1. NATIONAL FRAMEWORK FOR MANAGEMENT AND REGULATION OF RADIOACTIVE WASTE AND DECOMMISSIONING

1.1 National framework

1.1.1 Overview of national policy

Government policy is to protect the population, society and the natural environment from harmful levels of radioactivity through adequate and appropriate national measures whether deriving from European Union directives and regulations, international agreements or domestic legislative initiatives.

The policy for the management of radioactive waste is devolved in the UK to the Scottish, Welsh and Northern Ireland governments. The UK Government is responsible for policy in England. The term “the Government” is used where statements apply to all four governments.

There are specific policies for long-term management of high activity radioactive waste, management of low level radioactive waste, radioactive waste discharges and decommissioning.

1.1.1.1 Long-term management of higher activity radioactive waste

The Managing Radioactive Waste Safely White Paper was published in June 2008 by UK, Welsh and Northern Ireland governments. It sets out the technical programme to design and deliver a geological disposal facility and the process and criteria to be use to decide the siting of a facility.

The White Paper was accompanied by an invitation to communities to express an interest in entering into without commitment discussions with the UK Government about the possibility of hosting a geological disposal facility for higher activity radioactive waste at some point in the future. In the first year three local authorities have made such an Expression of Interest.

In June 2007 the Scottish Government announced its policy for higher activity radioactive wastes is to support “near surface, near site long-term storage facilities where the waste is monitorable and retrievable and the need for transporting it over long distances is minimal.” The Scottish Government is developing a Detailed Statement of its policy on which it will consult in Autumn 2009.

1.1.1.2 Management of low-level radioactive waste

A new UK policy for managing solid LLW was published by the UK Government and Devolved Administrations in March 2007. The new policy statement outlines the priorities for managing low-level radioactive waste responsibly and safely, by:

- allowing greater flexibility in managing the wide range of LLW that already exists and will arise in the future;
- maintaining a focus on safety, with arrangements supported by the independent regulators, including HSE and the environment agencies;

1 Further information and a copy of the White Paper can be found at www.defra.gov.uk/environment/radioactivity/mrws/index.htm.
seeking to first minimise the amount of LLW created before looking at disposal options, through avoiding generation, minimising the amount of radioactive substances used, recycling and reuse;

creating a UK-wide strategy for managing low-level waste from the nuclear industry, including at what point in the future a replacement (or replacements) for the national LLW disposal facility near Drigg in Cumbria might be required and planned, to be developed by the Nuclear Decommissioning Authority (NDA);

initiating a UK-wide strategy for the management of non-nuclear LLW. The first step will be for the UK Government, in conjunction with the NDA, to undertake a study that gives a clear picture of future LLW from the non-nuclear sector;

emphasising the need to involve communities and the wider public in developing and delivering LLW management plans.

The methods for managing and disposing of LLW in the long term already exist in the UK. However the review of managing LLW dealt with a number of new issues, including:

- the decommissioning and clean-up programme being undertaken by NDA, which will greatly increase the amount of LLW generated over the coming decades;
- the lack of long-term capacity at the national LLW disposal facility near Drigg to deal with this waste;
- the diminishing availability of other routes for dealing with LLW; and
- the increasing difficulty of finding small-scale treatment and disposal routes for the least radioactive wastes, which are very important for the non-nuclear sectors.

In June 2009 the NDA launched a consultation for the draft strategy for the Management of Solid Low Level Radioactive Waste from the UK Nuclear Industry (see 3.3).

1.1.1.3 Radioactive waste discharges

In the UK, the policy on the regulation of radioactive waste discharges and disposals is currently governed by two optimisation concepts: Best Practicable Environmental Option (BPEO) and Best Practicable Means (BPM). The progressive reduction of discharge limits and of actual discharges, having regard to the application of BPM, is a central tenet of the way in which radioactive discharges are controlled, and has been a feature of UK policy since 1993.

Policy on radioactive discharges is currently under review. The UK Government considers that a move to this approach will deliver a regime that is more consistent with the terminology of the OSPAR Strategy and other environmental protection regimes. The application of BAT will deliver the equivalent level of environmental protection as achieved, until now, by the use of BPM and BPEO. The Scottish Environment Protection Agency (SEPA) and the Northern Ireland Environment Agency (NIEA) intend to continue applying BPM and BPEO in the regulation of radioactive discharges in Scotland and Northern Ireland.

The revised UK Discharges Strategy was submitted to OSPAR in July 2009 with the aim of achieving progressive and substantial reduction of radioactive discharges and discharge limits so as to meet the UK’s commitments under the OSPAR Convention.

1.1.1.4 Decommissioning

In September 2004 the UK Government and the devolved administrations issued a statement of policy on the decommissioning of nuclear facilities updating and replacing the previous statement contained in paragraphs 120-131 of Cm 2919 published in July 1995, see Defra website. Key points of this policy are noted below.
The objective of decommissioning is to remove progressively the hazard that the facility poses. Decommissioning operations should be carried out as soon as reasonably practicable, taking all relevant factors into account.

Each operator produces and maintains decommissioning strategies and plans for its sites. The strategies and plans should take into account the views of stakeholders (including relevant local authorities, public and stakeholder groups). The strategies should take into account all relevant factors, assessing and presenting them in a transparent way, underpinned by objective information and arguments, and robust cost estimates. These include:

- ensuring worker and public safety;
- maintaining site security;
- minimising waste generation and providing for effective and safe management of wastes which are created;
- minimising environmental impacts including reusing or recycling materials whenever possible;
- maintaining adequate site stewardship;
- using resources effectively, efficiently and economically;
- providing adequate funding;
- maintaining access to an adequate and relevant skills and knowledge base;
- using existing best practice wherever possible;
- conducting research and development (R&D) to develop necessary skills or best practice; and
- consulting appropriate public and stakeholder groups on the options considered and the contents of the strategy.

The future use of the site, once decommissioning operations are completed, is a significant factor in determining decommissioning operations. The objective is to get the best solution overall taking into account the needs of the environment, and the safety of workers and the local community.

