6.1 Government believes that nothing has emerged from the MRWS consultation that alters its view that an approach based on voluntarism and partnership is the best means of siting of a geological disposal facility. Responses to the Managing Radioactive Waste Safely (MRWS) consultation on this issue were mainly about the details of delivering such an approach. This chapter addresses how a voluntarism and partnership approach would work.

6.2 Government does not wish to be over-prescriptive about the way that the voluntarism and partnership arrangements should work at the outset as individual local circumstances differ and, to a degree, a tailored approach to any discussions will need to be taken. This does not apply to the way in which technical issues, such as geology, are assessed, where there will be objective and consistent assessment.

6.3 For the purposes of this White Paper 'an approach based on voluntarism' means one in which communities voluntarily express an interest in taking part in the process that will ultimately provide a site for a geological disposal facility. Initially communities will be invited to express an interest in finding out more about what hosting a geological disposal facility would mean for the community in the long-term.

6.4 Participation up until late in the process, when underground operations and construction are due to begin (see paragraph 7.20), will be without commitment to further stages, whether on the part of the community or Government. If at any stage a community or Government wished to withdraw then its involvement in the process would stop. In practice, development could also be halted by the independent regulators at any point in the process through a refusal to grant authorisations for the next stage of work.

6.5 In the event that at some point in the future, voluntarism and partnership does not look likely to work Government reserves the right to explore other approaches.

What are communities in this context?

6.6 There will always be differences of opinion on what constitutes a 'community'. Government acknowledges the important role that existing local democratic decision-making structures are likely to play in a successful process as they are the elected representatives with a mandate to speak for communities.

6.7 Following careful consideration of responses to the MRWS consultation, the Government will define three types of community for the purposes of the site selection process. These definitions are below in Box 6. They are not rigid; the intention is to retain flexibility to account for local circumstances and allow communities to have a degree of self-definition.

6.8 The concept of 'community' is considered under three headings: the **Host Community**, the **Decision Making Body** and **Wider Local Interests**.

Box 6 Community definitions

Host Community – The community in which any facility will be built can be termed the 'Host Community'. The 'Host Community' will be a small geographically defined area, and include the population of that area and the owners of the land. For example, it could be a town or village.

Decision Making Body – Local Government will have decision-making authority for their host community. There are different local authority structures in different parts of the UK. For example, in England local authorities include district councils, county councils, metropolitan district councils and London Boroughs whereas in Wales, local authorities are unitary. Such a body will be termed **'**Decision Making Body'.

Wider Local Interests – Outside the Host Community, there are likely to be other communities that have an interest in the development of a facility in the Host Community, and there needs to be a mechanism that allows them to become involved in the process. Such a community might be the next village, a neighbouring district or a community on the local transport routes to the Host Community. Such communities will be termed 'Wider Local Interests'.

6.9 All three levels of community will need to liaise closely with one another as the process is taken forward. Both Government and the Nuclear Decommissioning Authority (NDA) will need to engage with all three 'communities'.

Issuing Invitations

6.10 In the MRWS consultation document Government invited views on providing information to communities and the manner in which it should issue invitations. Taking into account comments received on potential publicity campaigns, Government has decided to issue a public invitation for communities to express an interest in taking part in the siting process at the same time as the publication of this White Paper. This will publicise the invitation widely at the outset. Government has worked with the Welsh and Norther Ireland devolved administrations and with the Nuclear Legacy Advisory Forum[7] (NuLeAF) and, given the process is based on voluntarism, does not propose holding events or targeting media in specific regions or areas of the country. Initially the aim will be to raise awareness within particular stakeholder groups, in particular local government.

6.11 A number of responses to the MRWS consultation commented on the provision of information. Taking these into consideration and working with the Welsh and Northern Ireland devolved administrations and NuLeAF, a dedicated website (www.defra.gov.uk/mrws) has been set up to provide several layers of information on radioactive waste and its long-term management. This website provides, or links to, detailed information which is intended to be accessible and helpful to people with all levels of background knowledge from non-technical readers to experts. The factual information contained on the website has been commented on, in a personal capacity, by a number of members of the learned societies and academies including the Royal Society of Chemistry, the Royal Academy of Engineering and the Geological Society. All the information on the website will also be available in hard copy for those without internet access.

The early process

6.12 A number of responses to the MRWS consultation commented that there needed to be further interim step in the initial stages. In particular, it was suggested that a formal local decision was required that would follow an initial Expression of Interest. The Expression of Interest would be to facilitate initial discussion in the process. In light of these comments, there will be two key local decision points during the course of the early process:

- an Expression of Interest – this is the decision point at which local communities register their 'without commitment' interest in discussions about potential involvement in the siting process.
- a Decision to Participate – this is the point at which a Decision Making Body/ies makes a formal commitment to participate in the geological disposal facility siting process, but 'without commitment' to eventually host the facility.

[7] The special interest group of the Local Government Association

6.13 An indication of the potential steps for the early stages is set out in Table 2. Government would expect communities to make steady progress towards a Decision to Participate following an initial approach, but acknowledges that in practice, the precise nature of the steps could be subject to change as the process advances.

Table 2: Indicative Steps to Decision to Participate

Stage[8]	Indicative Step	Comment
Stage 1	1. Publication of White Paper and invitation for Expression of Interest	Internet based information pack launched – www.defra.gov.uk/mrws
	2. Preliminary discussion between potential local partners	Preliminary soundings taken. For example, through existing Local Strategic Partnerships or specifically convened meetings. Potential local partners might include, County/District Councils, Parish/Town Councils, local Community, Business and Environmental stakeholder groups, and neighbouring local authorities.
	3. Opportunity for initial discussions between potential local partners and Government/NDA	Preliminary discussions between potential local partners may raise issues that require clarification from Government/NDA prior to making an Expression of Interest
	4. Further soundings from potential local partners	The outcome of any discussions with Government/NDA may require further soundings to be taken from potential partners
	5. Decision about Expression of Interest	This decision will only be a trigger point to initiate high level geological screening and development of a programme of community engagement

8 Note Stages relate to Figure 1, pg 62

Table 2: Indicative Steps to Decision to Participate *(continued)*

Stage[8]	Indicative Step	Comment
Stages 2 & 3	6. Communicate Expression of Interest to local stakeholders and communities	It is important that the limited nature of the decision is widely understood. It is without commitment.
	7. Undertake high level geological screening	The screening will inform community engagement (see below). The screening process (see paragraphs 7.4 – 7.12) will enable potential local partners to review preliminary findings.
	8. Develop programme for community engagement	The objective of community engagement would be to inform a Decision to Participate. Planning for the programme of engagement might run in parallel to the high level geological screening.
	9. Seek agreement with Government on an Engagement Package	A Community may incur costs from taking part in the process and Government will contribute to these costs
	10. Undertake community engagement	A mixture of engagement methods could be used to ensure feedback from stakeholders and disinterested members of the public. This might include citizens panels, workshops, discussion in local groups or organisations, information provision to local communities, groups or individuals, quantitative feedback from opinion polls etc. Engagement should seek to identify the extent of support for participation; any issues of concern about participation; and the reasons for any opposition to participation.
	11. Opportunity for discussion with Government/NDA about the outcome of community engagement	Community engagement may raise issues requiring further discussion with Government/ NDA prior to a local Decision to Participate.
	12. Local review of pros and cons of participation	Local authority decision-makers will wish to review the outcome of community engagement and discussions with Government/NDA prior to reaching a Decision to Participate
	13. Local Decision to Participate	Decision Making Body/ies make a formal Decision to Participate (probably through a full meeting of the council/s)

6.14 With publication of this White Paper, Government invites communities to express an interest in opening up without commitment discussions on the possibility of hosting a geological disposal facility at some point in the future (See Chapter 8 – The next steps).

6.15 The Government wishes to allow sufficient time for any community to consider expressing an interest. At this early stage, it is expected that some communities may be better informed of the issues than others, for example those who already have local nuclear facilities, however, the option to express an interest will be left open for the foreseeable future. Any expressions of interest further into the process, when Government or the NDA's delivery organisation are already engaged with Communities who have taken a Decision to Participate, will be considered on a case by case basis.

Who can express an interest?

6.16 Government does not want to be prescriptive about who could initiate local discussions about an Expression of Interest, but expects the local Decision Making Body (or bodies) to be involved in an approach to Government. There may be initial interest from a local authority, a Parish Council or from organisations or landowners within an area. A community might make an initial approach to Government before identifying a specific site. Government would expect any Parish Council, organisation or landowner that wanted to be considered in the siting process to contact its local authority in the first instance to discuss putting forward an Expression of Interest to Government. If discussions stall at this stage, Government may be interested in entering into discussions with relevant parties to provide further information and to focus on any questions or areas of concern about the siting process and geological disposal.

6.17 Should a community within Wales wish to put forward an Expression of Interest it should do so to the Welsh Assembly Government (WAG). If this were to happen the WAG would at that point consider its position in respect of the geological disposal programme and the specific Expression of Interest. Should a community in Northern Ireland want to respond to the invitation, it should contact the Department of the Environment in Northern Ireland. Should a community in Scotland want to respond, UK Government would refer it to the Scottish Executive through the appropriate devolution mechanisms.

