Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom

26 March 2007

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

An Agency within the Department of the
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By Defra, DTI and the Devolved Administrations

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Statement of Government Policy

Introduction

1. This statement of UK Government and devolved administrations' (hereafter referred to as Government) policy for the long term management of the UK's solid low level radioactive waste (LLW) has been developed following public consultation (refs 1 and 2). This policy statement amends or replaces relevant parts of the 'Review of Radioactive Waste Policy: Final Conclusions (Cm2919) White Paper published in July 1995 (ref 3). The Supplementary Notes at Annex 1 provide additional information in support of this statement and Annex 2 lists and explains terminology and abbreviations used in the statement. Where, appropriate, references are made to these Annexes in the statement and to other published material which is listed at the end of this statement.

Policy aims

2. The policy statement covers all aspects of the generation, management and regulation of solid LLW and applies to the following organisations: those responsible for the production and management of wastes (waste producers and managers); the Nuclear Decommissioning Authority (NDA); the regulatory bodies; the Food Standards Agency (FSA)[1]; waste disposal facility operators; and regional planning bodies; and planning authorities[2]. Related but separate government policy covers:

- policy for the discharge of liquid and gaseous radioactive waste, which is set out in the UK Strategy for Radioactive Discharges (ref 4);

- management of radioactively contaminated land (ref 5);

- management of the UK's higher activity radioactive waste, which has been considered by the Committee on Radioactive Waste Management (CoRWM). CoRWM presented its recommendations to Government on 31 July 2006 (ref 6). Government responded to these recommendations on 25 October 2005 under its "Managing Radioactive Waste Safely" programme (ref 7).

3. Recognising that there is a large range of LLW types, and levels of associated radioactivity, Government policy does not aim to be prescriptive in its approach. It is acknowledged that each LLW management need will have its own approach, and the development of solutions on a case-by-case basis is a matter for waste managers. The key aim of this policy statement is therefore to provide a high level framework within which individual LLW management decisions can be taken flexibly to ensure safe, environmentally-acceptable and cost-effective management solutions that appropriately reflect the nature of the LLW concerned. The Supplementary Notes at Annex 1 provide further information to aid the implementation of the policy statement.

[1] FSA has responsibility for food safety across the UK.
[2] The planning framework differs across the UK – see Annex 1.

Definitions of LLW

4. Within the UK, LLW is now defined 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.

This definition supersedes that in paragraph 53(3) of Cm2919 (ref 3), and is a general definition which does not relate to specific disposal sites. The lower activity limit for LLW, below which waste is not required to be subject to specific regulatory control remains unchanged.[3] However such material may be subject to transport regulations.

5. Within the UK, Very Low Level Radioactive Waste (VLLW), sub-category of LLW is now defined as:

> **in the case of low volumes ('dustbin loads') – Low Volume VLLW:**
>
> "Radioactive waste which can be safely disposed of to an ***unspecified*** destination with municipal, commercial or industrial waste ("dustbin" disposal), each 0.1m^3 of waste containing less than 400 kilobecquerels (kBq) of total activity or single items containing less than 40 kBq of total activity.
>
> For wastes containing carbon-14 or hydrogen-3 (tritium):
>
> - in each 0.1m^3, the activity limit is 4,000 kBq for carbon-14 and hydrogen-3 (tritium) taken together; and
> - for any single item, the activity limit is 400 kBq for carbon-14 and hydrogen-3 (tritium) taken together.
>
> Controls on disposal of this material, after removal from the premises where the wastes arose, are not necessary[4]."
>
> OR
>
> **in the case of bulk disposals – High Volume VLLW:**
>
> "Radioactive waste with maximum concentrations of four megabecquerels per tonne (MBq/te) of total activity which can be disposed of to ***specified*** landfill sites. For waste containing hydrogen-3 (tritium), the concentration limit for tritium is 40MBq/te. Controls on disposal of this material, after removal from the

[3] See Annex 1, paragraph 7.

[4] The quantity of low volume VLLW that may be disposed of is currently the subject of research by SNIFFER. Once published the environment agencies will develop and publish guidance on the quantity of low volume VLLW that may be disposed of from any premises.

premises where the wastes arose, will be necessary in a manner specified by the environmental regulators[5]".

The principal difference between the two definitions is the need for controls on the total volumes of VLLW in the second (high volume) category being deposited at any one particular landfill site. These definitions supersede that for VLLW in paragraph 53(4) of Cm2919 (ref 3).

The regulation of LLW management

6. Nuclear industry radioactive waste management, including that of LLW, is regulated by a number of bodies. The Health and Safety Executive (HSE), in particular, regulates the on-site arising and storage of waste from a health and safety perspective. The environment agencies regulate the disposal and transfer of solid waste, as well as liquid and gaseous discharges. The Department for Transport and the Office for Civil Nuclear Security also regulate in this area. Regulatory approaches by the environment agencies and the HSE, in particular, have the potential to impact upon one another. Government looks to these bodies to maximise the consistency of their approaches to regulating radioactive waste management, including disposal of LLW, and on matters relating to delicensing and clean-up of nuclear sites and other land contaminated by radioactivity. Government also looks to the regulatory bodies to make clear, through published material, the steps that have been taken to address this requirement. Regulation of the management of non-nuclear industry LLW is the responsibility of the environment agencies, which regulate both accumulation and disposal of waste for the sites concerned.

LLW management plans

7. Plans for the management of all radioactive waste, including LLW, must be developed by waste managers. These plans must be prepared in a form, and to a level of detail, suitable for consideration by the relevant regulatory bodies.

8. All nuclear licensed sites should have a plan for the management of their LLW holdings and predicted future arisings that is part of a wider integrated waste management strategy, and is compatible with proposed end states.

9. The preparation of LLW management plans for non-nuclear industry sites should be proportionate to the scale of their waste production and holdings, as agreed with the regulator. It is a matter for the regulators to clarify their requirements in the light of the general principles set out in this statement of policy.

10. Strategic Environmental Assessment (SEA) will be required by European Union Directive 2001/42/EC for certain plans and programmes, and an environmental impact assessment may be required for projects under Directive 85/337/EC (amended by 97/11/EC). Guidance on the application of these Directives is available (refs 8 and 9).

[5] Controls are likely to include (but may not be restricted to) the total volume of waste being disposed of and any particular landfill site. The regulators will develop and publish guidance on this matter.

Key requirements of LLW management plans

11. LLW management plans must take into account all current and anticipated future arisings of LLW, and their radiological and non-radiological properties. This may necessitate additional characterisation work. Such plans must be developed with appropriate regulatory and stakeholder involvement and should take into account current best practice. As a general principle, such plans should be developed and agreed with the regulatory bodies in advance of the production of any new LLW streams.

12. In addition, the preparation of LLW management plans shall be based on:

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

13. These considerations are discussed further below.

Use of a risk informed approach

14. To ensure the safety of the public and protection of the environment, LLW management plans must be informed by assessments of potential radiation exposure and its associated risk. Such assessment will be part of the wider options' assessment requirements of the regulatory bodies.

15. For the period of operation of disposal sites for LLW, the effective dose to a representative member of the critical group should not exceed the single source-related dose constraint of 0.3 millisieverts (mSv) per year (the average annual dose from background radiation within the UK is 2.6mSv per year), and shall be reduced below this level to the extent practicable through the use of the Best Practicable Means (BPM) principle to ensure that doses to people are "as low as reasonably achievable" (ALARA), economic and social factors being taken into account. This dose constraint also applies to the period following cessation of operations, during which the site would remain under management control, and when monitoring would be undertaken.

16. Following final disposal and post-closure monitoring, and once management control of the waste has been withdrawn, the assessed radiological risk of fatal cancer or severe hereditary defect from the facility to a representative member of the potentially exposed group at greatest risk should be consistent with a risk target of 10^{-6} per year (i.e. one in a million per year) (ref 10)[6]. The environment agencies will be providing updated guidance on the requirements for authorisation of near-surface disposals of LLW. This will include advice on the extent to which those undertaking radiological impact assessments for LLW disposals should take account of non-human species.

Minimisation of waste arisings

17. To ensure that arisings of LLW and the requirements for its disposal are minimised, LLW managers should plan to manage their waste in accordance with the waste management hierarchy principles set out in UK waste strategy documents (ref 11). For LLW this means:

- not creating waste where practicable ("avoidance");
- reducing waste arisings (both by activity and by mass) to the minimum through the appropriate design and operation of processes and equipment and making effective use of techniques such as waste characterisation, sorting and segregation, volume reduction and surface contamination removal;
- otherwise minimising quantities of LLW requiring disposal through decay storage, re-use and/or recycling, and incineration (under appropriately regulated circumstances);
- disposal (which may, for some waste forms, include incineration).

18. The objective for LLW management plans should be to deal with potential arisings at the highest practicable level of this hierarchy. However, Government recognises that there are limitations to the application of the waste hierarchy in the management of legacy wastes[7].

Consideration of all practicable options for the management of LLW

19. Preparation of plans for the management of LLW must be based on an assessment of all practicable options for its long term management[8] Any implementation of options under this policy will be subject to a satisfactory risk assessment and optimisation study, as required by relevant regulatory bodies. Government believes that disposal to an appropriately engineered facility, either below or above ground, with no intent to retrieve should be the end point for LLW that remains following the application of the waste hierarchy. This position is held on the

[6] See Annex 1 paragraphs 37 to 40 or further explanation of use of the dose constraint and risk target.
[7] See Annex 1 paragraphs 16 to 18
[8] See Annex 1 paragraphs 19 to 25 for disposal options and options' assessment methods

basis that new disposal facilities will be of sufficiently robust design such that risks to the public in the future will be within the post-closure risk target,[9] and therefore that postponing final disposal to future generations is unjustified. With regard to LLW and VLLW disposal to landfill, Government sees no reason to preclude controlled burial of radioactive waste from nuclear sites from the list of options to be considered in any options' assessment, provided the necessary safety assessments can be carried out to the satisfaction of the environmental regulators This supersedes paragraph 117 of Cm2919 (ref 3).