Strategies harness the general benefits of radioactive decay while the problems to which it may give rise in certain areas are avoided. They seek to avoid the creation of radioactive wastes in forms that may reduce the number of options for safe and effective long-term waste management. The use of BPM strategies minimises the volumes of radioactive wastes created, particularly the volume of ILW. Where short-term increases in discharges of some radionuclides are unavoidable, the relevant environment agency must be satisfied that they represent the optimal result from appropriate option studies and reflect the application of the BPM and as low as reasonably achievable (ALARA) principles.

Operators review their strategies periodically and when changes in circumstances, including relevant Government policies, make this necessary.

The operators of sites for which NDA is responsible are also required through their contracts with NDA to produce plans covering the whole lifecycle of these sites, including their decommissioning.

### 1.1.2 Overview of relevant institutions

#### 1.1.2.1 Department of Energy and Climate Change

The Department of Energy and Climate Change (DECC) was created in October 2008, bringing together energy policy (previously with the Department for Business, Enterprise and Regulatory Reform (BERR)) with climate change mitigation policy (previously with the Department for Environment, Food and Rural Affairs (Defra)).

#### 1.1.2.2 Devolved Administrations

Scottish, Welsh and Northern Ireland Governments have responsibility for radioactive waste management policy in the relevant countries.
1.1.2.3 Health and Safety Executive (HSE)

HSE is responsible for enforcing legislation on health and safety at work and in particular, in relation to nuclear installations, for the operation of the nuclear site licensing regime.

1.1.2.4 The environment agencies

The Environment Agency was established in 1996 to provide environmental protection and improvement in England and Wales, including the regulation of radioactive waste disposal. It is a non-departmental public body, sponsored largely by the Defra and the Welsh Assembly Government (WAG). The equivalent organisation in Scotland is the Scottish Environment Protection Agency (SEPA) which is sponsored by the Scottish Government, and in Northern Ireland is the Northern Ireland Environment Agency (NIEA).

1.1.2.5 Nuclear Decommissioning Authority

The NDA is a non-departmental public body, established under the Energy Act 2004, responsible for the decommissioning and clean-up of the UK's civil public sector nuclear sites. The NDA is sponsored by the DECC and it is also responsible to the Scottish Ministers in or as regards its sites in Scotland. The NDA is responsible for

- 19 publicly owned civil nuclear sites.
- implementing geological disposal and radioactive waste management solutions, and:
- developing UK-wide nuclear Low Level Waste (LLW) strategy and plans; and
- oversight of British Energy’s liabilities arising from its current fleet of nuclear power stations.

1.2 National, technical regulatory organisation(s)

1.2.1 Regulatory function

1.2.1.1 Health and Safety Executive (HSE)

The Health and Safety Executive (HSE) was established by the Health and Safety at Work etc. Act 1974 (HSWA74). Its duties include enforcing the Act and its associated legislation (known as the relevant statutory provisions) where it is the enforcing authority. HSWA74 empowers HSE to appoint inspectors to enforce this legislation. Inspectors have a range of powers including powers of entry, powers to investigate, powers to serve enforcement notices and, in England and Wales, to prosecute.

HSE is responsible for enforcing legislation on health and safety at work and in particular, in relation to nuclear installations, for the operation of the nuclear site licensing regime. Within HSE, the responsibility for regulating the nuclear industry has been delegated to its Nuclear Directorate (ND). ND incorporates HM Nuclear Installations Inspectorate (NII) and it is NII that carries out the licensing and day-to-day regulation of the nuclear industry. Licensing powers are delegated to Her Majesty’s Chief Inspector of Nuclear Installations, who is also HSE’s Director of the Nuclear Directorate. This delegated authority from HSE gives the Chief Inspector the power to issue, add conditions to, and revoke nuclear site licences. The Office for Civil Nuclear Security (OCNS) and the UK Safeguards Office (UKSO) are also parts of HSE’s ND.

Her Majesty’s Chief Inspector of Nuclear Installations has direct lines of access, on nuclear safety matters, to Ministers for the Department of Energy and Climate Change and for the Ministry of Defence, reflecting their respective responsibilities to Parliament on civil and military nuclear safety.
1.2.1.2 Environment Agency

The Environment Agency was created by the Environment Act 1995 (EA95) with the aim of providing a more integrated approach to protecting and improving the environment of England and Wales as a whole – land, air and water. It is a ‘non-departmental public body’, sponsored largely by the Defra and the Welsh Assembly Government (WAG). Its powers and duties relate to environmental protection, flood defence, water resources, fisheries, recreation, conservation and navigation. EA95 sets out the principal aim of the Environment Agency “in discharging its functions so to protect or enhance the environment, taken as a whole, as to make the contribution towards attaining the objective of sustainable development”.

1.2.1.3 Scottish Environment Protection Agency

SEPA was established by EA95 to provide environmental protection and improvement in Scotland. Powers under RSA 93 are devolved to the Scottish Government. SEPA is a ‘non-departmental public body’ whose main source of funding is mainly from Grant in Aid provided by the Scottish Government and SEPA’s charging scheme.

Using its statutory powers, SEPA issues various permits, licences, consents, registrations and authorisations covering a wide range of commercial and institutional activities that have the potential for adverse impacts on the environment.

SEPA’s main aim is to provide an efficient and integrated environmental protection system for Scotland which will both improve the environment and contribute to the Scottish Ministers’ goal of sustainable development.

1.2.2 Organisation and resources

1.2.2.1 HSE’s Nuclear Directorate (ND)

Organisation

The Nuclear Installations Inspectorate (NII) was established in 1960 by the Nuclear Installations Act 1959. The 1959 Act was subsequently replaced by the Nuclear Installations Act 1965 (NIA65), retaining essentially the same regulatory powers. In 1975, NII was incorporated into HSE and now forms part of HSE’s Nuclear Directorate (ND). The Office for Civil Nuclear Security (OCNS) and the UK Safeguards Office (UKSO) joined ND in 2007.