6.18 Before making an Expression of Interest, Government suggests that the local authority should have canvassed opinion, for example, through existing Local Strategic Partnerships or specifically convened meetings with potential local partners. These partners might include Parish/Town Councils, local Community, Business and Environmental stakeholder groups, and neighbouring local authorities. An Expression of Interest must be made in writing and Government would expect it to outline the actions taken to gather opinion and arrive at the Expression.

6.19 There is no reason why two or more local authorities should not submit a combined Expression of Interest as, in practice, the initial area of investigation could cross local authority boundaries or involve two tiers of local government.

6.20 A local authority, or authorities, that make an Expression of Interest should have a clear commitment to organising community engagement to inform a Decision to Participate. Costs of such engagement will be funded, either partly or wholly, through Government to assist communities in considering these issues (paragraph 6.47 – 6.52).

Moving to a Decision to Participate

6.21 An Expression of Interest will enable without commitment discussion between local communities and Government to begin. The scope of initial discussions will be for mutual agreement between the local community/ies and Government. It could include discussion of what support might be available to assist continuing community engagement up until the next stage and of the point at which the NDA (and others) might become involved in discussions. At the same time the British Geological Survey (BGS) will be asked to apply sub-surface screening criteria in order to eliminate from the process any area that is obviously geologically unsuitable (see paragraph 7.4 – 7.12).

6.22 Government expects that the Decision Making Body will take the lead role in initiating further discussions with potential local partners and organising community engagement. Government will want to be satisfied that a Decision to Participate is credible. Credibility might be demonstrated on the basis of a local consultation process applying established local good practice. Credible local support would be expected amongst organisations likely to form a Community Siting Partnership (see paragraph 6.27 – 6.37), should a decision to participate be taken, as well as among the local community.

6.23 It is anticipated that Government and NDA involvement in early local engagement would come at the invitation of local authority decision-makers working in consultation with potential local partners. It is not anticipated that Government or NDA would organise local community engagement at their own initiative.

6.24 Engagement should seek to identify the extent of local support for participation; any issues of concern about participation; and the reasons for any opposition to participation. Engagement methods might include:

- citizens' panels
- workshops
- discussion in local groups or organisations
- information provision to local communities, groups or individuals
- quantitative feedback from opinion polls

6.25 The Decision to Participate should be accompanied by a report setting out the approach taken to engagement, the outcomes of that engagement and making clear the basis of the decision.

6.26 Not every resident in a potential Host Community will favour a Decision to Participate in the siting process. Government is not expecting, or seeking, a particular threshold of support but is keen to see evidence of appropriate community engagement and meaningful feedback on any concerns of those affected.

Community Siting Partnerships

6.27 Following a Decision to Participate, Government recognises that the site selection process and in particular the development of the facility, will require considerable engagement with communities. Whilst it does not propose to be prescriptive about how this engagement is undertaken, Government favours **a partnership approach.** This is an approach that also has a strong degree of support from many others, including the Committee on Radioactive Waste Management (CoRWM) and the Nuclear Legacy Advisory Forum (NuLeAF) (Refs. 46 and 47).

6.28 By a partnership approach Government means the setting up of a formal Community Siting Partnership such that the Host Community, Decision Making Bodies and Wider Local Interests will work with the NDA's delivery organisation and with other relevant interested parties to achieve a successful outcome. This could be by ensuring that questions and concerns about the geological disposal facility siting, construction, operation, closure and post-closure are addressed and resolved as far as reasonably practicable and that the project contributes to a community's further development and well-being.

6.29 Experience here and in other countries (Refs. 48 and 49) indicates that a partnership approach is often an effective method to provide opportunities for all parts of a community (i.e. Host Community, Decision Making Bodies and Wider Local Interests) to work together. These are often underpinned by formal agreements between the parties. In this proposed siting process a Partnership would provide a forum for the Host Community and the NDA's delivery organisation to exchange information and views and for the Community Siting Partnership to advise Decision Making Bodies in an open and constructive manner.

6.30 The MRWS consultation invited comments on whether and how partnership arrangements could be used to support a voluntarism approach. The partnership approach itself was not generally questioned, rather the responses suggested the need for more detail on the proposed arrangements. The following section sets out more detail on a partnership approach including the establishment of a partnership, its suggested role, objectives and decision-making responsibilities.

The operation of a Partnership

6.31 The **role of the Community Siting Partnership** in this context might be:

- Developing advice and recommendations for Decision Making Bodies
- Consideration of, and contribution to the work the implementing organisation and delivery organisation are undertaking to design, construct and operate a facility
- Obtaining specialist advice or commissioning research to inform its advisory role, address community concerns or identify ways of developing community well-being

- Ensuring that the siting process for a facility within a potential Host Community is effective and focussed on making progress
- Provision of public information about the activities, views and recommendations of the Community Siting Partnership
- Engagement or consultation with potential Host Communities and Wider Local Interests
- Identifying and addressing divergent views within those communities
- Liaison and discussion with local bodies with remits related to the mission of the Community Siting Partnership (e.g. Local Strategic Partnerships[9] or NDA Site Stakeholder Groups[10])
- Building the capacity of its membership to enable it to effectively carry out these roles

6.32 Government expects a Community Siting Partnership to be a partnership of local community interests, with members identified and recruited locally to enable its mission to be fulfilled. The NDA's delivery organisation would be a member of the Community Siting Partnership but would not be directly involved in decisions on community-related issues. There will need to be ongoing interaction between the NDA's delivery organisation and other members of the Community Siting Partnership. The NDA's delivery organisation will remain responsible throughout for ensuring compliance with technical and regulatory requirements.

6.33 The leadership role and democratic accountability of local government means that it should be responsible for major local decisions within the siting process. Local Government will be termed the 'Decision Making Body' and will take decisions relating to:

- continued participation at key stages, or exercising a Right of Withdrawal
- the local acceptability of proposals for Community Benefits Packages
- the local acceptability of the sites within an area that are proposed for field surface-based investigations
- whether potential retrievability of wastes has been adequately considered

In each case, the Decision Making Body would take careful account of advice and recommendations from the Community Siting Partnership.

6.34 The relevant local authority/ies are likely to have a lead role in setting up the Community Siting Partnership. In some overseas examples this has been done with the assistance of independent support and advice. **Members of the Community Siting Partnership** might include representatives of:

- local authorities (elected members and non-elected officers)
- the local Member of Parliament
- local public services (fire, police, health trust etc)
- local residents or resident groups

[9] Local Strategic Partnerships – www.neighbourhood.gov.uk/page.asp?id=531

[10] NDA Site Stakeholder Groups – www.nda.gov.uk/stakeholders/

- established local organisations (for example, local non-governmental organisations)
- Wider Local Interests
- NDA's delivery organisation

6.35 Although not a member of a Partnership, Government could participate in the work of the Community Siting Partnership as and when required. This might be as an associate member, or on an ad hoc basis depending on the requirements of a particular stage in the process. Regulatory bodies will also be involved, for example by providing advice to the Community Siting Partnership, although regulators will need to have a strictly defined role and remit that does not compromise their independence.

6.36 Government recognises that the nature and extent of a Community Siting Partnership, including its membership, may vary at different stages in the process. Government also anticipates that, because of the scale and importance of the issue, such a Partnership would be specific to this issue alone and not be a component part of another Partnership.

6.37 Government does not want to be prescriptive about the form of a Community Siting Partnership although guidance, providing example objectives, roles and responsibilities, should be taken into account by interested parties. This guidance is at Annex C.

Right of Withdrawal

6.38 The Right of Withdrawal (RoW) is an important part of the voluntarism approach intended to contribute to the development and maintenance of community confidence. Up until a late stage, when underground operations and construction are due to begin (see paragraph 7.20), if a community wished to withdraw then its involvement in the process would stop. As with other key local decisions in the siting process, the Decision Making Body will be responsible for exercising the RoW, based on advice and recommendations from the Community Siting Partnership.

6.39 All parties in a Community Siting Partnership should work positively to seek to avoid the need to exercise the RoW. This will be particularly important following a surface-based investigation programme, when considerable investment will have already been made.

6.40 To help avoid the need to exercise the RoW late in the process, it is proposed that the stated objectives of a Community Siting Partnership include seeking to develop partner and local community confidence that:

- there is a good prospect for developing an acceptable environmental safety case
- the potential development is likely to be able to address the planning requirements of the planning authority.
- a Community Benefits Package will be agreed such that the overall balance of benefits and any perceived detriments will reflect the needs of local communities and their future generations
- the question of potential retrievability of wastes has been adequately considered taking account of regulatory constraints

6.41 These objectives should be seen in the context of the proposed mission of a Community Siting Partnership (see Annex C). It is recognised that a Partnership may wish to adopt additional objectives that are related to this mission. Different elements of a Partnership's objectives will be achieved at different stages of the siting process. For example, it may be desirable for relevant parties to reach agreement about a Benefits Package in advance of the start of a borehole programme as part of surface-based investigations. In which case, this agreement could be 'banked' and would not be re-opened when considering whether to exercise a post-borehole RoW.

6.42 It is envisaged that a Community Siting Partnership will regularly review progress towards fulfilling its mission and objectives and address and resolve difficulties as they are identified.