20. Consideration may be given to decay storage of shorter-lived LLW prior to final disposal in the formulation of LLW management plans, subject to preparation of an appropriate safety case and securing the necessary regulatory approvals.

21. Some LLW has hazardous or toxic properties which must be taken into account in its disposal and incineration may be considered as a treatment or disposal option for some combustible LLW. For example, clinical waste contaminated with biological material needs to be disposed of by incineration and some types of liquid wastes, like oil, are also best dealt with by incineration. The use of incineration[10] and subsequent disposal of ash will be subject to production of an appropriate safety case and the necessary regulatory approvals.

Presumption towards early solutions

22. In preparing programmes and plans for the management of operational LLW, there should be a presumption by the waste manager towards management solutions which can be implemented early rather than late. Similarly, in preparing programmes and plans for the decommissioning and clean-up of nuclear sites, arrangements and provisions for the disposal of the LLW that is generated should be given consideration at the earliest possible stage. Early solutions does not necessarily equate to early *disposal*. For example, decay storage of wastes pending final disposal is perfectly acceptable provided that the decay storage provides a genuine benefit. The objective should be to put such solutions in place prior to the implementation of those programmes and plans wherever possible. Where this is shown not to be possible, or inappropriate, any interim management of these wastes will need to be conducted in a manner that is acceptable to regulators, and that takes account of the agreed final disposal route(s) identified from the options' assessments. Planning authorities and local communities should also be consulted to an extent that is commensurate with any proposals. Such an approach will contribute to the achievement of inter-generational equity.

The proximity principle and transport of waste

23. Use of centralised facilities, such as the Low Level Waste Repository (LLWR) near Drigg in Cumbria, or any similar future facility, may be the appropriate point of disposal for much LLW. However, depending on the intrinsic hazard of some forms of LLW, other solutions are possible. Options' assessments carried out to support the

[9] See paragraph 16 and Annex 1 paragraph 37.
[10] See Annex 1 paragraphs 19 to 22

development of LLW management plans must consider these other possible solutions, employing the proximity principle as a point of reference. However, although the desire to avoid excessive transportation of materials is an important consideration, it must be balanced with all the other relevant factors on a case by case basis.

24. There are UK regulations (ref 12) concerning the transport of radioactive wastes, and Government believes these regulations have provided a safe environment for the transport of LLW in the past, and will continue to do so into the future. However, it is also recognised that any transport will, of necessity, increase conventional transport risks and create the same environmental burdens as those associated with any long distance transport. For this reason, when options' assessments are carried out to support the development of LLW management plans, "transport" should be explicitly considered, taking into account the volumes and activity of the waste as well as the distance over which it will need to be transported for each option. The need to consider alternatives to long distance transport where possible applies in particular to large quantities of lower activity soil and rubble that will arise from large nuclear site decommissioning activities.

Consideration of the potential effects of climate change

25. To ensure that the necessary safety standards are maintained, plans for the provision of long term storage or disposal facilities for LLW should take due account of the potential future effects of climate change, in particular from rising sea levels, and to other foreseeable long term environmental changes, for example, glaciation.

Consultation and public involvement

26. Nuclear operators' proposed programmes and plans for the management and disposal of LLW should be developed by including wide stakeholder engagement to allow for an equitable approach. Such engagement should involve communities which may be impacted by the plans, including any host community in the vicinity of a waste treatment or disposal facility, and the local authorities concerned (defined in this document as 'local communities'). Government believes that early involvement by communities and stakeholders is both necessary and beneficial. When environment agencies consult on applications to dispose of LLW from nuclear sites they should take account of operators' consultations and adopt a proportionate approach. Non-nuclear operators do not need to consult the public on their LLW management plans. However, the regulators' consideration of any applications for an authorisation to dispose of LLW from non-nuclear producers can include consultation.

27. Guiding principles that should apply to such consultations are:

- provision for early local community input into the decision-making process;
- openness and transparency at all stages;
- provision of well prepared, good quality, accurate and easily understandable briefing material;
- use of an iterative consultation process where appropriate.

Import and export of LLW

28. Transfer of radioactive waste across national boundaries is regulated under the Transfrontier Shipment of Radioactive Waste Regulations 1993 (currently under review). The regulations require prior notification and approval by the environmental regulators before any radioactive waste can be exported from, or imported to, the UK. In recognition that technologies for the recycling of certain materials within radioactive waste have advanced over recent years, and that Cm2919 was not written with large-scale decommissioning in mind, Government policy on import and export of LLW has been modified as set out below and these modifications now amend, for LLW, the provisions of paragraphs 145 and 146 of Cm2919 (ref 3).

29. The export of LLW to other OECD (Organisation for Economic Co-operation and Development) and EU (European Union) countries may only be authorised or consented to by the competent UK authority in light of an assessment of all practicable options, and should not be permitted except:

- for the recovery of re-useable materials; OR
- for treatment that will make its subsequent storage and disposal more manageable.

In all cases where such processes would add materially to the wastes needing to be disposed of in the country of destination, the presumption should be that they will be returned to the UK, to a timescale agreed by regulators and competent authorities (as defined in the Transfrontier Shipment Regulations) in the UK and in the country of destination.

30. The import of LLW from other countries may only be authorised or consented to by the competent UK authority in light of an assessment of all practicable options, and if it complies with EU and UK legislation and any associated Government guidance provided to the competent UK authority, and should not be permitted except:

- for the recovery of re-useable materials; OR
- for treatment that will make its subsequent storage and disposal more manageable.

In all cases where such processes would add materially to the wastes needing to be disposed of in the UK, the presumption should be that they will be returned to the country of origin to a timescale agreed by regulators and competent authorities in the UK and in the country of origin.

The role of the NDA in providing for LLW management in the UK

31. Government wishes to ensure that there are disposal routes available for the long term management of LLW arisings from both the nuclear and non-nuclear industries in the UK, including Ministry of Defence LLW. Under the Energy Act 2004, the NDA has direct responsibility for the UK's civil public sector nuclear liabilities.

Wherever appropriate and practicable, the NDA will also make LLW management and disposal facilities available to other nuclear and non-nuclear industry managers of radioactive waste, on the basis of suitable commercial terms. These arrangements will appropriately complement other forms of LLW disposal provision by other organisations, e.g. landfill and incinerator operators.

32. The NDA will formulate and publish its plans for LLW management and disposal in its Strategy and Annual Plans, required by the Energy Act 2004 (EA04) and approved by the Secretary of State and the Scottish Ministers. The NDA has undertaken an environmental assessment of its first Strategy, published in March 2006 (ref 13), which will be subject to review in accordance with EA04. The NDA's Strategy and Annual Plans will provide guidance for national, regional and local planning authorities as necessary in the preparation of planning strategies and their appraisal. They will also form the basis for the NDA's contractors moving forward to apply for the planning and regulatory approvals required for any necessary facilities.

33. In line with its Strategy and Annual Plans, Government expects the NDA to:

- develop, and publish, a plan for the optimal use of the LLWR near Drigg. This must take into account the ongoing regulatory review of the Radioactive Substances Act 1993 (RSA93) authorisation of the site and, in light of this, uncertainty about its future capacity;

- as part of the process of preparing plans for the decommissioning and clean-up of its sites, and identifying the eventual end points and future uses that it foresees for them, assess the extent to which other LLW disposal options might be employed to manage the waste arisings from them; and

- in light of the above points assess if, and at what point in the future, a replacement, or replacements, for the LLWR near Drigg might be required and planned for.

34. In considering the use of the LLWR near Drigg and any replacement, either as national, regional or local facilities, the NDA should take into account potential need for use of these facilities by other nuclear and non-nuclear industry LLW managers.

35. The NDA will also support Government in developing and maintaining a UK-wide strategy for waste arising from the non-nuclear industry (see paragraph 37 below), to help ensure that the strategies for the nuclear and non-nuclear sectors are suitably integrated.

The management of non-nuclear industry LLW

36. The non-nuclear industry covers all radioactive waste production other than that from military and civil nuclear licensed sites. It includes organisations such as hospitals, pharmaceutical, research and educational establishments which produce LLW throughout the UK. In light of the functions of these organisations, and that they generally produce LLW of lower activity concentrations and amounts than the LLW

produced by the nuclear industry, Government's view that as a general principle, it is appropriate that communities should take greater responsibility for how they deal with non-nuclear industry LLW arisings. This section of the policy statement supersedes paragraphs 148-154 inclusive of Cm2919 (ref 3).

37. The non-nuclear industry has been mainly dependent on landfill and incinerator facilities, now usually provided by commercial operators, for disposal of their LLW. Government wishes to see the maintenance of the required disposal routes for these kinds of wastes that minimise the effect on the environment, including the need for long distance transport. Government therefore acknowledges that a UK-wide strategy is needed for wastes arising from the non-nuclear industry, and believes that implementation of such a strategy will require the steps set out below.

- firstly, the estimation of the extent and geographical distribution of LLW arisings from this sector. This will be undertaken by Government working on conjunction with the NDA;

- secondly, a process to develop a UK-wide strategy and identification of future arrangements for its delivery, again undertaken by Government working in conjunction with the NDA. The strategy should emphasise the importance of the waste management hierarchy, particularly waste avoidance. The involvement of the NDA will ensure that there is appropriate integration of the nuclear and non-nuclear industry strategies. There will be appropriate public and stakeholder engagement as the strategy is developed;

- thirdly, ensuring the provision of sufficient opportunities within national, regional and local planning strategies, as appropriate, to meet the non-nuclear industry disposal needs as set out in the UK-wide strategy.

38. Government recognises that identifying a UK-wide strategy for non-nuclear wastes, and the provision of supportive planning frameworks, will not in itself deliver waste management facilities on the ground without investment by the private sector. Government may need to consider how such facilities would be provided if these proved to be unavailable.

39. Government will continue to look to the environment agencies to maximise the consistency of their regulatory approach towards non-nuclear industry LLW producers, and to provide them with advice on the management of radioactive waste, including appropriate disposal routes, in a manner consistent with the aims and objectives of this policy statement.