In 1975 those parts of NIA65 relating to licensing became relevant statutory provisions of HSWA74. NII operates the nuclear site licensing system under NIA65 on behalf of HSE. NII grants licences to corporate bodies to install or operate nuclear installation on a particular site. NII, on behalf of HSE, may attach to a nuclear site licence such conditions as appear necessary or desirable in the interest of safety, or such conditions as it may think fit with respect to the handling, treatment and disposal of nuclear matter.

HSE’s Nuclear Directorate is currently organised into six Divisions.

- Divisions 1-3 are the main operational Divisions which carry out the day-to-day regulation, and each has the inspection, technical and administrative resources relevant to their dealings with a particular licensee or group of licensees. They employ specialists in such areas as civil engineering, human factors, structural integrity, health physics, radioactive waste management, decommissioning, management of safety, as well as electrical, mechanical and chemical engineering. Division 2
includes UKSO, which oversees the application of nuclear safeguards in the UK to ensure that the UK complies with its international safeguards obligations.

- Division 4 is responsible for nuclear operational strategy; planning, performance and finance; communications and stakeholder engagement; and the Director’s administrative support system.
- Division 5, ND’s OCNS, is the security regulator for the UK’s civil nuclear industry, responsible for approving security arrangements within the industry and enforcing compliance.
- Division 6, formed in July 2007, is responsible for dealing with ND’s Generic Design Assessment of potential new nuclear power reactors and nuclear safety research.
- Division 7, formed in June 2009, is responsible for policy and international co-ordination.

Each Division also has administrative support.

Financial resources

ND is funded through HSE, which is a Non-Departmental Public Body, sponsored in Parliament by the Department for Work and Pensions (DWP). HSE is funded by Parliament, through grant-in-aid. NIA65 empowers HSE to recover its expenses for regulatory work in support of the licensing regime from the nuclear licensees. HSE is required to operate a gross accounting arrangement, and receipts from charges are treated as appropriation-in-aid. Parliament, through the Spending Review, sets the overall level of HSE’s expenditure and therefore its receipts.

The principal charges applied to nuclear licensees fall under the provisions of the NIA65. ND determines the exact amount to be recovered, in total, from the licensees and then, on the basis of the amount of regulatory effort each has consumed, apportions charges to each licensee. For example, if a licensee consumes 10% of the NII’s effort, it will be charged 10% of ND’s expenses.

HSE also applies a levy to the major nuclear licensees to recover its expenses incurred under the Nuclear Safety Research Programme.

Human Resources

For the efficient and effective delivery of its work, NII relies upon qualified and well-trained staff from within ND and from other parts of HSE; also upon external sources of expert support and the results of research, and information exchange with other countries.

On 1 July 2009, ND employed 319 staff (in Full Time Equivalents). This included 174 nuclear inspectors plus 33 OCNS and 6 Safeguards staff. The majority of staff are based at Bootle in Merseyside, OCNS has offices at Harwell and Safeguards is based in London. In spite of continuing recruitment, the number of nuclear safety inspectors remains less than current predictions for future workloads require. HSE and the UK Government are actively engaged in measures to address this shortfall. In particular, on 30 June the Government published for consultation proposals2 to restructure ND as a statutory corporation to give it greater operational and financial autonomy, which should help it to recruit and retain the necessary specialist staff.

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Inspectors’ Qualifications

All ND nuclear inspectors are technically qualified, educated to degree level and have at least 5-7 years experience in a responsible position in industry, normally nuclear but exceptionally other high-hazard industries. Most are members of recognised professional institutions. They carry out site inspection or specialist/safety case assessment roles, delivering the regulatory functions required by the HSWA74 and nuclear legislation.

1.2.2.2 Environment Agency

Organisation

The Environment Agency (EA) has a board of up to 15 members, including the Chairman and Chief Executive, who are accountable to Government Ministers, and to WAG for its operations in Wales, for the EA’s organisation and performance. All are appointed by the Secretary of State for Environment, Food and Rural Affairs, except for one Board Member for Wales, who is appointed by the WAG. The Board delegates the EA’s day-to-day management to its Chief Executive and staff.

For most of its activities, the Environment Agency has broken down its work between 8 geographical regions. In each region, three statutory committees advise the Environment Agency about the operational performance of its functions, regional issues of concerns and regional implications of national policy proposals. These committees are the Regional Fisheries, Ecology and Recreation Advisory Committee, Regional Flood Defence Committee and the Regional Environment Protection Advisory Committee. There is also an advisory committee for Wales.

Committee members are appointed under statutory membership schemes designed to achieve representation from a wide range of the Environment Agency’s stakeholders. All Regional Environment Protection Advisory Committee meetings are advertised locally and the public is welcome to attend.

Following a reorganisation in mid-2002, the Environment Agency has established two specialist groups (North and South) to carry out the regulation of radioactive waste disposals, including discharges of liquid and gaseous wastes on and off nuclear licensed sites and radioactive waste management on other sites. Associated with the northern group are two assessment teams providing national support on solid waste disposal and on generic designs of potential new nuclear reactors. Similarly, associated with the southern group, there is a small team providing national support on radiation incident management. Other groups within the Environment Agency include the Radioactive Substances Regulation Policy Group, the National Monitoring and Assessment Team responsible for checking, monitoring and assessment of discharges to the environment and , and the Nuclear Waste Assessment Team , which provides technical expertise in radioactive waste disposal. There is also a group working jointly with HSE on Generic Design Assessment of proposed reactor designs for possible new nuclear power plants.

The Environment Agency and the Food Standards Agency liaise closely to ensure that their environmental monitoring programmes in England and Wales are appropriate. Annual results from the environmental monitoring programme in the UK are published jointly by the environment agencies, the Food Standards Agency and the Northern Ireland Environment Agency in a report entitled ‘Radioactivity in Food and the Environment’ (RIFE).

Financial resources

The Environment Agency has a total budget of over £1000 million, over half of which is spent on flood defence and, in 2007/08; £346 million was spent on Environment Protection. Income is derived chiefly from three sources:

- Income raised from charging for regulation.
- Flood defence levies.
• Government grants, which help to finance amongst other things, pollution prevention and control activities.