6.43 Information from site investigations and in particular from a surface-based investigation programme will be needed to assess the prospects for an acceptable environmental safety case, facility design and planning decision. A post borehole RoW could be exercised only in circumstances where, despite the best efforts of all parties, one or more of the Community Siting Partnership's objectives identified above is not going to be achieved.

6.44 In order to minimise financial risk and uncertainty, before the NDA's delivery organisation embarks on a borehole survey programme the circumstances in which a post borehole RoW might be exercised should be identified and agreed with Government through discussion and negotiation within a Community Siting Partnership and with Decision Making Bodies. The Government will expect the formal agreement that establishes the Community Siting Partnership to set out a commitment to undertake this work.

6.45 The requirement to define these circumstances before a borehole programme is likely to be both challenging and beneficial: challenging because it will involve matters of judgement; and beneficial because the definition will focus discussion, enhance understanding and make criteria for a RoW decision explicit before extensive work has been undertaken.

Engagement Packages and Community Benefits Packages

6.46 In light of the responses to the MRWS consultation, Government has decided that an Engagement Package and a Community Benefits Package will form part of its voluntarism and partnership approach, subject to them being affordable and offering good value for money. This would recognise that a community which expressed an interest in hosting a facility should be enabled to participate in the selection process; and that a community which hosts a geological disposal facility for higher activity radioactive wastes will be volunteering an essential service to the nation. A community will want to ensure that the impact of a geological disposal facility on their long term social and economic prospects is understood and that the needs of future generations are addressed appropriately.

Engagement Packages

6.47 Question 11 of the MRWS consultation document invited views on the use of community Engagement Packages and the activities that this might cover. Responses were supportive of the use of such packages and suggested a need for greater clarity of their coverage and the way they might operate.

6.48 In line with broad support from the responses, costs of local community engagement in the process will be funded, either partly or wholly, through Government to assist communities in considering the issues. What support, and the point at which it is available, will be something to be considered in the scope of initial discussions following an Expression of Interest.

6.49 Communities that have taken a Decision to Participate will incur costs in setting up and operating a Community Siting Partnership and so the work of a Partnership will also be supported through the Engagement Package.

6.50 Subject to overall budget and programme approval, and audit arrangements agreed with Government, it will be for a Community Siting Partnership to decide exactly how it spends its funding in seeking to fulfil its mission.

6.51 Government expects that a local authority will be the employing organisation for the Community Siting Partnership and a local authority member of the Community Siting Partnership will be the budget holder. Therefore the Partnership will be accountable to the local authority for the management of the budget and will be subject to local authority budget management rules as well as the agreed audits referred to above.

6.52 Based on the proposed role of a Community Siting Partnership and taking into account responses to the MRWS consultation, Government anticipates that such funding might cover:

- public information
- liaison, consultation and engagement
- salaries and associated costs of Community Siting Partnership staff
- office costs and overheads
- organisational costs of running the Community Siting Partnership and any working groups it might establish
- commissioning specialist advice
- reimbursement for out of pocket expenses of Community Siting Partnership members
- process evaluation

Community Benefits Packages

6.53 Question 12 of the MRWS consultation invited comments on how the development of a geological disposal facility could deliver lasting benefits to the host community and whether this should involve the use of benefits packages taking into account the best use of public funds. Comments were diverse including the need for clear funding criteria and for sound financial management. There was also the suggestion that the benefits package should be proportionate to the amount of waste or to the proximity of a community to a facility.

6.54 Construction and operation of a geological disposal facility will be a multi-billion pound project that will provide skilled employment for hundreds of people over many decades. It will contribute greatly to the local economy and wider socio-economic framework. There could be spin-off industry benefits, infrastructure benefits, benefits to local educational or academic resources, and positive impacts on local service industries that support the facility and its workforce. It is also likely to involve major investments in local transport facilities and other infrastructure, which would remain after the facility had been closed.

6.55 As such, hosting a geological disposal facility is likely to bring significant economic benefits to a community in terms of employment and infrastructure, maintained over a long period.

6.56 Any community that ultimately hosts a geological disposal facility will be keen to understand and agree the nature of these benefits, and will expect Government and the NDA to ensure that the project contributes to its development and well-being.

6.57 In addition there may be other benefits which may be commensurate with developing the social and economic wellbeing of a community that has decided to fulfil such an essential service to the nation. Government acknowledges that it could be at least a century until final closure of an entire facility is possible and so the development and operation of a geological disposal facility is an intergenerational issue. The local needs arising from the development are also likely to have an inter-generational element. This point was raised by a number of consultation responses and an approach needs to be identified that recognises and addresses the potential impact on a community over the long timescales involved.

6.58 Accepting that delivery mechanisms to achieve this will be developed as discussions progress, and without wishing to pre-judge what these might be, the following could be some of the overarching objectives for the investment that a community might benefit from as a result of hosting a geological disposal facility:

- Improved local training/skills development/education investment
- Increased business for local service industries
- Improved public services/infrastructure/housing/ recreational facilities
- Improved transport infrastructure
- Better local healthcare to meet the increased needs of the community
- Local environmental improvement

6.59 This list is illustrative rather than exhaustive, as short and long term local needs may vary depending on the community that hosts the facility.

6.60 Government does not believe it sensible to specify at this stage what specific mechanisms could be used, or to define the level or nature of benefits. Government remains open-minded, believing that any Benefits Packages should be developed between communities, the Government and NDA as discussions progress, taking into account local needs, affordability and value for money considerations.

6.61 As potential host communities and Community Siting Partnerships work with the NDA and Government they should begin a dialogue about the local needs arising from hosting a geological disposal facility. Final agreement on a package that delivers appropriate investment in the Host Community may take time, and possibly some years, as the precise nature and means of delivery of the geological disposal facility becomes clearer.

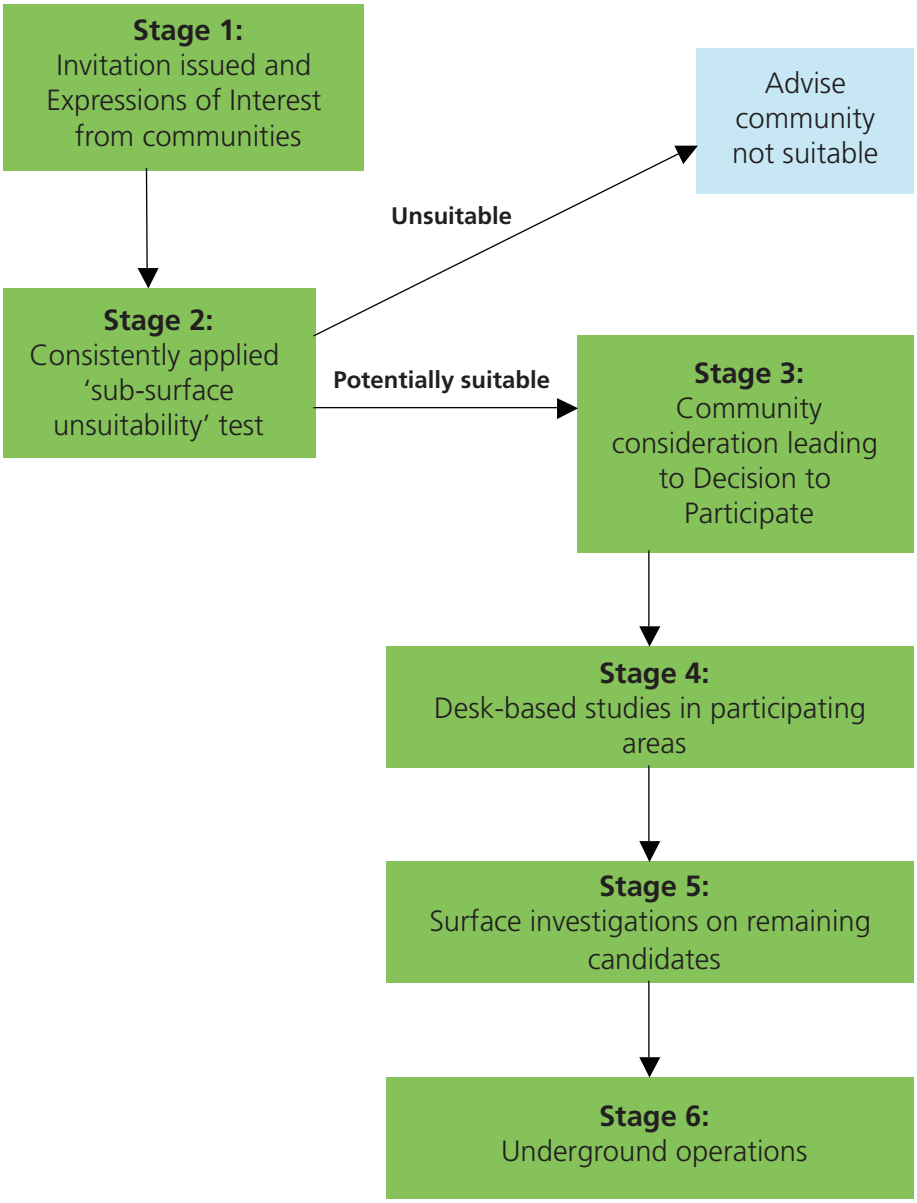
Chapter 7:
The site assessment process

A staged approach

7.1 The site assessment process will start from the point at which a community has made an Expression of Interest in opening up discussions with Government. It will be conducted in parallel to discussions between Government, the Nuclear Decommissioning Authority (NDA) and a local community.