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2. A Public Consultation on Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom: Summary of Comments and Government Response, [26 March 2007], Department for Environment Food and Rural Affairs (Defra, Scottish Executive, (SE), Welsh Assembly Government (WAG) and Department for the Environment Northern Ireland (DoENI).

3. Review of Radioactive Waste Management Policy: Final Conclusions, (Cm2919), HMSO, 1995.

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7. Response to the Report and Recommendations from the Committee on Radioactive Waste Management (CoRWM), Department for Environment, Food and Rural Affairs (Defra), Scottish Executive (SE), Welsh Assembly Government (WAG) and Department of Environment Northern Ireland (DoENI), October 2006.

8. (a) Implemention of Directive 2001/42 on the Assessment of the Effects of Certain Plans and programmes on the Environment– Commission Guidance, European Commission, 2003;

   (b) Guidance on EIA Screening, European Commission, June 2001.

9. A Practical Guide to the Strategic Environmental Assessment Directive, Office of Deputy Prime Minister, Scottish Executive, Welsh Assembly Government and Department of the Environment in Northern Ireland, 2005.

10. Radioactive Substances Act 1993: Disposal Facilities on Land for Low and Intermediate Level Radioactive Wastes: Guidance on Requirements for Authorisation, Environment Agency, Scottish Environment Protection Agency and Department of the Environment Northern Ireland, 1997.

11. (a) Cm 4693 “Waste Strategy 2000 for England and Wales” May 2000; (to be updated to “Waste Strategy 2007 for England and Wales” in 2007.
(b) Defra “Changes to waste management decision making principles in Waste Strategy 2000 “July 2005;
(c) Northern Ireland “Waste Management Strategy” 2000.
(d) The National Waste Strategy, Scotland 1999
(e) The National Waste Plan for Scotland 2003.

12. (a) For England, Scotland and Wales: “The Radioactive Material (Road Transport) Regulations 2002, SI 2002 No. 1093”; “The Radioactive Material (Road Transport) (Amendment) Regulations 2003, SI 2003 No. 1867; “The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2004, SI 2004 No. 568”; “The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment (Amendment) Regulations 2005, SI 2005 No. 1732”; and

(b) for Northern Ireland: “The Radioactive Substances (Carriage by Road) Regulations (Northern Ireland) 1983, SR 1983 No. 344”; “The Radioactive Substances (Carriage by Road) (Amendment) Regulations (Northern Ireland) 1986, SR 1986 No. 61”; “The Packaging, Labelling and Carriage of Radioactive Material by Rail Regulations (Northern Ireland) 2003, SR 2003 No. 533”.

13. NDA Strategy, Nuclear Decommissioning Authority, 2006.

Annex 1: Supplementary Notes to the Policy Statement

1. These Supplementary Notes are intended to provide additional information on how LLW arises in the UK and on the implementation of the Policy Statement.

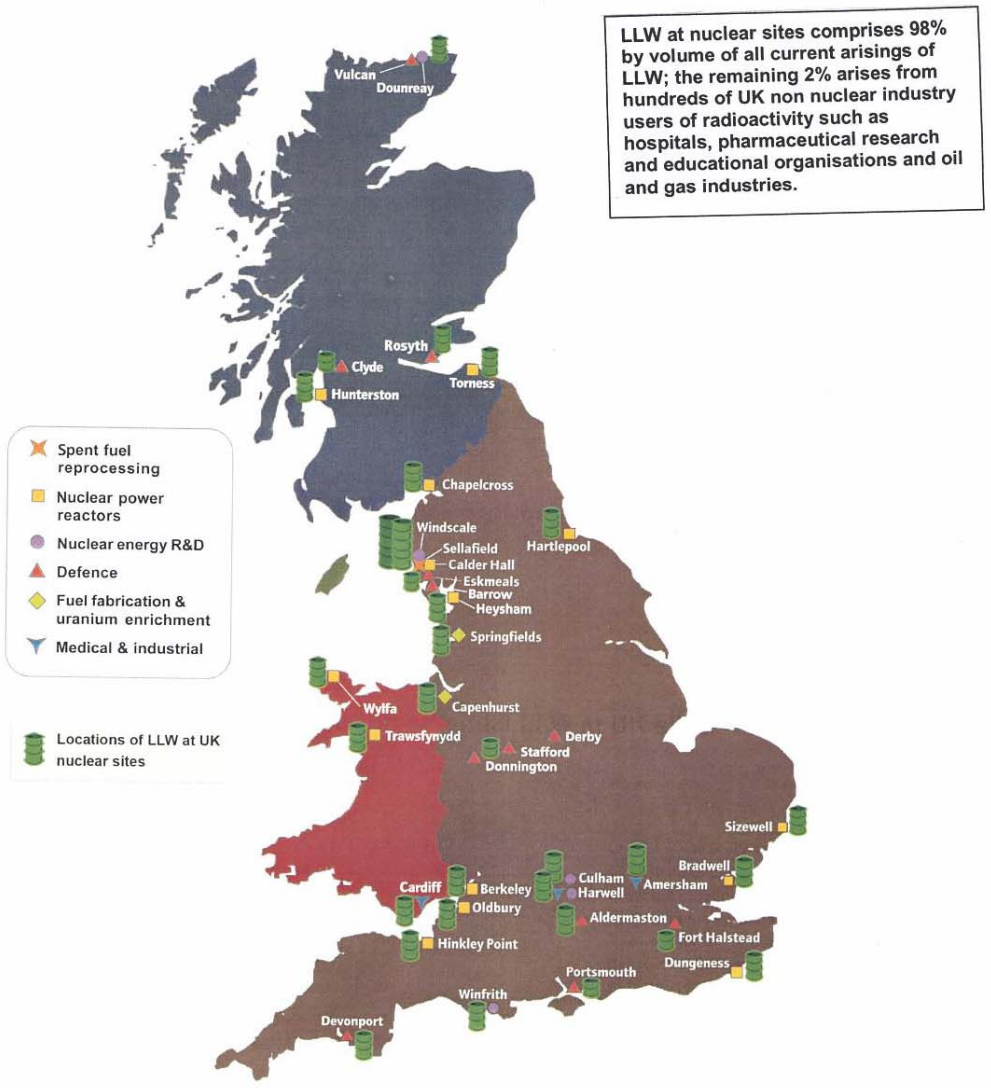
What is LLW?

2. From the 1920s, and increasingly from the initial period of nuclear energy development in the UK from about 1950, solid radioactive wastes have been produced, stored and disposed of from certain industries. These industries include most notably the nuclear power generation and weapons industries which are located across the UK (see Fig 1), but there has also been a contribution from many hundreds of non-nuclear industry users of radioactive materials, including hospitals, pharmaceutical, research and educational organisations, and the oil and gas industries.

3. One category of such wastes is LLW. This is waste containing relatively low levels of radioactivity. Most LLW arises today from operation of nuclear power stations, nuclear fuel reprocessing facilities and also from the decommissioning and clean-up of nuclear sites. Operational LLW is principally lightly contaminated miscellaneous waste arising from maintenance and monitoring, such as plastic, paper and metal. Decommissioning LLW is mainly soil, building materials and metal plant and equipment. A further indication of the nature of LLW is that while it is forecast that it will constitute around 90 per cent of future radioactive waste arisings by volume, it will contain less than 0.0003 per cent of the total radioactivity (ref 1).

4. Another characteristic of LLW is that although the concentration of radioactivity contained within it is low, it can span a very wide range (about five orders of magnitude, i.e. equivalent to a relative activity of 1 to 100,000). Below certain activity levels and types of radioactivity, no specific regulatory control is required. (See paragraphs 5-8.)

Fig.1 UK Nuclear sites where LLW is generated



How is LLW defined?

5. As outlined in paragraph 4 of the Policy Statement, the new definition of LLW within the UK[1], is:

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

This definition could, potentially, change in future in light of, for example, development of a new national disposal facility with different acceptance criteria to the current LLW repository near Drigg in Cumbria.

6. In practice, there is some LLW that falls within this general definition, which, because of its content of specific radionuclides, or its physical/chemical properties, may have to be managed along with intermediate level radioactive waste (ILW). Of the total amount of LLW that will arise from the operation and decommissioning of current nuclear plant, less than two per cent by volume falls into the category of material unsuitable for the LLWR near Drigg (ref 1). Proposals for the long term management of such LLW are set out in the Government's response to the CoRWM recommendations (see refs 6 and 7 of the Statement of Government Policy).

7. The lower activity limit for LLW, below which waste is not required to be subject to specific regulatory control, remains unchanged and is:

- for certain natural radionuclides in the uranium and thorium decay chains, the levels specified in Schedule 1 of RSA93, below which the substances are outside the scope of the Act; or

- for other artificial or man-made radionuclides, the levels laid down in the current suite of Exemption Orders issued under RSA93, below which controls additional to those specified in the Exemption Order, are not required. The most notable of these is the Substances of Low Activity (SoLA) Exemption Order. This specifies a level for exemption from regulatory control of 0.4 becquerels (Bq)/g for wastes which are substantially insoluble in water. (Different exemption thresholds may apply for the transport of radioactive waste.)

8. As outlined in paragraph 5 of the Policy Statement, the new definition of VLLW, a sub-category of LLW, is:

> **in the case of low volumes ('dustbin loads') – Low Volume VLLW:**
>
> "Radioactive waste which can be safely disposed of to an **unspecified** destination with municipal, commercial or industrial waste ("dust-bin" disposal), each $0.1m^3$ of waste containing less than 400 kilobecquerels (kBq) of total activity or single items containing less than 40 kBq of total activity.

[1] Other countries have different definitions of LLW

For wastes containing carbon-14 or hydrogen-3 (tritium):

- in each $0.1m^3$, the activity limit is 4,000 kBq for carbon-14 and hydrogen-3 (tritium) taken together; and
- for any single item, the activity limit is 400 kBq for carbon-14 and hydrogen-3 (tritium) taken together."