The Environment Agency charges operators for its nuclear regulatory activities on the basis of a daily rate for inspectors. This rate is reviewed annually. The Environment Agency also recharges operators for the monitoring it carries out. Annual charges for nuclear regulatory work and monitoring activities in financial year 2007/2008 were approximately £9.3 million.

Human resources

The Environment Agency has a total of over 13,000 staff, although only a small proportion of these are involved in nuclear regulation. The North and South nuclear regulatory groups have a total of around 45 technical staff, with additional administrative support. The other groups identified above involved with nuclear regulatory activities comprise approximately a further 30 technical staff.

Inspectors’ qualifications

Nuclear regulatory staff recruited by the Environment Agency are required to have a good honours degree in science or engineering, and several years experience in a technical or management role in the nuclear industry.

1.2.2.3 Scottish Environment Protection Agency

Organisation

Members of SEPA’s Main Board are appointed by the Scottish Ministers, and comprise a Chairman, a Deputy Chairman and between eight and ten members, including the Chief Executive. The Board has ultimate responsibility for the organisation. It meets regularly and is specifically concerned with:

• Establishing the overall strategic direction of SEPA within the policy and resources framework agreed with the responsible Minister;
• Overseeing the delivery of planned results by monitoring performance against agreed objectives and targets;
• Ensuring that SEPA operates sound environmental policies in relation to its own operations; and
• Ensuring that high standards of corporate governance are observed at all times.

SEPA also has three Regional Boards, reflecting its regional structure, each chaired by a member of the main Board. A Regional Board's general responsibilities include advising on the development of the business plans for the region, the generation and implementation of local initiatives for the environment, and advising on applications that have major effects on the local area.

SEPA has two specialist teams dealing with the radioactive waste disposals from nuclear sites in Scotland. The Environmental Protection and Improvement Unit covers the day-to-day regulatory activities such as issuing authorisations, inspection, enforcement etc. The Policy Unit covers more strategic matters such as liaison with Government or other bodies, influencing the development of forthcoming policy or legislation. This Unit also leads on environmental monitoring such as the collection and assessment of samples.

SEPA manages a monitoring programme that assesses levels of man-made radioactivity in the environment using a number of environmental indicators. The samples of water, food, soil etc, collected as part of SEPA’s programme, act both as indicators of the state of the environment and to verify that the levels of radioactivity present within these commodities have low radiological significance to man.

Results from the environmental monitoring programme are used as the basis for dose calculations to members of the public from consumption of food and exposures of members of the public from waste disposals.
In Scotland, the Food Standards Agency and SEPA liaise closely together to ensure that the environmental monitoring programme for radioactivity is appropriate. Annual results from the environmental monitoring programme in the UK are published jointly by the environment agencies, the Food Standards Agency and the Northern Ireland Environment Agency in a report entitled ‘Radioactivity in Food and the Environment’ (RIFE).

Financial resources

SEPA’s income is derived chiefly from three sources:

- Income raised from charging for regulation.
- Government grant-in-aid, which helps to finance work that is not cost-recoverable through charging schemes.
- Other sources (like financial agreements with NDA).

In the financial year 2008/09, SEPA’s grant-in-aid from the Scottish Government was £43.7 million and the total budget was £78.2 million. SEPA charges operators for its nuclear regulatory activities on the basis of a daily rate for an inspector, which includes an appropriate overhead allowance. The prices for all SEPA charging schemes are updated annually by Retail Price Index. In the event that SEPA prices have to increase by more than the Retail Price Index, or a scheme requires other changes, a public consultation is held. All changes which have been the subject of consultation have to be approved by the Scottish Minister before SEPA can implement them.

Human resources

SEPA has approximately 1300 staff, with around 30 technical staff dealing with radioactive substances, the majority of whom have some involvement in matters relating to nuclear sites.

Inspectors’ qualifications

Nuclear regulatory staff recruited by the Agency are required to have a degree in a relevant discipline.

1.3 National implementing organisations

1.3.1 Scope of responsibility

1.3.1.1 Nuclear Decommissioning Authority

Much of the UK civil nuclear sector (in particular, electricity production, associated fuel cycle plants and research facilities) is undergoing significant changes; many facilities are nearing the end of their operating lives, and there is greater emphasis on decommissioning, site clean-up and restoration. The UK Government has established the Nuclear Decommissioning Authority (NDA), which became operational on 1 April 2005. The NDA is responsible for the civil public sector nuclear facilities in the UK (see section 4) and has also been given responsibility for the implementation of geological disposal within the UK (see section 1.3) and for the development of a national strategy for solid LLW from the nuclear industry (see section 3.3).

In June 2008 the UK Government and devolved administrations for Wales and Northern Ireland published the Managing Radioactive Waste Safely (MRWS) White Paper setting out a framework for implementing geological disposal for higher activity wastes. The White Paper explains that the NDA is the implementing organisation, responsible for planning and delivering the geological disposal facility and, as
part of this process, will engage with communities and other stakeholders. The NDA already provides interim storage of waste on its sites and will continue to do so for as long as it takes to site and construct a geological disposal facility. The NDA will also undertake a programme of research and development to support optimised delivery of geological disposal and interim storage.

The 2008 MRWS White Paper intentionally does not set out a timescale for the MRWS site assessment and selection process, recognising that the voluntarism approach should proceed at a rate with which communities are comfortable. However, the White Paper does set out the stages that are expected to take place in the site selection process.

In June 2007 the Scottish Government announced its policy for higher activity radioactive wastes is to support “near surface, near site long-term storage facilities where the waste is monitorable and retrievable and the need for transporting it over long distances is minimal.” The Scottish Government is developing a Detailed Statement of its policy on which it will consult in Autumn 2009.

1.3.2 Organisation and resources

1.3.2.1 Nuclear Decommissioning Authority

The NDA takes an integrated view across the waste management chain, with both long and short term issues addressed in planning and strategy development. The NDA has established a new Radioactive Waste Management Directorate (RWMD), incorporating resources from the former United Kingdom Nirex Ltd, which it will develop into an effective delivery organisation to implement geological disposal.