7.2 It will be a staged process, allowing all those involved to take stock before deciding whether or not to move to the next stage at a particular site. Figure 1 overleaf indicates the main stages in the process.

Figure 1: Stages in the site selection process



Further explanation of this site assessment process is as follows.

Stage 1: Expression of Interest

7.3 Stage 1 corresponds to the period, discussed previously (see paragraph 6.12), up to the point where a community decides to open up without commitment discussions with Government.

Stage 2: Initial screening out of unsuitable areas

7.4 Question 8 of the Managing Radioactive Waste Safely (MRWS) consultation invited views on the initial sub-surface screening criteria and their application. Following the consultation the Chairs of the two expert groups who developed the sub-surface screening criteria (the Criteria Proposal Group, CPG and the Criteria Review Panel, CRP) were asked to consider their findings in light of the consultation responses received.

7.5 The Chairs did not consider that any significant new sub-surface screening criteria were identified by respondents. Some responses identified possible site selection criteria that may need to be applied at some point later in the process although many were not sub-surface characteristics – i.e. population density or the nature conservation status of some potential sites.

7.6 Some responses expressed surprise that earthquakes and faults and "geological movements" were not exclusion criteria. Following careful consideration, the Chairs continue to consider that any potential impact as a result of geological instability should be considered as part of the site specific risk assessments that will be needed later in the site selection process. This is based on their initial advice that the potential for seismic effects to occur in the UK is low by global standards.

7.7 Overall, the Chairs concluded that the criteria recommended in the MRWS consultation should stand and that further criteria are unnecessary at this initial stage.

7.8 They did, however, take the opportunity to make clearer the wording of a few parts of their summary advice and also to provide a definition of what they mean by "shallow permeable formations", that is, formations of this kind that occur at less than 500 metres.

7.9 The updated sub-surface screening criteria and further information on how they were derived are available at Annex B.

7.10 On the application of the criteria the Chairs believed that there was nothing in the response material that seemed to challenge the proposal of inviting the British Geological Survey (BGS) to apply the criteria consistently to all areas that made an Expression of Interest. Some responses suggested that the criteria should be applied before inviting communities to express an interest although Government continues to believe that applying the criteria after initial Expressions of Interest is the right approach. Applying the criteria to every part of the UK would be prohibitively expensive, time-consuming and unnecessary in a voluntarist process.

7.11 Once communities have expressed an interest in opening up discussions with Government, the BGS will be asked to apply sub-surface screening criteria to an area. This will eliminate areas that are obviously unsuitable and avoid further unnecessary work.

7.12 For each area that expresses an interest, the BGS will make a draft report available for discussion and peer review to the Host Community, the Decision Making Body, the NDA, the regulators and the Committee on Radioactive Waste Management (CoRWM) before completion and publication in its final form. Government will fund this initial screening work and the BGS report will help inform a decision about whether to participate.

Stage 3: Community consideration leading to Decision to Participate

7.13 Stage 3 corresponds to the period during which a Decision Making Body makes a formal commitment to participate in the siting process, but 'without commitment' to host the geological disposal facility (see paragraph 6.12 – 6.26). Stage 3 will run in parallel to Stage 2 although a Decision to Participate will only be able to be made if Stage 2 does not lead to the whole area associated with the community being 'screened out'.

7.14 Following this Decision to Participate, Government expects that a formal Community Siting Partnership will be set up such that the Host Community, Decision Making Bodies and Wider Local Interests work with the NDA and other relevant interested parties for the remaining stages.

Stage 4: Desk-based studies in participating areas

7.15 Participating communities whose areas have not been screened out by sub-surface criteria and who wish to continue their involvement will be carried forward to the desk-based studies at stage 4.

7.16 Stage 4 will involve the NDA's delivery organisation undertaking more detailed assessments focusing on the suitability of a specific site or sites within each potential Host Community. These assessments will be mainly through desk-based studies, and will involve gathering information about the candidate communities and sites and evaluating them against the site selection criteria. The NDA's delivery organisation will work with Community Siting Partnerships to ensure that local issues are addressed in the assessments. In parallel, Government anticipates that Partnerships will be discussing the package of measures that they would like to see implemented alongside a disposal facility to develop the community's social and economic wellbeing (see Chapter 6).

7.17 The stage 4 assessment will be reviewed by the independent regulators and subject to independent scrutiny by CoRWM. On the basis of these assessments and reviews:

- The Community Siting Partnership would make recommendations to local Decision Making Bodies about whether to proceed to the next stage of the site selection process
- The Decision Making Bodies would decide whether to proceed to the next stage of the site selection process
- The Government would then decide on one or more candidate sites to take forward to Stage 5.

Stage 5: Surface-based investigations of remaining candidates to identify a preferred site

7.18 This stage will involve the NDA's delivery organisation obtaining planning permission to undertake surface-based investigations at the remaining candidate site or sites, which would include non-intrusive seismic surveys and then later the drilling of boreholes to various depths to investigate local geology in more detail. Assuming planning permission were granted, the NDA's delivery organisation would undertake the surface-based investigations, which could last a number of years, and carry out more detailed assessments of the sites in question. The NDA's delivery organisation will work with Community Siting Partnerships to ensure that local issues are addressed in the assessments, and will evaluate sites against the criteria discussed below. As part of a staged

Borehole drilling during surface investigations in Sweden (courtesy SKB)

authorisation process, it is envisaged that the NDA's delivery organisation would require an authorisation from the environmental regulator before proceeding with the Stage 5 investigations.

7.19 Government proposes that once these more detailed assessments have been completed they be reviewed, as at the previous stage, and that then:

- The Community Siting Partnership would make recommendations to its local Decision Making Bodies about whether to proceed to the next stage of the site selection process
- The Decision Making Bodies would decide whether they wish to proceed to the next stage of the site selection process
- Government would make an informed decision on a preferred site.

7.20 Because subsequent stages of the process are specific to one site and involve very significant expenditure, Government proposes that the decision to proceed in the bullets in paragraph 7.19 above would be **the final opportunity** for a community to withdraw. This would also be the point at which any final agreement should be reached on the scope of any Benefits Package (see Chapter 6). Although the community would have given its final consent for development to proceed, the continuing process of disposal facility development would still be subject to regulatory approval with appropriate hold-points, as described earlier, and would be discontinued if the necessary regulatory approvals could not be obtained. Provision is contained within the relevant regulatory processes for public body notification and opportunity for Community Siting Partnerships to influence development proposals.

Stage 6: Underground operations

7.21 Part of this work will involve the NDA's delivery organisation undertaking long-term underground investigations. The aim of this work will be to confirm a site's suitability to host a geological disposal facility that complies with safety and environmental regulatory requirements. This process will be subject to regulatory scrutiny and the NDA's delivery organisation will have to submit specific assessments for review at agreed hold-points. If the site meets the regulatory requirements, the regulators will permit construction of a geological disposal facility to proceed at the preferred site. Planning permission will be required for underground investigative work and construction of the geological disposal facility (see Chapter 5).

Measurements of drill cores from test drilling in Sweden (courtesy SKB)

Timing

7.22 The programme for developing a facility needs to be flexible and able to incorporate both robust technical site investigations and ongoing interactions between the project and the Host Community. This may mean accommodating longer discussion periods and more research to address stakeholders' concerns. There is nevertheless, the need to maintain momentum in taking forward this important programme to ensure the safe and secure long-term management of higher activity radioactive waste in the UK.

Criteria for assessing and evaluating candidate sites

7.23 Question 9 of the MRWS consultation invited views on whether Government had identified the relevant assessment criteria and asked for comments on how the criteria should be applied at different stages. Responses included comments on the weighting of the criteria, the need for more detail on the proposed process and the need for criteria to reflect the views of potential host communities.

7.24 Analysis of the responses showed broad support for the criteria proposed in the MRWS consultation document as a basis for evaluation of sites. Responses did not identify any new broad criteria, but provided proposals of further factors that should be included within those already outlined.

7.25 In light of responses, the proposed criterion 'level of community support' has been removed. It is already a central feature of the process and a key determinant in a community Right of Withdrawal. Government considers that the voluntarism process is based on community support and as such it would apply to all communities and sites.

7.26 The proposed criteria that should be taken into account in carrying out the assessments are:

- geological setting
- potential impact on people
- potential impact on the natural environment and landscape
- effect on local socio-economic conditions
- transport and infrastructure provision
- cost, timing and ease of implementation.

7.27 Not all of these criteria may be relevant at every stage and they may have a different weight in different assessments. As explained in the Government consultation document (Ref. 5) the criteria have been derived from various sources, including from requirements under Strategic Environmental Assessment (SEA), Sustainability Appraisal (SA) and Environmental Impact Assessment (EIA) (see paragraphs 5.38 and 5.39).

7.28 At each stage of the process increasingly detailed assessments will be made of potential sites, with resources focussed on investigating those that are most likely to be suitable.