Controls on disposal of this material, after removal from the premises where the wastes arose, are not necessary;

OR

in the case of bulk disposals – High Volume VLLW:

"Radioactive waste with maximum concentrations of four megabecquerels per tonne (MBq/te) of total activity which can be disposed of to **specified** landfill sites. For waste containing hydrogen-3 (tritium) the concentration limit for tritium is 40MBq/te. Controls on disposal of this material, after removal from the premises where the wastes arose, will be necessary in a manner specified by the environmental regulators."

9. The principal difference between the two definitions is the need for controls on the total volumes of VLLW in the second (high volume) category being deposited at any one particular landfill site. These controls are likely to include (but may not be restricted to) the total volume of waste being disposed of at any particular landfill site. At the time of publication a project is underway by the Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) which will provide information to define more firmly the volume component. This will enable regulators to develop and publish guidance on this matter.

How are LLW and VLLW wastes transported in the public domain?

10. Except for wastes that have an activity content that renders them exempt from all regulatory control, all radioactive material, which may include LLW and VLLW wastes depending upon the radionuclide specific activity and the total activity content of the consignment, are transported in the public domain in accordance with transport regulations that stipulate the packaging requirements for the material.

How is information on UK radioactive wastes made public?

11. Information on UK radioactive wastes from licensed nuclear sites is currently compiled on a 3-yearly basis into a database and hence into a document called the UK Radioactive Waste Inventory (ref 1). Government, in conjunction with the NDA, will continue to update the UK Radioactive Waste

Inventory at regular intervals[2]. All licensed nuclear site operators, including those contracted on behalf of the NDA, are expected to produce estimates of all LLW waste holdings and future arisings that are as accurate as practicable, including those that will arise from decommissioning and clean-up activities, and to submit these estimates for inclusion in the Inventory for the appropriate estimation dates. The United Kingdom Atomic Energy Authority (UKAEA) and British Nuclear Group (BNG) have historically estimated volumes of ILW and LLW arisings from non-nuclear users because of their involvement with an ILW store, and the LLWR near Drigg. Data on UK non-nuclear user LLW that do not go to the LLWR near Drigg have not been readily available. As the first step in development of a UK-wide strategy for non-nuclear industry wastes (see paragraphs 32 and 33 below) Government has commissioned work to assess these arisings and their geographical distribution (ref 2).

Who is responsible for, and involved in the management of LLW?

12. The purpose of the policy statement is to provide a high level framework setting out principles for the long term management of LLW in the UK. The manner in which the policy is taken forward is via UK-wide strategies. The NDA will develop a UK-wide strategy in the case of LLW from nuclear sites (see paragraphs 36 to 38 of the Statement of Government Policy and paragraph 31 below). In light of this latter role, and recognising that the NDA will contribute to the development of additional waste facilities for LLW, the NDA will also support Government in the development and maintenance of a UK-wide strategy for non-nuclear LLW (see paragraph 33 below). This strategy will draw upon the Government-commissioned work to define non-nuclear industry wastes, referred to in paragraph 9 above. Other aspects of the policy are implemented by the regulators through their day-to-day regulatory activities.

13. A number of organisations are involved in the safe management of LLW. These organisations and their responsibilities are defined below.

[2] The previous functions of UK Nirex Ltd in respect of the Inventory are now held by the NDA.

Organisations with roles in the management of LLW
Government: Sets the policy for radioactive waste management, following public consultation.
Regulators: The regulatory bodies ensure that Government policy is being applied to waste management. They are the Nuclear Installations Inspectorate (NII) of the Health and Safety Executive (HSE), the environment agencies (the Environment Agency (EA) in England and Wales, the Scottish Environment Protection Agency (SEPA) in Scotland), the Environment and Heritage Service of the Department of the Environment (DOE) in Northern Ireland and the Department for Transport (DfT). Fundamentally, the environment agencies are responsible for ensuring the safety of the public and protection of the environment, the HSE the safety of workers, and the DfT for safety during transport. The principal legislation under which the environment agencies, and in Northern Ireland, DOE, operate, with the broad aim of protecting and enhancing the environment, is the Environment Act 1995.[3] Under the Radioactive Substances Act 1993 (RSA93), the agencies, and in Northern Ireland, DOE, can grant authorisations for the accumulation of radioactive waste on non-nuclear premises and for the disposal of radioactive wastes, including transfers and discharges to air and water, from both nuclear and non-nuclear premises. The HSE is the UK statutory body with day-to-day responsibility for the enforcement of safety legislation. It is the statutory licensing authority for UK civil nuclear installations, a function which the NII undertakes on its behalf, under the Nuclear Installations Act 1965 (NIA65). This includes coverage of the management of radioactive waste on nuclear sites. The principle legislation, under which the DfT operate, with the responsibility for the enforcement of safety legislation during transport, is 1974 Health and Safety at Work Act and the 1991 Radioactive Material Road Transport Act. The Office for Civil Nuclear Security (OCNS) also ensures that Government policy is applied to radioactive waste management to ensure that certain categories of material are subject to effective security protection. The principal legislation applied by OCNS is the Nuclear Industries Security Regulations 2003.
Waste Managers: Waste managers, working on behalf of waste owners, have responsibility for the safe and environmentally responsible management and disposition of specific radioactive wastes in accordance with regulatory requirements, and the funding thereof. The organisation may or may not equate to a waste producer, who generated the waste in the first instance, as the responsibilities listed here may have passed to another organisation in the interim.
The NDA: The NDA, established on 1 April 2005 under the Energy Act 2004, is responsible for most of the UK's radioactive waste, including LLW, as it has assumed responsibility for the UK's public sector civil nuclear sites previously owned and operated by BNFL and UKAEA[4].
Planning authorities: Decisions on planning applications for facilities for the

[3] In Northern Ireland, the equivalent legislation is "Waste and Contaminated Land (Northern Ireland) Order 1997"

[4] The NDA has taken over responsibility for the sites formerly owned by BNFL, and UKAEA

management of radioactive and other forms of waste, including LLW, are a matter for the planning authority concerned. Decisions on planning applications are taken within a framework provided by national, regional and local planning policy. This framework differs across the UK but there is a common expectation for local level plans to identify suitable sites for waste management. The terms national, regional and local planning authorities and strategies are used in this document to reflect these differences across the UK.
Waste disposal facility operators: Waste disposal facility operators are responsible for the safe and environmentally responsible operation of their sites in accordance with the conditions set by the relevant regulatory and planning approvals. Facilities for the disposal of LLW may vary from large publicly-owned facilities, such as the LLWR near Drigg in Cumbria, to local privately-owned landfills and incinerators. Ongoing regulatory scrutiny of the operation of these facilities is maintained by the EA in England and Wales, SEPA in Scotland, and in Northern Ireland, the DOE. HSE also regulates the LLWR near Drigg because it is a licensed nuclear site.

14. Ultimate responsibility for ensuring the safe and environmentally responsible management and disposal of LLW within the UK rests with the waste managers at the facilities where the waste resides. Arrangements set in place for the safe management and eventual disposal of LLW by these various managers must be in line with Government policy. They must also be subject to approval by, and have the necessary authorisations from, the relevant regulatory bodies and planning authority as appropriate.

What are the requirements for LLW management plans?

15. Waste management plans, and the effort which is devoted to collating them, must be proportionate to the issue in question. For instance, the regulators will expect that LLW producers in the nuclear industry conduct formal and traceable options' assessment processes to develop robust plans. At the other end of the scale, a non-nuclear operator, with only small volumes of waste to deal with, would simply have to demonstrate to the regulator that they have considered all possible waste routes and have applied the waste management hierarchy. This could be done as part of the existing application and inspection process under radioactive substances legislation. The policy statement sets out the factors that should be considered within a waste management plan. The mechanisms and regulatory instruments by which these factors should be developed and presented are as follows:

- **use of a risk-informed approach to ensure safety, with consideration given to radiological and conventional risks, striking an appropriate balance between the two;**

For instance, in the case of permanent disposal, risk calculations underpin operational and post-closure safety cases for stores and repositories and these override considerations of the origin of any particular waste. Hence disposal of unit activity of any particular nuclide carries with it the same risk regardless of whether it has arisen from a nuclear site or a hospital. However, it is the case that in general terms the types and quantities of LLW arising from the non-nuclear industry will permit their disposal via routes that may not be appropriate for nuclear LLW. Calculations on prospective dose are

required under current legislation enforced by the HSE (Ionising Radiations Regulations 1999; Ionising Radiations Regulations (Northern Ireland) 2000) and the environment agencies (RSA93).

- **minimisation of waste arisings;**

RSA93 standard authorisation conditions require wastes to be minimised. Licence condition 32, in the case of nuclear licensed sites, also places this requirement on operators.

- **consideration of all practicable options for the management of LLW;**

Options' assessments are required under RSA93 authorisation conditions for nuclear operators. In the case of non-nuclear operators, the regulators should not necessarily require a full assessment, but will nevertheless expect that operators present arguments to support a particular waste decision, as part of the standard process for any application made under RSA93.

- **a presumption towards early solutions to waste management;**

Government intends that any options' assessment should explicitly consider 'timing' and that early solutions should be preferred. In effect, this means that the Government expects that waste management solutions (not necessarily 'disposal') should be implemented as early as possible in relation to any particular project or activity which will generate waste.

- **appropriate consideration of the proximity principle and waste transport issues;**

The requirement to consider proximity and transport has not previously been included in Government policy on radioactive waste management. Since the previous statement of policy in this area in 1995, both have assumed greater prominence in the general management of waste, and they should, as with 'timing' be explicitly considered in an options' assessment process.

- **consideration of the potential effects of future climate change, and other predicted environmental changes in the case of long term storage or disposal sites**

This factor is an essential feature of post-closure performance (safety) assessments which should support applications for permanent disposal of LLW. This requirement applies specifically to those who own and/or operate such sites.

How does the waste management hierarchy apply?