In growing RWMD as a prospective Site Licence Company for delivering geological disposal, the NDA is adopting a minimalist approach. The plan is to form a wholly owned subsidiary of the NDA that will hold disposal authorisations under the Radioactive Substances Act and a site licence under the Nuclear Installations Act. The skills and expertise required are driven by the requirements of a Safety and Environment Management Prospectus being developed in co-operation with regulators.

Implementation of the geological disposal facility programme by the NDA will comply fully with relevant UK and international legislation and conventions. Regulatory bodies will work closely together to ensure the regime as a whole is coherent, effective and efficient. Individual aspects of regulation will be carried out in accordance with the statutory responsibilities of each regulatory body and will be clearly delineated. It will be the responsibility of the RWMD to ensure that its programme is appropriately coordinated as part of a staged application and approval process to ensure that permissions are obtained in the right order.

Financial resources

The RWMD has a budget of around £17 million for the 2009/10 financial year. However, this is likely to be increased as progress is made in finding a suitable location.

The exact cost of a geological disposal facility will be influenced by many different factors, including the inventory of waste, the geology at the site in question and the design of a geological disposal facility. The NDA is developing a parametric cost model which will allow the implications and costs of different scenarios to be assessed. The current best estimate for a geological disposal facility is £12.2 billion (at 2008 money values).
Human resources

RWMD’s staffing strategy is based on the premise of a lean organisation of highly skilled and suitably qualified and experienced individuals, supplemented by expert contract support from the supply chain, where appropriate.

In order to meet the commitments set out in the MRWS White Paper, to provide a sound basis for development into a competent project delivery organisation and support longer term commitments, RWMD needs to strengthen its internal capabilities and competences in specific fields e.g. Health, Safety and Environment, Geology and Engineering.

At present (2009) RWMD has around 65 staff members.

2. LEGAL FRAMEWORK

2.1 Primary Legislation and General Regulations

2.1.1 Nuclear Installations Act 1965
Under the Nuclear Installations Act 1965, (NIA65) no site can be used for the purpose of installing or operating a nuclear installation unless a nuclear site licence is currently in force, granted by the HSE. Only a corporate body, such as a registered company or a public body, can hold a licence and the licence is not transferable. Sections 1, 3 to 6, 22 and 24A of the NIA65 are relevant statutory provisions of the HSWA74 (i.e. these sections are subject to HSWA74 arrangements for regulation and enforcement). The Act empowers HSE to attach conditions in the interests of safety or radioactive waste management to any licence that it grants.

2.1.2 Nuclear Installations Regulations 1971
The Nuclear Installations Regulations 1971 prescribe, among other things, those spent fuel and radioactive waste management installations for which a nuclear site licence is required. These are installations designed or adapted for:

- “the processing of irradiated nuclear fuel other than processing carried out solely for the purpose of chemical or isotopic assay or metallographic investigation of such nuclear fuel”; and
- the “storage of …… irradiated nuclear fuel, [or] bulk quantities of any other radioactive matter which has been produced or irradiated in the course of the production or use of nuclear fuel, other than storage incidental to carriage and in the case of irradiated nuclear fuel other than storage incidental to” the purposes of chemical or isotopic assay or metallographic investigation of such nuclear fuel.

2.1.3 Health and Safety at Work etc. Act 1974
The Health and Safety at Work etc. Act 1974 (HSWA74) places general duties on all employers (not just nuclear site licensees) to conduct their undertakings in such a way as to ensure, so far as is reasonably practicable, the health and safety at work of their employees and also of persons not in their employment who may be affected by their work activities.

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2.1.4 Ionising Radiations Regulations 1999

The Ionising Radiations Regulations 1999 (IRR99)\(^6\) provide for the protection of all workers and members of the public, whether on licensed sites or elsewhere, from ionising radiations. IRR99 implement aspects of the BSS Directive\(^7\) which established basic safety standards, including the setting of radiation dose limits for employees and members of the public for all activities involving ionising radiation. IRR99 also implement Council Directive 90/641/Euratom\(^8\) on the operational protection of outside workers exposed to the risk of ionising radiation during their activities in controlled areas. Outside workers are persons undertaking activities in radiation controlled areas designated by an employer other than their own.

2.1.5 Justification of Practices Involving Ionising Radiation Regulations 2004

In August 2004, the Justification of Practices Involving Ionising Radiation Regulations 2004\(^9\) came into force. These regulations provide for the justification of new classes or types of practice and the review of existing classes or types of practice where there is new and important evidence regarding their consequences or effectiveness.

2.1.6 Environment Act 1995

The Environment Act 1995 (EA95)\(^10\) sets the basis for the regulatory framework with respect to environmental protection. It also established the Environment Agency and the Scottish Environment Protection Agency (SEPA) as regulators together with their funding arrangements.

2.1.7 Radioactive Substances Act 1993

The Radioactive Substances Act 1993 (RSA93)\(^11\) requires prior authorisation to dispose of radioactive waste, including that from nuclear installations. It also requires registration for the keeping and use of radioactive material (other than by nuclear sites licensees) and authorisation for the accumulation of radioactive waste (other than on nuclear licensed sites). RSA93 empowers the appropriate environment agency to attach limits and conditions to any authorisation that it issues. The Energy Act 2004 amended RSA93 to allow the transfer of authorisations from one person to another following consultation with statutory consultees. This avoids the need for a new application to be made for authorisation under the RSA93, and also harmonises radioactive substances regulation with other areas of environmental regulation.

This harmonisation is now being extended, in England and Wales, where consideration is being given to incorporating RSA93 into the Environmental Permitting Regulations 2007, along with a number of other conventional regulatory regimes such as those for discharges to water, groundwater and solid waste disposal. The aim is to provide a common process framework to reduce the administrative burden on those who currently have a number of different regulatory permits. This opportunity for legislative change is also being used to modernise and clarify certain aspects of RSA93 and, in particular, to introduce a staged

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permitting process for the development of major radioactive waste disposal facilities. These new Regulations are expected to be implemented in April 2010.