7.29 In light of MRWS consultation responses, particularly those suggesting a need for criteria to reflect the views of potential host communities, Government has decided not to publish a firm methodology or relative weighting at this stage. Instead, Government has asked the NDA to develop proposals for a site assessment methodology. A document setting out those proposals is available on the NDA website at www.nda.gov.uk/strategy/waste/geological-disposal.cfm. The proposals take account of MRWS consultation responses, comments from CoRWM, inputs from the London School of Economics on decision theory and from SKB – the Swedish Waste Management Organisation – who have successfully developed and implemented a siting process for a geological disposal facility in Sweden.

7.30 The publication of the proposals for a site assessment methodology allows stakeholders, including communities who express an interest in participating, to consider and comment on the proposals during the development of the methodology. This will be done as part of the strategic environmental assessment framework.

7.31 The methodology will need to be finalised and agreed by Government prior to final publication and will include proposals for a process to review and establish criteria, a scoring system, their relative weightings and their means of application. The methodology will not produce a decision as its output but rather be a decision aiding process.

Chapter 8:
Next steps

8.1 With publication of this White Paper, Government invites communities to express an interest in opening up without commitment discussions on the possibility of hosting a geological disposal facility at some point in the future.

8.2 To support consideration of this invitation, a dedicated website – www.defra.gov.uk/mrws – has been set up with several layers of background information on radioactive waste and its long-term management. This website provides, or links to, detailed information which is intended to be accessible and helpful to people with all levels of background knowledge from non-technical readers to experts. It also provides information on how a community can make an Expression of Interest.

8.3 Government wishes to allow sufficient time for any community to consider expressing an interest. At this early stage, it is expected that some communities may be better informed of the issues than others, for example, those who already have local nuclear facilities. However, the option to express an interest will be left open for the foreseeable future. Any expressions if interest further into the process, when Government or the Nuclear Decommissioning Authority's (NDA's) delivery organisation are already engaged with Communities who have taken a Decision to Participate, will be considered on a case by case basis.

8.4 Expressions of Interest in opening up such discussions or securing further information should be sent or emailed to:

Senior Responsible Officer
Managing Radioactive Waste Safely Programme
4 C, Ergon House
Horseferry Road
London
SW1P 2AL

Phone: 020 7238 1728
Email: radioactivewaste@defra.gsi.gov.uk
Fax: 020 7238 6471

8.5 Should a community within Wales wish to put forward an Expression of Interest it should do so to the Welsh Assembly Government (WAG). If this were to happen the WAG would at that point consider its position in respect of the geological disposal programme and the specific Expression of Interest.

Managing Radioactive Waste Safely
Radioactivity and Pollution Prevention Branch
Welsh Assembly Government
Cathays Park
Cardiff
CF10 3NQ

Email: r&ppmailbox@wales.gsi.gov.uk

8.6 Should a community in Northern Ireland want to respond to the invitation, it should contact the Department of the Environment in Northern Ireland. Should a community in Scotland want to respond, UK Government would refer it to the Scottish Executive through the appropriate devolution mechanisms.

8.7 UK Government and devolved administrations will notify other Managing Radioactive Waste Safely (MRWS) sponsors following receipt of Expressions of Interest.

Annex A:

Features of a geological disposal facility

A.1 The features of a geological disposal facility will include the following:

Surface facilities

A.2 A variety of different facilities will be needed above ground, for example construction support facilities, management and administration offices, workshops and, possibly, a waste encapsulation plant and a visitor centre. There will also be a need for transport-related infrastructure to manage the arrival of waste at the facility. Transport of waste is subject to strict regulatory control, as discussed in Chapter 5.

A.3 Access to the underground vaults and disposal tunnels could be via one or more sloping underground tunnels ('drifts') and/or one or more vertical shafts. The number required will be determined by the need to provide separate access routes for personnel and waste to segregate the construction and waste emplacement operations and to provide services such as power and ventilation. The depth at which the underground vaults and disposal tunnels will be located is likely to be somewhere between 200 and 1000 metres, but this will depend on the geology at the site in question. Given the length of time over which a facility will be expected to function, the potential local effects of some future surface change e.g. through ice ages, erosion, etc. will also need to be taken into account in the design.

Underground facilities for Intermediate Level Waste/Low Level Waste (ILW/LLW)

A.4 ILW/LLW wastes will typically be immobilised in a cement-based grouting material within standardised, highly engineered stainless steel or concrete-lined stainless steel containers. The waste packages will then be placed in horizontal engineered vaults or other suitable structures within the host geological environment. The waste packages can then be stored underground until the decision is taken to close the vaults. Following emplacement of the wastes the vaults would be 'backfilled' when technically required, for example with alkaline grout, specially formulated to inhibit dissolution of any radionuclides, and then sealed.

Underground facilities for High Level Waste (HLW) and spent fuel

A.5 Because they generate heat, HLW and spent fuel (if classified as waste for disposal) require different disposal structures and layouts from ILW, LLW and other non-heat generating radioactive materials. There are a number of ways in which HLW and spent fuel could be packaged and contained, and research in this area is likely to present alternative models over the coming years. For example, one method that is planned to be used in Sweden and Finland, and could potentially be applicable in the UK to stocks of HLW and spent fuel, is based on sealing the waste in copper canisters with a cast iron internal frame for strength. These canisters are placed in individual deposition holes drilled in the floor of deposition tunnels and surrounded by bentonite clay, which expands on contact with water and so seals the space around the canister. Under appropriate conditions copper is extremely resistant to corrosion, and in a suitable geo-chemical environment such as this the canisters

can be expected to maintain their integrity for hundreds of thousands of years. Following waste emplacement, the deposition tunnels would be backfilled and sealed.

Size of a geological disposal facility

A.6 The dimensions of the underground areas of a geological disposal facility will be determined by the exact inventory for disposal, the properties of the host rock and the geometry of features within it. Nevertheless indicative geological disposal facility dimensions have been estimated for an inventory similar to the Committee on Radioactive Waste Management (CoRWM) Baseline Inventory discussed in Chapter 3 and therefore does not cover waste arising from any new nuclear power stations. Those estimates indicate that the underground area of host rock required (i.e. the 'footprint') for an ILW/LLW disposal facility would be of the order of 1km², and for a HLW and spent fuel disposal facility (assuming that the latter were treated as a waste) would be of the order of 3km². In practice it may be possible to build a geological disposal facility over a smaller area, by building deposition tunnels or vaults on different levels. This would however depend on the geology of the site.

Construction and operations

A.7 Construction of a geological disposal facility would employ standard techniques that are used in the underground construction and nuclear industries for other major engineering projects, and have already been used to construct operational underground radioactive waste facilities in other countries. The project will also require ongoing involvement of the scientific (and in particular the geological) community. Underground facilities would be developed in stages to enable waste emplacement operations to begin as soon as practicable once relevant approvals (see Chapter 5) had been received. Main facilities would be developed first, after which additional vaults and deposition tunnels would be constructed, equipped and commissioned as required throughout the life of a geological disposal facility. Construction and waste emplacement activities would be managed to ensure physical segregation of the two activities.

Closure

A.8 Once a geological disposal facility has been filled with waste, a process which could take many decades, the shafts and tunnels can be backfilled and sealed and the surface facilities dismantled or used for something else. There will then follow a period of post-closure institutional control and monitoring in accordance with regulatory requirements. What happens to the site will be a matter for future generations – the site could be farmed, forested, allowed to return to nature, or used for construction or other purposes, with the waste itself isolated within the multi-barrier system in the geological formations hundreds of metres below the ground. Records of the location and general contents of the facility would be held by The National Nuclear Archive.

Annex B: Initial sub-surface screening criteria

B.1 In late 2006, Government asked for scientific advice on the criteria that could be used to rule out areas of the UK put forward for the geological disposal of radioactive waste but which, because of their sub-surface characteristics, would probably not in fact be suitable. Two independent groups of scientists were asked to consider this issue. One group would identify such "screening (or exclusion) criteria" and the other group would review the proposals. The two groups were known as the Criteria Proposals Group (CPG) and the Criteria Review Panel (CRP).

B.2 A joint report by CPG and CRP was submitted to Government in April 2007. Wider public and stakeholder comments were sought on the proposed criteria which were set out in a summary of the CPG/CRP advice included as part of the June 2007 consultation document "A framework for implementing geological disposal".

B.3 After the consultation closed, the Chairs of the two groups, Professor Peter Styles and Professor Howard Wheater, were asked to review their advice in light of the responses. It was made clear that they were free, for example, to include new criteria or take out any of their original ones as they thought appropriate. Their views can be read in full at:
www.defra.gov.uk/environment/radioactivity/waste/hilw/disposal.htm,
but the Summary section is as follows:

> In light of responses to the Government's recent consultation on implementing geological disposal, we have reviewed the advice we gave on criteria for screening out areas that, because of their sub-surface characteristics, are probably unsuitable for this form of long-term radioactive waste management.
>
> Our conclusions are that the criteria we recommended should stand, that further criteria are unnecessary at this initial stage of site selection, and that we see no need for any fundamental change to the way in which our original recommendations were set out.
>
> We are, however, taking the opportunity to make clearer the wording of a few parts of our summary advice. We are also providing a definition of what we mean by "shallow permeable formations", that is, formations of this kind that occur at less than 500 metres.