16. LLW management policy requires application of the waste management hierarchy: non-creation where practicable; minimisation of arisings where the creation of waste is unavoidable; recycling and re-use;

and, ultimately, disposal. Use of this hierarchy is consistent with wider Government policy on waste management.

17. It is recognised that some of the steps in the hierarchy require different considerations from those required for conventional (non-radiological) wastes. For instance, avoidance of waste creation is less relevant in the case of materials which are already contaminated by historical activities. In this case, the “avoidance” step should be considered in respect of secondary wastes which will be created during the managing of existing LLW. Action taken to prevent the migration of radioactivity in soil would be an example of such an avoidance step. Waste management plans should consider waste management holistically, and look at the entire lifecycle of the process from initial waste generation to ultimate disposal.

18. Re-use and recycling of LLW may be limited to particular waste forms, for example metals being a case where recycling opportunities are most likely. Both the Commission of the European Community and the International Atomic Energy Agency (IAEA) have produced guidance on the recycling of radioactive wastes (ref 3). Government believes there may be opportunities for industry-wide initiatives to increase re-use and recycling of some LLW forms.

What disposal options are available?

19. There are various options available that may be considered for the disposal of the wide spectrum of waste types and activity concentrations within LLW in the UK. These are:

- disposal to facilities that have yet to be constructed to take ILW (where this is deemed to be necessary: see paragraph 6);
- disposal to near-surface facilities of the kind employed at the LLWR near Drigg, where disposal is by way of compaction, grouting and placement in a concrete vault;
- disposal to specific areas of, or adjacent to, nuclear licensed sites (e.g. the current landfill-type disposal at British Nuclear Group Sellafield) or to disposal facilities that might, in future, be constructed at, or adjacent to, nuclear sites;
- in-situ disposal; that is, burial at the point of arising;
- disposal at *specified* landfill sites for LLW and high volume VLLW, including the practice of “controlled burial”, providing that this meets specified regulatory requirements: such use of specified landfill sites, subject to meeting regulatory requirements, supersedes paragraph 117 of Cm2919 (ref 4);
- general disposal of low volume VLLW to an unspecified destination, together with municipal, commercial or industry wastes;
- incineration.

20. Incineration is sometimes regarded as a disposal option for the disposal of combustible LLW because it reduces its volume. However, volatile radionuclides may be dispersed in incinerator gases then partly captured in the gaseous abatement system; non-volatile radionuclides are retained in the ash. Incineration may therefore be a method of treatment, or disposal, or both. For activity in ash, it may represent a volume increase in cases where radioactive waste is one of a number of feedstocks, or volume decrease in the case of some incinerators on nuclear sites which only burn radioactive waste.

21. These and any other options identified as a result of any future developments or best practice review may be used in a flexible way, subject to production of a safety and environmental assessment, appropriate to local circumstances, that is approved by the regulatory bodies, and, in the case of sites licensed under the NIA65, takes account of anticipated site end points.

22. Facilities for the management, including the disposal of LLW should be "fit for purpose", but must also be shown to maintain consistent safety standards through the use of a risk-informed assessment. Government recognises that different engineering solutions may be appropriate for different types of LLW and VLLW.

What kind of options' assessment is needed?

23. All nuclear industry LLW management plans must be based on a formal assessment of all the practicable options for the long term management of the waste, taking into account safety and environmental impacts, and social and economic factors. Assessment of the environmental effects of alternative options is also a requirement of the EU Directive on SEA (2001/42/EC).

24. The options' assessment methodology used must be in a form suitable for its purpose. A current common method used in the UK in support of the preparation of LLW management plans is the best practical environmental option (BPEO) analysis process. The Environment Agencies have published guidance (ref 5) describing how they will assess the way in which an options' study has been conducted, how the methodology has been applied and setting out the typical components of their regulatory assessments. The guidance pre-dates recent work to promote the development of Integrated Waste Strategies and, as such, is being reviewed.

25. The implementation of the whole or part of an LLW management plan may trigger the requirement for other assessments, including Environmental Impact Assessments (EIA) by nuclear operators of any project subject to the EU EIA Directive (85/337/EC amended by 97/11/EC).

How is "best practice" interpreted?

26. Government expects that waste producers and owners are fully appraised of all the latest technical developments in the field of LLW management and, where necessary, initiate research to support production of their own LLW management plans. In considering the options for LLW

management, ‘Best Practice’ should be established as a benchmark against which to judge any LLW management plans.

27. Government recognises that technical developments in radioactive waste management occur in this progressive field. It welcomes progress in this area and will look, where practicable, for the NDA and other appropriate bodies to support and encourage new developments, particularly in the fields of:

- new and improved disposal methodologies;
- appropriate segregation of LLW at source;
- reduction (minimisation) initiatives;
- increased re-use and recycling, and the opening of markets for recycled wastes;
- risk assessment methodologies, to enable a demonstration that the required risk criteria can be met; and
- assay methods, to improve the quality of the inventory data and further reduce uncertainties.

What are the transport requirements?

28. The requirements for the transport of the nine classes of dangerous goods, of which radioactive material is class 7, are under revision for the road and rail modes of transport and are to be published and in force by mid 2007. The regulations include the packaging requirements for materials containing radionuclides which are dependant upon the radionuclide specific activity of the material, its form (solid, liquid or gas) and the total quantity of activity in the consignment.

What is the role of the planning system in LLW management?

29. Planning helps shape the places in which people live and work and offers local communities real opportunities to influence how they want their area to develop. It operates through a system of plan preparation and control over the development and use of land. The statutory framework for forward planning differs in detail across the UK, but there is a requirement that those preparing plans should take into account the waste management needs of their area, including for LLW.

30. Together with national policy, regional and local plans where available are material to decisions on individual planning applications and when they form part of the statutory development plan have added weight. For example, in England the statutory development plan comprises regional and local planning documents and planning applications must be determined in accordance with it unless material considerations indicate otherwise. Key regional and local planning documents are subject to the SEA Directive for

example, in England and Wales, SEA is incorporated into a wider mandatory framework of Sustainability Appraisal (SA), but the processes are analogous.

- **Nuclear industry waste**

31. For the national, regional or local facilities of the kind likely to be required by the NDA for the management of nuclear industry waste, Government considers that a clear statement of Government policy is needed to support the planning process. This would be taken into account in both the preparation of national, regional and local plans and the determination of planning applications. In practice, this will be provided by Ministers' assessment and agreement of the NDA's Strategy and Annual Plans, preparation of which will be subject to the NDA's own processes of public and stakeholder engagement. The NDA will look to coordinate this engagement where practicable with the community involvement that is central to the development of plans in the planning system. Close working between the NDA and its contractors and those responsible for plan-making in the planning system will also help in the development of options and their environmental appraisal, including through statutory SEA, where appropriate.

- **Non-nuclear LLW industry waste**

32. Quantities of non-nuclear industry produced LLW will be much smaller, currently by about a factor of 50, than that which arises from nuclear industry activities. The ability of these small producers to manage and dispose of this waste will be essential to the conduct of their business.

33. Government wishes to see continued availability of disposal routes provided by the public and private sectors, and the provision of additional disposal routes where these are necessary. Government accepts that a UK wide strategy for waste arisings from the non-nuclear industry is necessary. In paragraphs 36 to 38 of its Statement of Government Policy, Government has set out its views on the steps needed to ensure implementation of the strategy. Government will set in place provisions to: gather information on non-nuclear industry waste arisings; develop a strategy for the management of these arisings; ensure provision of opportunities within planning strategies to meet the disposal needs of the non-nuclear industry. This work will be undertaken in conjunction with the NDA, under the auspices of the Government's Radioactive Waste Policy Group (RWPG) to ensure appropriate integration with the nuclear industry LLW strategy.

34. There is an explicit need for planning authorities to consider the requirements of the non-nuclear industry, as will be identified by the UK-wide non-nuclear industry waste strategy. Government considers that planning authorities should work with the environmental regulators, the non-nuclear industry radioactive waste producers and operators of disposal facilities in shaping planning strategies that ensure the provision of suitable opportunities for the management and disposal of non-nuclear industry LLW and VLLW.

35. Government continues to welcome the operation of the non-nuclear industry liaison groups run by the EA and SEPA[5]. These forums provide the opportunity for the non-nuclear industry to make those agencies aware of concerns over, and problems encountered by, the regulation of radioactive substances. They also facilitate communication with the non-nuclear industries on matters relevant to the keeping and use of radioactive substances and the disposal of radioactive waste.

36. Although Government, working in conjunction with the NDA, will ensure that a UK-wide strategy is developed, LLW managers will need to ensure that the necessary financial provision for the long term management of their LLW has been made.

What is the derivation of the risk targets and limits?

What does a risk target mean and why has it been set at its present level?

37. The current risk target (see ref 10 of the Statement of Government Policy) of less than one death or serious injury in a million per year applies to the period after withdrawals of controls from a disposal site. It is a target rather than a limit or constraint because:

> (i) a number of potentially exposed groups of people have to be considered, alongside the probability that any of them may become exposed. This is not the same situation as being able to identify existing critical groups, and being able to calculate their actual exposure through habit surveys and environmental monitoring;
>
> (ii) a number of other uncertainties exist in calculations of dose into the future, for example climate change, inadvertent human intrusion into the site, so the concept of a limit or constraint could not apply once the site was released from control;
>
> (iii) more generally, imposing a regulatory standard in the form of a limit or constraint on risk for the performance of a disposal site after withdrawal of control is meaningless because compliance cannot be demonstrated.

The risk target has been set at its present level in conformity with Principle 4 of the IAEA Safety Fundamentals 111-F[6] (1996), namely that: “Radioactive waste shall be managed in such a way that predicted impacts on the health of future generations will not be greater than relevant levels of impact that are acceptable today.” Because, as explained above, it is meaningless to set a limit or constraint on risk for the performance of a disposal site after withdrawal of control, it is necessary to consider what the **target** is for levels of impact that are acceptable today. In accordance with the HSE publications,

[5] See Small Users’ Liaison Group and Scottish Non-Nuclear Industries’ Liaison Group entries of Annex 2

[6] The IAEA is currently updating 111-F, which UK environmental regulators will take account of when they review their own guidance (see ref 10 of the Statement of Government Policy).