Legal requirements for the keeping and use of radioactive material and authorisation for the accumulation of radioactive waste on a nuclear licensed site are addressed by provisions in the Licence Conditions attached to each nuclear site licence, which are enforced by HSE.

A review of Exemption Orders under RSA93 (including the Substances of Low Activity Exemption Order) is currently being undertaken with the aim of simplifying regulation for those seeking or using an Exemption Order, whilst at the same time maintaining appropriate protection to human health and the environment. The review is expected to be completed by 2010.

2.1.8 Radiation (Emergency Preparedness and Public Information) Regulations 2001
The Radiation (Emergency Preparedness and Public Information) Regulations 2001 (REPPIR)\(^{12}\) implemented in Great Britain the Articles on intervention in cases of radiation emergency in the BSS Directive. They also partly implement Council Directive 89/618/Euratom\(^ {13}\) on informing the general public about health protection measures to be applied and steps to be taken in the event of an emergency. A radiation emergency is defined as a reasonably foreseeable event that is likely to result in any member of the public receiving an effective dose of 5mSv during the year immediately following the emergency.

2.1.9 High Activity Sealed Sources and Orphan Sources Regulations 2005
The High Activity Sealed Sources and Orphan Sources Regulations 2005 (HASS Regulations)\(^ {14}\) implement European Council Directive 2003/122/Euratom. They established a regulatory system for the authorisation of practices involving high-activity sealed sources. Under the Regulations, before issuing such an authorisation, the relevant competent authority must ensure that adequate arrangements exist for the safe management of sources, including when they become disused sources. These latter arrangements may provide for the transfer of disused sources to the supplier or to a recognised storage facility. In addition, financial provision must have been made to cover the cost of managing disused sources safely, including in the eventuality of the holder becoming insolvent or going out of business.

2.1.10 Management of Health and Safety at Work Regulations 1999
The Management of Health and Safety at Work Regulations 1999 (MHSW99)\(^ {15}\) include requirements on employers, including nuclear site licensees, to:

- make assessments of the health and safety risks of their activities;
- make, give effect to and record the appropriate health and safety arrangements;
- ensure that their employees are provided with appropriate health surveillance;
- appoint an adequate number of competent persons to assist them in complying with health and safety legislation;
- establish and give effect to procedures to be followed in the event of serious or imminent danger arising;
- provide employees with information concerning the:-
  - risks to their health and safety;
  - preventive and protective measures;


procedures necessary in the event of serious or imminent danger; and
- persons nominated to implement evacuation procedures;
- co-operate with other employers to enable statutory health and safety obligations to be met, including the provision of health and safety information; and
- ensure that employees, taking into account their capabilities, have adequate health and safety training which is repeated periodically as appropriate.

2.1.11 Energy Act 2004
The Energy Act 2004 established a new cross-border Non-Departmental Public Body, the Nuclear Decommissioning Authority (NDA), which came into being in April 2005 to take over the responsibility for decommissioning, and operation via civil contracts with operators pending decommissioning, of designated civil nuclear sites.

2.1.12 Health and Safety (Fees) Regulations
The annual Health and Safety (Fees) Regulations (the latest being for 2009)\(^{16}\) provide for the charging of fees for work by HSE in relation to the assessment of a design proposal for any new nuclear installation. This includes any matters relating to the installation's construction, commissioning, operation and decommissioning, which are to be assessed by HSE prior to any application for a nuclear site licence under NIA65\(^{15}\) that may be made based upon the particular design proposal that has been assessed.

2.1.13 Environmental Protection Act 1990
Part IIA of the Environmental Protection Act 1990 (EPA90)\(^{17}\) set up a system for the regulation of contaminated land in England, Wales and Scotland. The regime provides a framework for identifying and remediation of contaminated land. Part IIA defines contaminated land as land that poses unacceptable risks through its current use.

In 2006 in England and Wales, and 2007 in Scotland, the Part IIA regime was extended to apply to land contaminated with radioactivity resulting from uses of radioactive materials. It only applies in circumstances where the radioactivity is the result of a past practice or work activity, or the after-effects of a radiological emergency. This includes substances containing artificial radionuclides or processed natural radionuclides. Radioactivity originating from nuclear sites was excluded from these regulations. However, the liability for any harm that such radioactivity might cause was already covered by the NIA65.

2.1.14 Radioactive Contaminated Land Regulations
The Radioactive Contaminated Land (Modification of Enactments) (England) (Amendment) Regulations 2007\(^{18}\) modified EPA90 in England so that it applies to radioactivity originating from nuclear sites. Similar modifications apply in Wales and Scotland. Parallel regulations apply in Northern Ireland. Modifications which apply in Scotland are The Radioactive Contaminated Land (Scotland) Regulations 2007 (SSI 2007/179), The Radioactive Contaminated Land (Scotland) (Amendment) Regulations 2007 (S.I No. 2007/3240) and The Radioactive Contaminated Land (Scotland) Amendment Regulations 2009 (SSI 2009/202)\(^{19}\).

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\(^{16}\) The Health and Safety (Fees) Regulations 2008, http://www.opsi.gov.uk/si/si2008/uksi_20080736_en_1

\(^{17}\) Environmental Protection Act 1990 (c. 43) http://www.opsi.gov.uk/acts/acts1990/Ukpga_19900043_en_1.htm


2.1.15 Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations

The Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (EIADR99) implement the requirement for an environmental impact assessment for decommissioning nuclear power stations and nuclear reactors arising from Council Directive 85/337/EEC (as amended by Council Directive 97/11/EC on the assessment of the effects of certain public and private projects on the environment. Before decommissioning or dismantling of a nuclear reactor or power station can take place, a licensee must apply to HSE for consent, undertake an environmental impact assessment and provide an environmental statement. The information to be included in an environmental statement is referred to and specified in Schedule 1 to the Regulations. A list of HSE determinations is given in the Fourth UK Report to the Convention on Nuclear Safety.