B.4 The two Chairs also wanted to make clear that it was the full version of their original advice, rather than the summary given in the consultation document, that should be regarded as authoritative. Similarly, members of the public interested in the exclusion criteria should also read the CPG/CRP review document in full.

B.5 On the basis of this review, Government is satisfied that the exclusion criteria to be used at this early stage of the site selection process are robust, appropriate and fit for purpose. The CPG/CRP review indicated that some minor changes were necessary to the way in which the recommended criteria were expressed. These points have been incorporated into a revised Table summarising the exclusion criteria recommended by CPG and CRP (as well as some other criteria considered by CPG/CRP but not, in the event, recommended for use at this stage). The Summary Table B1 of criteria (originally included in the consultation document as Table A1) has therefore been updated and sets out those that will be applied.

Table B1: Summary table of initial sub-surface screening criteria

	To be applied as exclusion criteria?	Reasons/explanations and qualifying comments
Natural resources		
Coal	Yes	Intrusion risk to depth, only when resource at >100m depth
Oil and gas	Yes	Intrusion risk to depth
Oil shales	Yes	Intrusion risk to depth
Industrial minerals (except evaporites)	No	Low resource value – limiting the potential for economic exploitation at depth
Evaporite minerals	No	Wide distribution – insufficient resource loss and intrusion risk to justify exclusion
Metal ores	Some ores	Intrusion risk only where mined at depth, i.e. >100m
Bulk rock resources	No	Not exploited at depth
Disposal of wastes/gas storage	Yes	Only where already committed or approved at >100m depth
Geothermal energy – shallow[1] ground source heat	No	Not exploited at depth
Geothermal energy – low grade heat extraction from deep rocks and groundwaters	No	Not an a priori general exclusion – value for development is currently speculative
Groundwater		
Aquifers	Yes	Where all or part of the geological disposal facility host rock is located within the aquifer
Shallow[1] permeable formations	Yes	Where all or part of the geological disposal facility host rock would be provided by permeable formations that might reasonably be exploited in the future
Deep permeable saline formations	No	No potential as exploitable groundwater resources

1. "Shallow", in this context, means less than 500 metres below the surface. Therefore, "deep" and "at depth" mean more than 500 metres below the surface.

Table B1: Summary table of initial sub-surface screening criteria *(continued)*

	To be applied as exclusion criteria?	Reasons/explanations and qualifying comments
Formations neighbouring exploitable groundwater	No	Where the host rock volume provides adequate long-term isolation of the waste
Specific complex hydro-geological environments	Yes	Deep karstic formations and known source rocks for thermal springs
Geological stability		
Earthquakes & faults	No	Later assessment of potential impact on sites
Uplift and erosion	No	Influence on geological disposal facility depth and design and later site exclusion in extreme cases
Other geohazards	No	Site specific risk assessment will be required later in the process
Geotechnical issues		
Rock stress and engineering issues	No	Later assessment when detailed site data are available
Other sub-surface criteria		
Specific complex geological environments	No	Need not be excluded at this stage
Other geological and hydrogeological characteristics	No	Only required at in-situ geoscientific investigation stage

Annex C:

Community Siting Partnerships: Guidance

Introduction

C.1 The Government is committed to a partnership approach. This approach is important in two main ways. First, to shape the relationships between national and local bodies. Second, to inform the establishment of a formal Community Siting Partnership of local community interests in those areas where decisions have been taken to participate in the siting process.

C.2 Although Government does not wish to be prescriptive about the forms of Community Siting Partnership that are established, the following guidance should be taken into account by interested parties.

Mission Statement

C.3 A Community Siting Partnership should adopt a formal mission statement, for example:

> The mission of a Community Siting Partnership is to ensure that: all the questions and concerns of potential Host Communities within its area and its Wider Local Interests about the geological disposal facility siting, construction, operation, closure and post-closure are addressed and resolved as far as reasonably practicable; and that the project contributes to a community's development and well-being

Objectives

C.4 A set of objectives should also be identified to help guide the work of the Community Siting Partnership, and enable it to review progress. It is suggested that the objectives might include seeking to develop partner and local community confidence that:

- there is a good prospect for developing an acceptable environmental safety case
- the potential development is unlikely to lead to significant objections on planning grounds
- a Benefits Package will be developed such that the overall balance of benefits and impacts will contribute to the well-being of local communities and their future generations
- the question of potential retrievability of wastes has been adequately considered
- the Host Community and the Wider Local Interests – have been engaged in the debate.

Such objectives will need to be achieved for a successful siting process.

The Role of a Community Siting Partnership

C.5 In order to fulfil its mission and objectives, Government envisages that the role of the Partnership will include:

- Developing advice and recommendations for Decision Making Bodies
- Consideration of, and contribution to the work the implementing organisation and delivery organisation are undertaking to design, construct and operate a facility.
- Obtaining specialist advice or commissioning research to inform its advisory role, address community concerns or identify ways of developing community well-being
- Ensuring that the siting process for a facility within a potential Host Community is effective and focussed on making progress
- Provision of public information about the activities, views and recommendations of the Community Siting Partnership
- Engagement or consultation with potential Host Communities and Wider Local Interests
- Identifying and addressing divergent views within those communities
- Liaison and discussion with local bodies with remits related to the mission of the Community Siting Partnership (e.g. Local Strategic Partnerships or Site Stakeholder Groups)
- Building the capacity of its membership to enable it to effectively carry out these roles.

Participants in a Partnership may wish to adopt additional formulations of their role, as related to the mission of the Partnership.

Decision-Making Responsibilities

C.6 Although a Community Siting Partnership would be able to take decisions about how it undertakes all elements of its role, it would not have powers to usurp the decision-making responsibilities of other bodies, including the Nuclear Decommissioning Authority (NDA) as implementing organisation, the NDA's delivery organisation, the regulators, and local and national government. A Partnership is expected to play a crucial part in ensuring that the decisions of those bodies are well-informed and robust, particularly regarding community concerns.

C.7 The leadership role and democratic accountability of local government means that it should be responsible for major local decisions within the siting process. It will be the Decision Making Body and will take decisions relating to:

- continued participation at key stages, or exercising a Right of Withdrawal
- the local acceptability of proposals for Community Benefits Packages
- the local acceptability of the sites within an area that are proposed for field surface-based investigations
- whether potential retrievability of wastes has been adequately considered

In each case, the Decision Making Body would take careful account of advice and recommendations from the Community Siting Partnership.

C.8 For participating areas that cross local authority boundaries or have two tier local government, Government will require clarity about which local authorities will take decisions about Partnership recommendations as the siting process progresses.

Timescales

C.9 It is envisaged that potential partners would begin to work together in the steps leading up to a local Decision to Participate in the siting process. If a Decision to Participate is taken, the formal Community Siting Partnership would then be established. The Partnership must be able to develop, evolve and respond to change over a period of decades to enable it to fulfill its mission and objectives.

Membership

C.10 Government expects a Community Siting Partnership to be a partnership of local community interests, with members identified and recruited locally to enable its mission to be fulfilled. The NDA's delivery organisation would be a member of the Partnership but would not be directly involved in decisions by the Partnership on community-related issues. The relevant local authority/ies are likely to have a lead role in setting up the Partnership. Recruitment should be informed by local research to identify all stakeholders that wish to participate. There will be flexibility in the geographic scope and membership of a Partnership to take account of local circumstances.

C.11 Government expects the relevant local authority/ies to be effectively represented within the Community Siting Partnership so that its views can be expressed, local political realities are recognised and there are no surprises when proposals are presented for decision.

The Role of National Bodies

C.12 The NDA's delivery organisation would not be directly involved in decisions by the Partnership on community-related issues or in finalising Partnership advice to Decision Making Bodies, other than when asked to provide a view or technical input. There will, however, need to be ongoing interaction between the NDA's delivery organisation and other members of the Partnership, and Government believes this involvement will allow them to be exposed directly to community concerns and allow real-time feedback of information in both directions. It is hoped this will assist in achieving the most efficient and open engagement, allowing unhelpful misunderstandings to be avoided wherever possible. Of course, the NDA's delivery organisation will remain responsible throughout for ensuring compliance with technical and regulatory requirements.

C.13 Although not a member of a Community Siting Partnership, Government could participate in the work of the Partnership as and when required. This might be as an observer, an associate member, or on an ad hoc basis depending on the requirements of a particular stage in the process. Regulatory bodies will also be involved, for example by providing advice to the Partnership, although regulators will need to have a strictly defined role and remit that does not compromise their independence.

C.14 The role of the national bodies could include:

- The pro-active provision of timely information and advice, including the presentation of proposals, advice and research findings
- Participation in Partnership discussions, working groups and studies
- Responding to Partnership requirements for further information and advice
- Involvement in wider community engagement and consultation initiatives as organised by the Partnership, hearing community views directly and providing information as required
- Assistance with building the capacity of Partnership members to fulfil its mission and objectives

Establishing the Community Siting Partnership and Early Steps

C.15 UK experience of Local Strategic Partnerships highlights the importance of enabling prospective members of a Partnership to develop a shared vision about its mission, objectives, role and the way they will be delivered. Discussion will need to address organisation and procedures, access to specialist knowledge, external communications and engagement, training and skills, funding and resources, and evaluation of progress. Government expects prospective members of the Partnership to develop recommendations in each of these areas that will form the basis of a formal Partnership Agreement. Government and the NDA's delivery organisation will need to be able to sign up to the Agreement.