The Tolerability of Risks from Nuclear Power Stations (1992), *and Reducing Risks, Protecting People* (2001), a level of individual risk of less than one in a million per year is considered to be a suitable target for broad acceptability without concern. Paragraph 130 states: "HSE believes that an individual risk of death of one in a million per annum for both workers and the public corresponds to a very low level of risk and should be used as a guideline for the boundary between the broadly acceptable and tolerable regions."

Why should an operational LLW disposal facility have the same dose constraint as other nuclear facilities that have to discharge radioactivity to air and water?

38. Although the regulators' guidance (see ref 10 in policy statement) refers to the dose constraint of 0.3mSv/y, based on the advice of the National Radiological Protection Board (now the Health Protection Agency), this is not to say that this level of constraint would necessarily apply to future disposal facilities. In practice, the regulators set limits on disposals, rather than a constraint on doses, in any authorisation issued for a disposal facility. In accordance with their usual practice, such limits for a new disposal facility would be set no higher than operationally necessary. Prospective assessments, that is future estimates of dose, would be carried out assuming disposals at the limits, to demonstrate compliance with the applicable dose constraint. Retrospective assessments, that is estimates of received dose, would also be carried out based on environmental monitoring. In addition, the authorisation would include a condition requiring the operator to use best practicable means to minimise impacts from disposals.

What about limits and constraints for land remediation? Are they consistent with those applying to a LLW disposal facility?

39. In recommending dose constraints to members of the public, the International Commission on Radiological Protection (ICRP) distinguishes between interventions and practices (ref 6). Intervention refers to a situation where action is being taken to reduce a pre-existing radiation dose, for example, where land has been contaminated by historic activities. Hence, intervention is about doing something to alleviate a situation that already exists. This contrasts with exposures which are occurring as a result of current practices, for example, the operation of a nuclear site, where one is seeking to ensure that doses are no greater than they need to be.

40. For radioactively contaminated land, the Health Protection Agency has advised that the level of exposure at which intervention should be considered is 3mSv/year[7]. This is set above the dose constraint of 0.3mSv/year for a practice because one of the principles of intervention is that the benefits must outweigh the detriments (i.e. there is a need to take account of, for example, disruption to people's lives by the intervention, and the cost of so doing). A further difference behind the dose level at which intervention should be considered and the dose constraint for a practice is that in the former case,

[7] See ref 5 of the Statement of Government Policy for its application in England.

those responsible for the original contamination are no longer liable or are unknown, whereas an existing site, that is. a practice, is under the control of a known operator. However, if contaminated land was to be considered for some new development, then the dose constraint of 0.3mSv/year would apply, on the basis that a planned redevelopment would constitute a practice, that is it would constitute an additional dose to those exposed after redevelopment and would be under control.

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(b) CEC “Recommended radiological protection criteria for the recycling of metals for the dismantling of nuclear installations” CEC RP89, 1988;
(c) CEC “Recommended radiological protection criteria for the clearance of buildings and building rubble from the dismantling of nuclear installations” CEC RP 113, 1999;
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5. EA, SEPA “Guidance for the Environment Agencies’ Assessment of Best Practicable Environmental Option Studies at Nuclear Sites”, February 2004.

6. International Commission on Radiological Protection “1990 Recommendations of the International Commission on Radiological Protection”, Annals ICRP 21(1-3). (ICRP Publ 60).

Annex 2: Glossary of Terms and List of Abbreviations

Activity The number of atoms of a radioactive substance which decay by nuclear disintegration each second. The unit of activity is the **Becquerel**, which is equivalent to one disintegration per second.
As Low As Reasonably Achievable (ALARA) The ALARA principle is contained in the Euratom Basic Safety Standards Directive 96/29, which is transposed into UK law. Essentially, it means that all reasonable steps should be taken to protect people. In making this judgement, factors such as the costs involved in taking protection measures are weighed against benefits obtained, including the reduction in risks to people and the environment.
Alpha radiation Alpha radiation 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 five 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.
Annual dose constraint A restriction on annual dose of 0.3 **millisieverts** (mSv) to an individual from a single source of radiation exposure, applied at the design and planning stage of any activity to ensure that when aggregated with doses from all sources, excluding natural background and medical procedures, the dose limit (1mSv per annum) is not exceeded. The UK dose constraint derives from international advice as contained in the recommendations of **ICRP**.
Assay methods Methods used to estimate the total **radionuclide** content of a waste type. This includes external measurements of dose rate at the surface of the waste and sampling of the waste itself.
British Energy plc (BE) A generator of electricity from its fleet of nuclear power stations and a major customer of **BNG,** for the supply of fuel, reprocessing services and storage of spent fuel.
Becquerel (Bq) The standard international unit of radioactivity equal to one radioactive transformation per second. Becquerels are abbreviated to Bq. LLW is classified according to its radioactivity content per unit mass of waste (Bq per gram, or per tonne). Multiples of becquerels commonly used to define radioactive waste are: kilobecquerels (kBq) equal to one thousand Bq; megabecquerels (MBq) equal to one million Bq; gigabecquerels (GBq) equal to one thousand million Bq.
Best Practicable Environmental Option (BPEO) In the context of authorisations under **RSA93**, for nuclear sites, the options' assessment method currently used is Best Practicable Environmental Option (BPEO). BPEO was described by the Royal Commission on Environmental Pollution, Twelfth Report (Cm 210) 1988 as "…. the outcome of a systematic and consultative decision-making procedure which emphasises the protection and conservation of the environment across land, air and water. The BPEO procedure establishes, for a given set of objectives, the option that provides the most benefit or least damage to

the environment as a whole, at acceptable cost, in the long-term as well as in the short term". A BPEO study is usually carried out by or on behalf of the waste producer and assessed by the relevant environment agency as a basis for its regulatory decision-making.
Best Practicable Means (BPM) BPM is a term used by the environment agencies (**EA** and **SEPA)** in authorisations issued under the **R RSA93**. Essentially, it requires operators to take all reasonably practicable measures in the design and operational management of their facilities to minimise discharges and disposal of radioactive waste, so as to achieve a high standard of protection for the public and the environment. BPM is applied to such aspects as minimising waste creation, abating discharges, and monitoring plant discharges and the environment. It takes account of such factors as the availability and cost of relevant measures, operator safety and the benefits of reduced discharges and disposals. If the operator is using BPM, radiation risks to the public and the environment will be **ALARA**.
Beta radiation Beta radiation takes the form of particles (electrons) emitted from the nucleus of a decaying (radioactive) 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.
Beta/gamma radiation Beta radiation is usually accompanied by the emission of **gamma rays**, hence the term "beta/gamma activity".
British Nuclear Group (BNG) Previous owners of the nuclear fuel reprocessing facility at Sellafield, the LLW disposal site near to Drigg, the fuel fabrication plant at Capenhurst and Springfields, and the Magnox nuclear power plants. All British Nuclear Group sites are now owned by the **NDA**, but are currently (2007) operated by their previous owners.
Clean-up The **decontamination** and **decommissioning** of a nuclear licensed site.
Command 2919 (Cm2919) The Review of Radioactive Waste Management Policy: Final Conclusions White Paper published in July 1995. This was the last comprehensive UK Government radioactive waste policy statement. Areas of this statement have been superseded by the decisions and actions of subsequent UK Government administrations.
Committee on Radioactive Waste Management (CoRWM) An independent body set up by UK Government and the devolved administrations in November 2003, to recommend the best option, or combination of options, for long term management of intermediate level waste **(ILW)** and high level waste (**HLW).** CoRWM reported to Government in July 2006. (See refs 6 and 7 in the Policy Statement.)
Consignment Any load of radioactive material, packaged or unpackaged, that is presented for transport.
Controlled burial Also known as "special precautions burial". A process of disposal for solid LLW that has an activity level above that which would allow it to be disposed of as **VLLW**. Controlled burial takes place at **landfill** sites used for the deposit of substantial quantities of ordinary refuse but which are approved for the disposal of radioactive substances. Controlled burial has various limitations placed on its use in terms of

maximum activity per waste container, type of container, surface dose rate of container, and depth of burial beneath earth or ordinary waste.
Decay chains These generally refer to the three naturally occurring series of **radionuclides**, all of which start with a single parent nuclide (uranium-238, uranium-235 and thorium-232) each of which decays via a number of radioactive daughters of different half lives and activity type (i.e. alpha or beta/gamma radiation), eventually ending with stable nuclides of lead.
Decay storage The process of allowing material containing short-lived radionuclides to decay (see **radioactive half life**) so that the final waste is easier to dispose of as radioactive waste, or until the point where the waste becomes exempt from specific regulatory requirements (see **SoLA**). Used extensively in hospitals and research establishments, and to some extent by the nuclear industry.
Decommissioning The process whereby a nuclear facility, at the end of its economic life, is taken permanently out of service and its site made available for other purposes.
Decontamination Removal or reduction of radioactive contamination.
Delicensing The process of removal from regulatory control by the **Health and Safety Executive**, of a nuclear site, which has been licensed under the **Nuclear Installations Act 1965**.
Department of the Environment in Northern Ireland (DOE)
Department for Environment, Food and Rural Affairs (Defra)
Department of Trade and Industry (DTI)
Devolved administrations Collective term for the Scottish Executive, Welsh Assembly Government and in Northern Ireland, the Department of the Environment.
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**. Disposal may also refer to the release of airborne or liquid wastes to the environment (i.e. emissions and discharges).
Dose A general term used as a measure of the dose absorbed by man from radiation, measured in sieverts, and its sub-multiples (millisieverts – mSv - equal to one thousandth of a sievert, or microsieverts, equal to one millionth of a sievert). Radiation dose is received from many sources – of the average annual dose of 2.6 mSv, 85 per cent comes from natural background radiation, 14 per cent from medical sources and the remaining one per cent from miscellaneous man-made sources. See also **Annual dose constraint**.
Drigg A village in West Cumbria close to which is the **Low Level Waste Repository (LLWR)** currently used for most UK LLW.
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 UKs public civil nuclear sites.
Environment agencies Collective term for the **Environment Agency (EA)** (for England and Wales), the **Scottish Environment Protection Agency (SEPA) and** in Northern Ireland, the