2.1.16 Other relevant legislative frameworks

Planning / Environmental Assessment Regulation

The planning regulatory framework covers, in general, requirements for Environmental Impact Assessments (EIA). In most cases, local planning authorities are the competent authorities. Involvement of public and other bodies in the regulatory process

Planning permission is obtained from the relevant local authority under the Town and Country Planning Act 1990 for England and Wales and the Planning etc. (Scotland) Act 2006 for Scotland. In Scotland, in due course, this will be replaced by secondary legislation bringing in to force the provisions of the Planning etc (Scotland) Act 2006. In some instances, an application for planning permission may be “called in” by the relevant Minister for ministerial decision. This usually reflects the fact that the development is seen as having national importance. The planning authority may suggest the “call in”. Where an application for planning permission is “called in”, a local Public Inquiry is set up. In England and Wales the independent Planning Inspectorate arranges for one of its inspectors to hear and receive evidence for or against the proposal. The inspector then makes a report and a recommendation to the Secretary of State for Communities and Local Government or to the Welsh Assembly Government. In Scotland, a Reporter from the Scottish Government’s Directorate for Planning and Environmental Appeals will provide a recommendation before a decision is taken by the Scottish Ministers or, in the case of a delegated case, a decision letter will be issued by the Directorate.

The planning application process provides an opportunity to inform and obtain views from the public. For major developments such as a radioactive waste repository, this could be through the public inquiry process. Similarly, the environment agencies will consult on a developer’s application for the authorisation of disposal of radioactive waste in a repository. HSE, the Environment Agency and SEPA have corporate policies to ensure that public information is available in an open and transparent manner, subject to the

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requirements of the Freedom of Information Act 2000\textsuperscript{26}, the Freedom of Information (Scotland) Act 2002\textsuperscript{27}, and the Environmental Information Regulations 2004, and the Environmental Information (Scotland) Regulations 2004\textsuperscript{28}.

One of the statutory objectives of the environment agencies is to develop a close and responsive relationship with the public, local authorities and other representatives of local communities and regulated organisations. In determining applications for radioactive waste disposals on or from sites licensed under NIA65, the agencies consult statutory bodies such as local and health authorities, fisheries and agriculture committees, in addition to the Food Standards Agency and HSE. They also undertake wide public consultation. After considering all the views expressed, they publish a “decision document” setting out their decision and the reasons behind it, including their response to issues raised during consultation. In Scotland, SEPA also consults with the Scottish Government for applications made to dispose of radioactive waste from nuclear licensed sites under the terms of a mutual agreement to enable decisions to be taken as to whether Ministers wish to exercise their powers under the RSA93.

2.1.17 Transport of radioactive materials

The UK’s regulatory framework for the transport of radioactive material reflects international codes, treaties and regulations:

- the GB Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2007\textsuperscript{29};
- the Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997\textsuperscript{30};
- Merchant Shipping Notice No MSN 1791(M), the Carriage of Dangerous Goods and Marine Pollutants in Packaged Form – Amendment 32-04 to the IMDG Code\textsuperscript{31}; and
- the Air Navigation Order 2005\textsuperscript{32} together with the Air Navigation (Dangerous Goods) Regulations 2002\textsuperscript{33}, amended in 2004, SI 2004\textsuperscript{34}.

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\textsuperscript{26} Freedom of Information Act 2000, \url{http://www.opsi.gov.uk/acts/acts2000/20000036.htm}

\textsuperscript{27} Freedom of Information (Scotland) Act 2002, \url{http://www.opsi.gov.uk/legislation/scotland/acts2002/20020013.htm}

\textsuperscript{28} Environmental Information (Scotland) Regulations 2004, \url{http://www.opsi.gov.uk/legislation/scotland/ssi2004/20040520.htm}

\textsuperscript{29} The GB Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2007, SI 1573, \url{http://www.opsi.gov.uk/si/si2007/uksi_20071573_en_1}

\textsuperscript{30} The Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997, SI 2367, \url{http://www.opsi.gov.uk/si/si1997/19972367.htm}

\textsuperscript{31} Merchant Shipping Notice No MSN 1791(M), The Carriage of Dangerous Goods and Marine Pollutants in Packaged Form – Amendment 32-04 to the IMDG Code


\textsuperscript{33} The Air Navigation (Dangerous Goods) Regulations 2002, SI 2786, \url{http://www.opsi.gov.uk/si/si2002/20022786.htm}

\textsuperscript{34} The Air Navigation (Dangerous Goods) Regulations 2002 Amendment 2004, SI 3214, \url{http://www.opsi.gov.uk/si/si2004/20043214.htm}
2.1.18 Transfrontier shipments

The regulatory framework for transfrontier shipment of radioactive materials and radioactive waste derive from European requirements that are either directly applicable European legislation or are implemented in the UK through the European Communities Act 197235.


2.1.19 Northern Ireland

There are no nuclear installations in Northern Ireland, which has its own regulatory framework that mirrors that in the rest of the UK. In addition to RSA93, the relevant statutory provisions for the province include:

- the Health and Safety at Work (Northern Ireland) Order 197837;
- the Ionising Radiation Regulations (Northern Ireland) 200038;
- the Radiation (Emergency Preparedness and Public Information Regulation) (Northern Ireland) 200139; and
- Radioactive Contaminated Land Regulations (Northern Ireland) 200640

Additionally, the Department of the Environment, Northern Ireland (DOENI) has made legislation (The Radioactive Substances (Basic Safety Standards) Regulations (Northern Ireland) 2003)41, under powers conferred by the European Communities Act 1972, to meet the obligations imposed by the BSS Directive.

2.2 Regulations concerning specific activities or facilities

2.2.1 Radioactive waste management

2.2.2 Decommissioning


In the UK regulations are not granted to specific facilities or activities. Instead a range of permits are issued under the national legislation described above.

2.3. Guidance on implementation

2.3.1 Radioactive waste management

2.3.1.1 NII guidance

In relation to the safe management of radioactive waste on nuclear licensed sites, guidance has been issued by HSE\textsuperscript{42} containing the following fundamental expectations:

- Production of radioactive waste should be avoided. When radioactive waste is unavoidable, its production should be minimised.
- Radioactive material and radioactive waste should be managed safely throughout its life cycle in a manner that is consistent with modern standards.
- Full use should be made of existing routes for the disposal of radioactive waste.