C.16 A very early task of a Community Siting Partnership will be to develop a detailed local implementation plan for the Partnership's work, building on the national implementation framework. This should enable the Partnership to work with the NDA's delivery organisation to integrate the requirements of the Partnership approach with the technical programme, resulting in a shared understanding of the way forward and a plan that is owned by all key players at national and local levels.

Costs and Funding

C.17 To achieve its mission and fulfil its roles effectively, a Community Siting Partnership will need adequate funding. Government will make available an agreed level of funding as part of the Engagement Package.

C.18 Subject to overall budget approval and audit arrangements agreed with Government, it will be for a Partnership to decide exactly how – in seeking to fulfil its mission – it spends its funding.

C.19 Government expects that a local authority member of the Community Siting Partnership will be the budget holder and employing organisation for the Partnership. Therefore the Partnership will be accountable to the local authority for the management of its budget and will be subject to local authority budget management rules as well as the agreed audits.

C.20 Based on the role of a Community Siting Partnership, Government anticipates that such funding might cover:

- public information
- liaison, consultation and engagement
- salaries and associated costs of Partnership staff
- office costs and overheads
- organisational costs of running the Partnership and any Working Groups it might establish
- commissioning specialist advice
- capacity building of members
- reimbursement for out of pocket expenses of Partnership members
- process evaluation

Agreements

C.21 It is envisaged that agreements will be put in place between the members of the Community Siting Partnerships and the Government. These could cover:

- A description of the facility being proposed
- The mission, aims and objectives of the Partnership
- The roles of the parties involved
- Requirements for community involvement
- Funding arrangements for the Partnership
- Who the Partnership is responsible to and how that responsibility is managed
- How the Partnership's work and accounts will be scrutinised
- Right of Withdrawal.

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Glossary

Activity
The number of atoms of a radioactive substance which decay (radioactive decay) by nuclear disintegration each second. The unit of activity is the becquerel.

Advanced Gas-cooled Reactor (AGR)
The reactor type used in the UK's second generation nuclear power plants.

Alpha activity
Alpha activity takes the form of particles (helium nuclei) ejected from a decaying (radioactive) atom. Alpha particles cause ionisations in biological tissue which may lead to damage. The particles have a very short range in air (typically about 5 cm) and alpha particles present in materials that are outside of the body are prevented from doing biological damage by the superficial dead skin cells, but become significant if inhaled or swallowed.

Baseline Inventory
An estimate of the higher activity radioactive waste and other materials that could, possibly, come to be regarded as wastes that might need to be managed in the future through geological disposal drawn from the UK Radioactive Waste Inventory.

Becquerel (Bq)
The standard international unit of radioactivity equal to one radioactive decay per second. Becquerels are abbreviated to Bq. Multiples of becquerels commonly used to define radioactive waste activity are: kilobecquerels (kBq) equal to 1 thousand Bq; megabecquerels (MBq) equal to 1 million Bq; gigabecquerels (GBq) equal to 1 thousand million Bq.

Beta activity
Beta activity takes the form of particles (electrons) emitted during radioactive decay from the nucleus of an atom. Beta particles cause ionisations in biological tissue which may lead to damage. Most beta particles can pass through the skin and penetrate the body, but a few millimetres of light materials, such as aluminium, will generally shield against them.

Borehole Disposal
The concept of disposing of some forms of radioactive waste in extremely deep boreholes, a number of kilometres down in the Earth's crust.

British Geological Survey (BGS)
The BGS provides expert services and impartial advice in all areas of geoscience.

Clean-up
The decontamination and decommissioning of a nuclear licensed site.

Committee on Radioactive Waste Management (CoRWM)
CoRWM was set up in 2003 to provide independent advice to Government on the long-term management of the UK's solid higher activity radioactive waste. In October 2007, CoRWM was reconstituted with revised Terms of Reference and new membership. The Committee will provide independent scrutiny and advice to UK Government and devolved administration Ministers on the long-term radioactive waste management programme, including storage and disposal. Further information available at www.corwm.org.uk

Community Siting Partnership (or Partnership)
A partnership of local community interests that will work with the NDA's delivery organisation and with other relevant interested parties to ensure questions and concerns of potential Host Communities and its Wider Local Interests are addressed and resolved as far as reasonably practicable and to advise Decision Making Bodies at each stage of the process.

Criteria Proposals Group (CPG)
An expert group set up to recommend a set of scientific criteria for the initial sub-surface exclusion of areas of the UK unsuitable for the location of a geological disposal facility.

Criteria Review Panel (CRP)
An expert group established to undertake independent peer review and assessment of the CPG's proposals to ensure that they are sound and workable.

Decommissioning
The process whereby a nuclear facility, at the end of its economic life, is taken permanently out of service. The term "site clean-up" is sometimes used to describe the work undertaken to make the site available for other purposes.

Decontamination
Removal or reduction of radioactive contamination.

Department for Business, Enterprise and Regulatory Reform (BERR)
previously Department of Trade and Industry (DTI).

Department for Environment, Food and Rural Affairs (Defra)

Department for Transport (DfT)

Department of Communities and Local Government (DCLG)

Department of Environment Northern Ireland (DoENI)

Devolved administrations
Collective term for the Scottish Executive, Welsh Assembly Government and in Northern Ireland, the Department of the Environment.

Disposability
The degree to which conditioned waste meets the standards for final disposal.

Disposal
In the context of solid waste, disposal is the emplacement of waste in a suitable facility without intent to retrieve it at a later date; retrieval may be possible but, if intended, the appropriate term is storage.

Energy Act 2004 (EA04)
An Act of Parliament, EA04 which, inter alia, established the NDA and set out its duties and responsibilities for the decommissioning and clean-up of the UK's public civil nuclear sites.

Environment Agency
The environmental regulator for England and Wales. The Agency's role is the enforcement of specified laws and regulations aimed at protecting the environment, in the context of sustainable development, predominantly by authorising and controlling radioactive discharges and waste disposal to air, water (surface water, groundwater) and land. The Environment Agency also regulates nuclear sites under the Environmental Permitting Regulations and issues consents for non-radioactive discharges.

Environmental Impact Assessment (EIA)
A legal requirement under EU Directive 85/337/EEC (as amended) for certain types of project, including various categories of radioactive waste management project. It requires information on the environmental impacts of a project proposal to be submitted by the developer and evaluated by the relevant competent authority (the planning authority, HSE or other regulators concerned).

Euratom Treaty
The legislative basis for the activities of European Union countries in the nuclear energy field.

European Commission (EC)
The executive body of the European Union. Its primary roles are to propose and implement legislation, and to act as guardian of the treaties which provide the legal basis for the European Union.

European Union (EU)
The European Union of countries of which the United Kingdom is a member. The EU issues its own legislation which the UK, as a member state, is obliged to follow.

Expression of Interest (EoI)
The decision point at which local communities register their 'without commitment' interest in discussions with Government about potential involvement in the geological disposal facility siting process.

Gamma activity
An electromagnetic radiation similar in some respects to visible light, but with higher energy. Gamma rays cause ionisations in biological tissue which may lead to damage. Gamma rays are very penetrating and are attenuated only by shields of dense metal or concrete, perhaps some metres thick, depending on their energy. Their emission during radioactive decay is usually accompanied by particle emission (beta or alpha activity).

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

Half-life
The time taken for the activity of a given amount of a radioactive substance to decay to half of its initial value. Each radionuclide has a unique half-life.

Health and Safety Executive (HSE)
A statutory body whose role is the enforcement of work related health and safety law. HSE is the licensing authority for nuclear installations. The Nuclear Safety Directorate of HSE exercises this delegated authority through the Nuclear Installations Inspectorate (NII) who are responsible for regulating the nuclear, radiological and industrial safety of UK nuclear installations under the Nuclear Installations Act 1965.

High Level Waste (HLW)
Radioactive wastes 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.

Higher activity radioactive waste
It includes the following categories of radioactive waste: high level waste, intermediate level waste, a small fraction of low level waste with a concentration of specific radionuclides.

Infrastructure Planning Commission (IPC)

Intermediate level waste (ILW)
Radioactive wastes exceeding the upper activity boundaries for LLW but which do not need heat to be taken into account in the design of storage or disposal facilities.

International Atomic Energy Agency (IAEA)

International Commission on Radiological Protection (ICRP)
An international advisory body founded in 1928 providing recommendations and guidance on radiation protection. ICRP recommendations normally form the basis for EU and UK radiation protection standards.

Ionisation
When radiation (alpha, beta, and gamma activity) interacts with matter, it can cause atoms and molecules to become unstable (creating ions). This process is called ionisation. Ionisation within biological tissue from radiation is the first stage in radiation leading to possible change or damage within the tissue.

Legacy Waste
Radioactive waste which already exists or whose arising is committed in future by the operation of an existing nuclear power plant.