Department of the Environment, Environment and Heritage Service (DOE).
Environment Act 1995 An Act of Parliament which established the **EA** in England and Wales, and the **SEPA** in Scotland.
Environment Agency (or EA) 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. In addition to authorisations issued under the **RSA93**, the EA also regulates nuclear sites under the Pollution Prevention and Control Regulations and issues consents for non-radioactive discharges.
Environmental Impact Assessment (EIA) A legal requirement under EU Directive 85/337/EEC (amended by 97/11/EC) for various categories of project, including the construction of radioactive waste stores and reactor decommissioning. It requires an environmental statement on the 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).
Equitable approach In the context of this document, a general term, meaning providing the opportunity for **stakeholders** and the **public** to input to decision making in relation to long term management of LLW.
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.
Exemption Order (EO) **RSA93** makes provision for certain low activity wastes, when used for certain purposes and when managed in particular ways, to be excluded from particular regulatory provisions made under the Act.
Fit for purpose In the context of this document, a term applied to waste disposal facilities which are engineered to a degree that is commensurate with the types of wastes they will receive. Hence, LLW towards the higher end of its definition would go to a facility that has a greater degree of engineering than those towards the bottom end of the definition. In all cases, the intention is that facilities will provide adequate protection of people and the environment, and would meet all regulatory requirements.
Food Standards Agency (FSA) The independent Government department set up by the Act of Parliament in 2000 to protect the public's health and consumer interests in relation to food.
Gamma radiation 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 from a **radionuclide** during radioactive decay is usually accompanied by particle emission (**beta or alpha particles)**.
GE Healthcare Company which produces and supplies products containing radioisotopes for healthcare and biosciences purposes, from facilities at Amersham, Buckinghamshire, and Cardiff. Its facilities at Harwell are being decommissioned.

Guidance on Requirements for Authorisation (GRA): see ref 10 in the Policy Statement
A 1997 document issued by the EA, SEPA and DOE Northern Ireland entitled "RSA93: Disposal Facilities on Land for Low and Intermediate Level Radioactive Wastes: Guidance on Requirements for Authorisation". Once management control of the waste has been withdrawn, the GRA requires that the assessed radiological risk to a representative member of the potentially most exposed public group should be consistent with a risk target of one in a million. The GRA refers to new disposal facilities (i.e. it does not cover historic disposals at the **LLWR** near Drigg). The GRA is under review.

Half-life (see Radioactive half life)

Health and Safety Executive (HSE)
A statutory body whose role is the enforcement of work related health and safety law under the general direction of the Health and Safety Commission established by the Health and Safety at Work Act 1974. 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 nuclear installations UK wide.

Health Protection Agency (HPA)
A UK-wide Non Departmental Public Body (**NDPB**) that protects the health and well-being of the population. The Radiation Protection Division,formerly the National Radiological Protection Board, which is part of the Centre for Radiation, Chemical and Environmental Hazards, carries out the HPA's work on ionising and non-ionising radiations. It undertakes research to advance knowledge about protection from the risks of these radiations; provides laboratory and technical services; runs training courses; provides expert information and has a significant advisory role in the UK.

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. (See also refs 6 and 7 in the Policy Statement.)

Incineration
The process of burning waste at high temperature in a facility regulated by the environment agencies. Combustible LLW is mostly comprised of clinical waste from hospitals that must be burnt because it contains biological material. Alternatives such as reuse and recycling of these and other hazardous wastes are impracticable because of the hazardous nature of the wastes. Wastes containing some types of liquids (e.g. oil) may also be best dealt with by incineration. Incinerators taking LLW must be authorised under RSA93 because the process leads to some discharges of radioactivity (which must be authorised), and the ash which remains after burning LLW must also be disposed of as LLW.

Integrated Waste Strategies (IWS)
An integrated waste strategy is not a legal requirement but is required of contractors working under the auspices of the **NDA**. It covers solid radioactive waste in all waste categories (ie **LLW, ILW, HLW**). For example, during an options' assessment, one option could be to store ILW until it decays to LLW.

Intergenerational equity
An ethical concept, which, in the context of this document, means the consideration by the present generation, who have created (and benefited from use of) radioactive materials, of the role of future generations in the management of long lived radioactive waste.

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. (See also refs 6 and 7 in the Policy Statement.)

International Atomic Energy Authority (IAEA)

International Commission on Radiological Protection (ICRP)
An 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 particles, beta particles, and gamma rays**) interacts with matter, it can cause atoms and molecules to become unstable (creating ions). This process is called ionisation and alpha particles, beta particles and gamma rays are therefore often referred to as ionising radiation. Ionisation within biological tissue from radiation is the first stage in radiation leading to possible change or damage within the tissue.

Ionising Radiations Regulations 1999 (IRR99)
The main legal requirements, enforced by the **HSE**, concerning the control of exposure to radiation arising from the use of radioactive materials and radiation generators in work activities in the nuclear industry; medical and dental practice; manufacturing; construction; engineering; paper; offshore drilling; education (colleges, schools) and non-destructive testing.

Landfill
The disposal of waste by shallow burial. Modern landfills are lined to reduce seepage of material from the site into the environment, and once full, are capped to reduce rainfall entering the site. The EU Directive on the landfill of waste (Council Directive 99/31/EC) set targets for the reduction of biodegradable municipal waste sent to landfill. This is likely to have an impact on the use of landfill for LLW and VLLW, on the basis that there will be fewer landfills available.

Licensed nuclear sites
All major nuclear sites must be licensed by the Nuclear Installations Inspectorate (part of the **HSE**) under the **Nuclear Installations Act 1965**. Hence, all civil sites handling nuclear materials fall within this term (i.e. all nuclear power stations, nuclear fuel production and reprocessing sites, sites undertaking storage of and/or research into, nuclear materials, and major plant producing radioisotopes). The LLWR near **Drigg** is also a licensed nuclear site.

Low Level Waste (LLW)
Includes metals, soil, building rubble and organic materials, which arise principally as lightly contaminated miscellaneous scrap. Metals are mostly in the form of redundant equipment. Organic materials are mainly in the form of paper towels, clothing and laboratory equipment that have been used in areas where radioactive materials are used – such as hospitals, research establishments and industry. LLW contains radioactive materials other than those acceptable for disposal with municipal and general commercial or industrial waste. It is now defined as “radioactive waste having a radioactive content not exceeding four gigabecquerels per tonne (GBq/te) of alpha or 12 GBq/te of beta/gamma radioactivity”.

Low Level Waste Repository (LLWR) near Drigg
The LLWR near Drigg is in Cumbria and has operated as a national LLW disposal facility since 1959. Wastes are compacted and placed in containers before being transferred to the facility. Following a major upgrade of disposal operations in 1995, all LLW is now disposed of in engineered concrete vaults. The LLWR near Drigg is

owned by the **NDA** and currently operated by **BNG**.

Local community
In the context of this document, those communities which may be impacted by waste management plans, including any host community in the vicinity of a waste treatment or disposal facility, and the local authorities concerned.

Luminising
The process of using a radionuclide with a material that emits light when irradiated, for example, radium was used in old watches and instrument dials so their numbers could be seen as a green glow in the dark.

Millisievert (mSv) – see Dose.

Ministry of Defence (MoD)
MoD sites producing radioactive waste are mainly those producing and handling nuclear fuel for submarines and those producing and handling radioactive materials for nuclear weapons.

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.

Non-nuclear industry waste
A general term for the radioactive wastes produced by those industries and organisations that are not involved with production of nuclear energy or nuclear weapons. The wastes arise either from the use of **radioisotopes** for a particular purpose, or due to the concentration of radioactivity as a result of extraction processes. In the former case, the radionuclides are produced by a **radioisotope** factory. Examples of their use are: for diagnostic and therapeutic purposes in medicine; as tracers of biological and other processes in research; for demonstration purposes in educational establishments; as a fundamental part of some industrial and consumer products. In the case of waste arising from extraction processes, the most notable example in the UK is the accumulation of naturally occurring radioactive materials (NORM) as scale during the extraction of oil and gas from the North Sea. These scales attach to pipework associated with the extraction process, and because of their accumulation and consequent raised level of radioactivity, are treated as radioactive waste. Another example of radioactive waste arising from extraction processes is that arising from processing ores for rare earth elements. The physical form of non-nuclear industry waste is therefore highly variable, ranging from clinical waste from hospitals requiring incineration, through to pipework from dismantling oil and gas pipework and waste from mineral processing.

Nuclear Decommissioning Authority (NDA)
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 UKAEA). 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 the 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 Health & Safety Executive**
Nuclear waste A general term for the radioactive waste produced by those industries involved with nuclear energy and nuclear weapons' production, and large scale radioisotope production. It includes **LLW, ILW and HLW**.
Office for Civil Nuclear Security (OCNS) The independent security regulator for the UK civil nuclear industry.
Organisation for Economic Co-operation and Development (OECD) Comprises 30 member countries sharing a commitment to democratic government and the market economy. Best known for its publications and statistics, its work covers economic and social issues from macroeconomics, to trade, education, development and science and innovation.
Operational Environmental Safety Case In the context of this document, the compilation of documents prepared by **BNG**, for consideration by the **EA**, demonstrating that the public are sufficiently protected whilst the LLWR near **Drigg** is under institutional control, from hazards which may arise as a result of the disposal of radioactive wastes on the site, in accordance with an authorisation under **RSA93**.
Optimisation Optimisation is the process of ensuring that all radiation exposures of the public are as low as reasonably achievable (see **ALARA)**. Optimisation is achieved by employing best practicable means (**BPM).** Optimisation, justification and limitation are the three key principles of radiation protection recommended by the **International Commission on Radiological Protection** in 1990 and which form the basis of European Community and UK legislation.
Options' assessment See **Best Practicable Environmental Option**
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.
Post-Closure Safety Case In the context of this document, the compilation of documents prepared by **BNFL**, for consideration by the **EA**, demonstrating that the public will be sufficiently protected after the period of institutional control, from hazards which may arise as a result of the disposal of radioactive waste at the LLWR near **Drigg**, in accordance with an authorisation under **RSA93**.
Prospective dose An assessed dose of the future radiological impact of proposed discharges of radioactive waste into the environment.
Proximity principle The Proximity Principle is a key element of EU environmental and municipal waste management policy. It was introduced in Article 5 of the Waste Framework Directive (75/442/EEC as amended by Directive 91/156/EEC) in 197, and is incorporated into UK waste strategy documents (see ref 11 in the Policy Statement). It means to enable waste to be disposed of in one of the nearest appropriate installations.