Low Level Waste (LLW)
LLW is defined as "radioactive waste having a radioactive content not exceeding 4 gigabecquerels per tonne (GBq/te) of alpha or 12 GBq/te of beta/gamma activity".

Managing Radioactive Waste Safely (MRWS)
A phrase covering the whole process of public consultation, work by CoRWM, and subsequent actions by Government, to identify and implement the option, or combination of options, for the long term management of the UK's higher activity radioactive waste.

Maritime and Coastguard Agency (MCA)
Body with responsibility for developing, promoting and enforcing high standards of marine safety within British territorial waters and ports.

Ministry of Defence (MoD)

New build
New build of a nuclear power station.

Nirex (UK Nirex Ltd)
An organisation previously owned jointly by Defra and the DTI. Its objectives were, in support of Government policy, to develop and advise on safe, environmentally sound and publicly acceptable options for the long-term management of radioactive materials in the United Kingdom. The Government's response to CoRWM in October 2006 initiated the incorporation of Nirex functions into the NDA, a process which was completed in March 2007.

Non-Governmental Organisations (NGOs)
In its broadest sense, a non-governmental organisation is one that is not directly part of the structure of Government.

Nuclear Decommissioning Authority (NDA)
The NDA is the implementing organisation, responsible for planning and delivering the geological disposal facility. The NDA was set up on 1 April 2005, under the Energy Act 2004. It is a non-departmental public body with designated responsibility for managing the liabilities at specific sites. These sites are operated under contract by site licensee companies (initially British Nuclear Group Sellafield Limited, Magnox Electric Limited, Springfields Fuels Limited and UK Atomic Energy Authority). The NDA has a statutory requirement under the Energy Act 2004, to publish and consult on its Strategy and Annual Plans, which have to be agreed by the Secretary of State (currently the Secretary of State for Trade and Industry) and Scottish Ministers.

Nuclear Installations Act 1965 (NIA65)
UK legislation which provides for the operation and regulation of nuclear installations within the UK.

Nuclear Installations Inspectorate (NII) see HSE

Nuclear Legacy Advisory Forum (NuLeAF)
A special interest group, established by the Local Government Association, to provide a mechanism for identifying a common local government viewpoint on nuclear clean-up issues and to act as an interface with Government and the regulatory bodies as they consult on waste management and clean-up policy and practice.

Nuclear Safeguards
Measures to verify that States comply with their international obligations not to use nuclear materials (plutonium, uranium and thorium) for nuclear explosives purposes. Global recognition of the need for such verification is reflected in the requirements of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) for the application of safeguards by the International Atomic Energy Agency (IAEA). Also, the Treaty Establishing the European Atomic Energy Community (the Euratom Treaty) includes requirements for the application of safeguards by the European Commission.

Nuclear technology
Technology that involves the reactions of the nuclei of atoms. It forms the basis for nuclear power plants and supporting research and operations. The world's first commercial nuclear power station, Calder Hall in Sellafield, England was opened in 1956.

Nuclear waste
A general term for the radioactive waste produced by those industries involved with nuclear energy and nuclear weapons' production.

Office for Civil Nuclear Security (OCNS)
The independent security regulator for the UK civil nuclear industry.

Partnership (see Community Siting Partnership)

Passive Safety
The need to provide and maintain a safety function by minimising the need for active safety systems, monitoring or prompt human intervention. Requires radioactive wastes to be immobilised and packaged in a form that is physically and chemically stable. The package should be stored in a manner that is resistant to degradation and hazards, and which minimises the need for control and safety systems, maintenance, monitoring and human intervention.

Planning authorities
A general term for those regional planning bodies and local authorities throughout the UK who are responsible for the preparation of planning strategies and for determining applications for construction and operation of waste treatment and disposal facilities that may be sited in their area of responsibility.

Plutonium
A radioactive element occurring in very small quantities in uranium ores but mainly produced artificially, including for use in nuclear fuel, by neutron bombardment of uranium.

Pressurised Water Reactor (PWR)
Reactor type using ordinary water under high pressure as coolant and neutron moderator. PWRs are widely used throughout the world for electricity generation. The Sizewell B reactor in Suffolk is of this design.

Radioactive decay
The process by which radioactive material loses activity, e.g. alpha activity naturally. The rate at which atoms disintegrate is measured in becquerels.

Radioactive material
Material designated in national law or by a regulatory body as being subject to regulatory control because of its radioactivity.

Radioactive Substances Act 1993 (RSA 93)
UK legislation which provides for regulation of the disposal of radioactive wastes, including liquid and gaseous discharges to the environment.

Radioactive waste
Any material contaminated by or incorporating radioactivity above certain thresholds defined in legislation, and for which no further use is envisaged, is known as radioactive waste.

Radioactive Waste Management Directorate (RWMD)
A new NDA Directorate established to design and build an effective delivery organisation to implement a safe, sustainable, publicly acceptable geological disposal programme. It is envisaged that this directorate will become a wholly owned subsidiary company of the NDA. Ultimately, it will evolve under the NDA into the organisation responsible for the delivery of the geological disposal facility. Ownership of this organisation can then be opened up to competition, in due course, in line with other NDA sites.

Radioactivity
Atoms undergoing spontaneous random disintegration, usually accompanied by the emission of radiation.

Radionuclide
A term which refers to a radioactive form of an element, for example, carbon-14 and caesium-137.

Repository
A permanent disposal facility for radioactive wastes.

Reprocessing
A physical or chemical separation operation, the purpose of which is to extract uranium or plutonium for re-use from spent nuclear fuel.

Right of Withdrawal (RoW)
This is an important part of the voluntarism approach intended to contribute to the development and maintenance of community confidence. Up until a late stage, when underground operations and construction are due to begin, if a community wished to withdraw then its involvement in the process would stop.

Safety cases
A 'safety case' is the written documentation demonstrating that risks associated with a site, a plant, part of a plant or a plant modification are as low a reasonably practicable and that the relevant standards have been met. Safety cases for licensable activities at nuclear sites are required as license conditions under the NIA65.

Scottish Environment Protection Agency (SEPA)
The environmental regulator for Scotland. The Agency's role is the enforcement of specified laws and regulations aimed at protecting the environment, in the context of sustainable development, predominantly by authorising and controlling radioactive discharges and waste disposal to air, water (surface water, groundwater) and land. SEPA also regulates nuclear sites under the Pollution Prevention and Control Regulations and issues consents for non-radioactive discharges.

Scottish Executive (SE)

Seismic survey
A technique for determining the detailed structure of the rocks underlying a particular area by passing acoustic shock waves into the rock strata and detecting and measuring the reflected signals.

Sizewell B
A PWR nuclear power plant in Suffolk, operated by British Energy.

Spent fuel (Spent nuclear fuel)
Used fuel assemblies removed from a nuclear power plant reactor after several years use and treated either as radioactive waste or via reprocessing as a source of further fuel.

Stakeholders
In the context of this document, people or organisations, having a particular knowledge of, interest in, or be affected by, radioactive waste, examples being the waste producers and owners, waste regulators, non-Governmental organisations and local communities and authorities.

Storage
The emplacement of waste in a suitable facility with the intent to retrieve it at a later date.

Strategic Environmental Assessment (SEA)
In this document, SEA refers to the type of environmental assessment legally required by EC Directive 2001/42/EC in the preparation of certain plans and programmes. The authority responsible for the plan or programme must prepare an environmental report on its likely significant effects, consult the public on the report and the plan or programme proposals, take the findings into account, and provide information on the plan or programme as finally adopted.

Sustainability Appraisal (SA)
A form of assessment used in England, particularly in regional and local planning, covering the social, environmental and economic effects of proposed plans and appraising them in relation to the aims of sustainable development. SAs fully incorporating the requirements of the SEA Directive (2001/42/EC) are mandatory for a range of regional and local planning documents under the Planning and Compulsory Purchase Act 2004.

Thorium
A naturally occurring, weakly radioactive element and an alternative to uranium as a nuclear fuel.

UK Radioactive Waste Inventory (UKRWI)
A compilation of data on UK radioactive waste holdings, produced about every three years. The latest version, for a holding date of 1 April 2007, was published in June 2008. It is produced by Defra and the NDA. It is the latest public record of information on the sources, quantities and properties of Low Level Waste (LLW), Intermediate Level Waste (ILW) and High Level Waste (HLW) in the UK. It comprises of a number of reports and additional detailed information on the quantities and properties of radioactive wastes in the UK that existed at 1 April 2007 and those that were projected to arise after that date.

Unconditioned Waste
Radioactive waste in its initially generated state, prior to its preparation and packaging for longer term storage and/or disposal in a solid and stable form.

Uranium
A heavy, naturally occurring and weakly radioactive element, commercially extracted from uranium ores. By nuclear fission (the nucleus splitting into two or more nuclei and releasing energy) it is used as a fuel in nuclear reactors to generate heat.

Voluntarism
An approach in which communities "express an interest" in participating in the process that would ultimately provide the site for a geological disposal facility. Initially a community would be expressing an interest in finding out more about what hosting such a facility would involve. In the latter stages there would be more detailed discussion of plans and potential impacts.

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

Waste Management Steering group (WMSG)

Welsh Assembly Government (WAG)

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