Radioactive decay The process by which a **radionuclide** undergoes transformation with the emission of radiation. (See also **Radioactive half-life**.)
Radioactive half-life The time required for one half of the atoms of a given amount of a particular **radionuclide** to disintegrate through **radioactive decay**. Each radionuclide has a unique half-life, and half lives vary from fractions of a second through to many millions of years. The half-life of a radionuclide therefore is of fundamental importance when considering its safe long term management.
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. (See **RSA93** and **NIA65**.)
Radioactive Waste Policy Group (RWPG) A group consisting of UK Government departments, the devolved administrations, the Nuclear Decommissioning Authority and the principal regulatory bodies (the Health and Safety Executive and the environment agencies) established to consider radioactive waste management policy and the arrangements for its delivery.
Radioactively contaminated land Land that is contaminated with radioactivity from past practices or work activities, or from the after-effects of radiological incidents, and which may give rise to harm to people. Intervention should be considered for land which is contaminated to the extent that a dose of 3mSv/year may be received by any individual. (See ref 5 in the Policy Statement as regards England.)
Radiological risk The probability that an individual will suffer a serious radiation induced health effect as a result of the presence of a radiation source, for example, a disposal facility. In this context, a serious radiation-induced health effect is a fatal cancer or a severe hereditary defect.
Radionuclide A common term which refers to any **radioisotope** of any element, so for example, carbon-14 and caesium-137 are both described as radionuclides.
Radioisotope Different radioactive forms of the same element, for example caesium-134 and caesium-137 are both radioisotopes of the element caesium.
Regulators In the context of this document, principally those bodies responsible for the regulation of the nuclear industry and non-nuclear industry LLW producers. (See Environment Agencies and HSE, Regulation may also involve other departments, in particular the Department for Transport and the Office for Civil Nuclear Security.)
Regulatory Impact Assessment (RIA) The RIA is a requirement of Government. It is a tool designed for delivering better regulation, and the RIA process is aimed at helping Government departments deliver successful policy. It is an analysis of the likely impacts of a policy change and the range of options for implementing it. It considers: any form of regulation (for example, formal legislation, codes of practice or information campaigns); the full range of potential impacts (economic, social and environmental); and where the impact may fall (business, the public sector, the voluntary sector or other groups). RIA should be carried out for all policy changes, whether European or domestic, which could affect the public or private sectors, charities, the voluntary sector or small businesses.

Risk The chance that someone or something that is valued will be adversely affected by a hazard, where a hazard is the potential for harm that might arise, for example, from ionising radiation.
Risk informed In the context of this document, the concept that risk calculations from proposed waste management practices should be part of the process for securing safety and determining best options for managing the waste.
Risk target A level of radiological risk from a single disposal facility which provides a numerical standard for assessing the long term performance of the facility. Requirement R2 of the EA's **GRA** (ref 10 to the Policy Statement), states that, after control is withdrawn, the assessed radiological risk from the facility to a representative member of the potentially exposed group at greatest risk should be consistent with a risk target of one in a million per year. A risk of less than one in a million means that the radiation dose, if received by one million people, would result in one fatal cancer or severe hereditary defect from the exposure.
Radioactive Substances Act 1993 (RSA93) UK legislation which provides for regulation of the disposal of radioactive wastes, including liquid and gaseous discharges to the environment. It also provides for regulation of the accumulation of radioactive wastes on non-nuclear sites: this function for licensed nuclear sites being provided by the **NIA65**.
Safety cases A document or suite of documents providing a written demonstration that risks have been reduced as low as reasonably practicable. Safety cases for licensable activities at nuclear sites are required under the licence conditions under the **NIA65**.
Scottish and Northern Ireland Forum for Environmental Research (SNIFFER) A body that identifies advice and research on behalf of Scottish and Northern Ireland government and regulatory bodies.
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. In addition to authorisations issued under the **RSA93**, SEPA also regulates nuclear sites under the Pollution Prevention and Control Regulations and issues consents for non-radioactive discharges.
Scottish Executive (SE)
Scottish Non Nuclear Industries Liaison Group (SNNILG) A Scottish Environment Protection Agency (SEPA) run group of non-nuclear industry representatives that meets approximately. HSE and the Scottish Executive are also members. SNNILG's objectives are to provide: a forum for effective liaison, communication and consultation between non-nuclear users of radioactive substances and the SEPA; an improved understanding of SEPA and users' objectives, priorities and constraints in respect of the management of radioactive waste, with the aim of improving both the clarity and consistency of regulation.
Sellafield The **NDA**-owned nuclear-licensed site in West Cumbria comprising nuclear fuel storage, reprocessing and manufacturing facilities, currently operated by British Nuclear Group Sellafield Ltd (previously BNFL). Sellafield surrounds the Windscale licensed site, operated by **UKAEA.** The NDA's strategy, published in March 2006,

sets out milestones in decommissioning of the site, culminating in final site clearance and closure in 2120.
Site constraint The site-related dose constraint applies to the aggregate exposure resulting from discharges from a number of sources with contiguous boundaries at a single location. It includes the radiological impact of current discharges from the entire site, but excludes the impact of direct radiation and historical discharges. It is particularly relevant to complex sites such as those with more than one nuclear power station. The site constraint of 0.5 mSv/year applies irrespective of whether different sources on the site are owned and operated by the same or by different organisations.
Small Users' Liaison Group (SULG) An Environment-Agency run group of non-nuclear industry representatives that meets approximately twice a year. HSE and Defra are also on the membership. SULG's objectives are to provide: a forum for effective liaison, communication and consultation between non-nuclear users of radioactive substances and the EA; an improved understanding of EA and Users' objectives, priorities and constraints in respect of the management of radioactive waste, with the aim of improving both the clarity and consistency of regulation.
Special precautions burial (see controlled burial)
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 concerned with radioactive waste 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.
Substances of Low Activity Exemption Order (SoLA) An exemption order issued under **RSA93**. This specifies a level of radioactivity that is exempt from regulatory control, of 0.4Bq per gram for wastes which are substantially insoluble in water.
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.
Sustainable development A principle underpinning planning. It is the idea of ensuring a better quality of life for everyone, now and for future generations. A widely used definition was drawn up by the World Commission on Environment and Development in 1987: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

UKAEA (United Kingdom Atomic Energy Authority)
UKAEA is a Non Departmental Public Body (NDPB) which undertakes nuclear research. It currently operates the nuclear licensed sites of Dounreay, Harwell, Winfrith and Windscale. Under the Energy Act 2004, the **NDA** has the designated responsibility for the decommissioning and clean-up of UKAEA sites.

UK Nirex Ltd
An organisation previously owned jointly by the Defra and the Department of Trade and Industry. 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 (see ref 7 in the Policy Statement) announced the incorporation of Nirex functions into the **NDA**.

UK Radioactive Waste Inventory
A 3-yearly compilation of data on UK radioactive waste holdings (in terms of sources, quantities and properties) currently produced by Defra and UK Nirex Ltd, to provide up-to-date information essential for waste management policy development, regulation and planning of waste treatment, packaging, storage and long term management. The latest version, for a holding date of 1 April 2004, was produced in October 2005. (See ref 1 to the Supplementary Notes.)

Uranium and thorium decay chains – see Decay chains.

Very low level waste (VLLW)
Covers waste with very low concentrations of radioactivity. It arises from a variety of sources, including hospitals and the wider non-nuclear industry. Because VLLW contains little total radioactivity, it has been safely treated by various means, such as disposal with municipal and general commercial and industrial waste directly at landfill sites or indirectly after incineration. Its formal definition is: (a) **in the case of low volumes ('dustbin loads') of VLLW** "Radioactive waste which can be safely disposed of to an ***unspecified*** destination with municipal, commercial or industrial waste ("dustbin" disposal), each $0.1m^3$ of waste containing less than 400 kilobecquerels (kBq) of total activity or single items containing less than 40 kBq of total activity. For wastes containing carbon-14 or hydrogen-3 (tritium):

- in each $0.1m^3$, the activity limit is 4,000 kBq for carbon-14 and hydrogen-3 (tritium) taken together; and
- for any single item, the activity limit is 400 kBq for carbon-14 and hydrogen-3 (tritium) taken together.

Controls on disposal of this material, after removal from the premises where the wastes arose, are not necessary."
Or (b) **in the case of high volumes of VLLW** "Radioactive waste with maximum concentrations of four megabecquerels per tonne (MBq/te) of total activity which can be disposed of to ***specified*** landfill sites. For waste containing hydrogen-3 (tritium), the concentration limit for tritium is 40MBq/te. Controls on disposal of this material, after removal from the premises where the wastes arose, will be necessary in a manner specified by the environmental regulators".

Waste manager Any organisation that currently has responsibility for the safe and environmentally responsible disposition of specific radioactive wastes in accordance with regulatory requirements, and the funding thereof. The organisation may or may not equate to the **waste producer**, who generated the waste in the first instance, as the responsibilities listed above may have passed to another organisation in the interim.
Waste producer The organisation that produced radioactive waste in the first instance. The waste producer may or may not equate to the current **waste manager**, as responsibility for the waste may have been passed to another organisation in the interim.
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