Remaining radioactive material and radioactive waste should be put into a passively safe state for interim storage pending future disposal or other long-term solution.

2.3.1.2 Environment Agencies Guidance

The environment agencies have prepared Guidance on Requirements for Authorisation for near-surface disposal facilities on land for solid radioactive wastes\textsuperscript{43}. In England, Wales and Northern Ireland, a policy of geological disposal of higher activity wastes has been adopted. The Environment Agency and the Northern Ireland Environment Agency have published Guidance on Requirements for Authorisation for geological disposal facilities on land\textsuperscript{44}. This guidance does not apply in Scotland, where a policy of long-term near surface, near site interim storage has been adopted.

Amongst other things, the two Guidance documents include a common fundamental protection objective with a supporting set of principles and requirements for disposal of solid radioactive waste to specialised disposal facilities on land. The fundamental protection objective is to ensure that all disposals of solid radioactive waste to facilities on land are made in a way that protects the health and interests of people and the integrity of the environment, at the time of disposal and in the future, inspires public confidence and takes account of costs.

The principles set out in the Guidance are:

- **Principle 1: Level of protection against radiological hazards at the time of disposal and in the future**

\textsuperscript{42} Guidance for inspectors on the management of radioactive materials and radioactive waste on nuclear licensed sites, March 2001, \url{http://hse.gov.uk/nuclear}

\textsuperscript{43} See \url{http://www.environment-agency.gov.uk/business/sectors/99322.aspx}

\textsuperscript{44} Managing our Radioactive Waste Safely – CoRWM Recommendations to UK Government, July 2006, \url{http://www.corwm.org.uk/content-1092
Solid radioactive waste shall be disposed of in such a way that the level of protection provided to people and the environment against the radiological hazards of the waste both at the time of disposal and in the future is consistent with the national standard at the time of disposal.

- **Principle 2: Optimisation (as low as reasonably achievable)**
  Solid radioactive waste shall be disposed of in such a way that the radiological risks to individual members of the public and the population as a whole shall be as low as reasonably achievable under the circumstances prevailing at the time of disposal, taking into account economic and societal factors and the need to manage radiological risks to other living organisms and any non-radiological hazards.

- **Principle 3: Level of protection against non-radiological hazards at the time of disposal and in the future**
  Solid radioactive waste shall be disposed of in such a way that the level of protection provided to people and the environment against any non-radiological hazards of the waste both at the time of disposal and in the future is consistent with that provided by the national standard at the time of disposal for wastes that present a non-radiological but not a radiological hazard.

- **Principle 4: Reliance on human action**
  Solid radioactive waste shall be disposed of in such a way that unreasonable reliance on human action to protect the public and the environment against radiological and any non-radiological hazards is avoided both at the time of disposal and in the future.

- **Principle 5: Openness and inclusivity**
  For any disposal of solid radioactive waste, the relevant environment agency shall:
  - establish ways of informing interested parties and the public about regulatory goals, processes and issues;
  - consult in an open and inclusive way.

The principles are accompanied by the following set of requirements that a developer/operator would need to address in developing a radioactive waste disposal facility.

- **Requirement R1: Process by agreement**
  The developer should follow a process by agreement for developing a disposal facility for solid radioactive waste.

- **Requirement R2: Dialogue with potential host communities and others**
  The developer should engage in dialogue with the planning authority, potential host community, other interested parties and the general public on its developing environmental safety case.

- **Requirement R3: Environmental safety case**
  An application under the Radioactive Substances Act 1993 relating to a proposed disposal of solid radioactive waste should be supported by an environmental safety case.

- **Requirement R4: Environmental safety culture and management system**
The developer/operator of a disposal facility for solid radioactive waste should foster and nurture a positive environmental safety culture at all times and should have a management system, organisational structure and resources sufficient to provide the following functions: (a) planning and control of work; (b) the application of sound science and good engineering practice; (c) provision of information; (d) documentation and record-keeping; (e) quality management.

- **Requirement R5: Dose constraints during the period of authorisation**

  During the period of authorisation of a disposal facility for solid radioactive waste, the effective dose from the facility to a representative member of the critical group should not exceed a source-related dose and a site-related dose constraint [These are defined in the Guidance].

- **Requirement R6: Risk guidance level after the period of authorisation**

  After the period of authorisation, the assessed radiological risk from a disposal facility to a person representative of those at greatest risk should be consistent with a risk guidance level of 10^-6 per year (i.e. 1 in a million per year).

- **Requirement R7: Human intrusion after the period of authorisation**

  The developer/operator of a geological disposal facility should assume that human intrusion after the period of authorisation is highly unlikely to occur. The developer/operator should consider and implement any practical measures that might reduce this likelihood still further. The developer/operator should also assess the potential consequences of human intrusion after the period of authorisation.

- **Requirement R8: Optimisation**

  The choice of waste acceptance criteria, how the selected site is used and the design, construction, operation, closure and post-closure management of the disposal facility should ensure that radiological risks to members of the public, both during the period of authorisation and afterwards, are as low as reasonably achievable (ALARA), taking into account economic and societal factors.

- **Requirement R9: Environmental radioactivity**

  The developer/operator should carry out an assessment to investigate the radiological effects of a disposal facility on the accessible environment, both during the period of authorisation and afterwards, with a view to showing that all aspects of the accessible environment are adequately protected.

- **Requirement R10: Protection against non-radiological hazards**

  The developer/operator of a disposal facility for solid radioactive waste should demonstrate that the disposal system provides adequate protection against non-radiological hazards.

- **Requirement R11: Site investigation**

  The developer/operator of a disposal facility for solid radioactive waste should carry out a programme of site investigation and site characterisation to provide information for the environmental safety case and to support facility design and construction.
• **Requirement R12: Use of site and facility design, construction, operation and closure**

The developer/operator of a disposal facility for solid radioactive waste should make sure that the site is used and the facility is designed, constructed, operated and capable of closure so as to avoid unacceptable effects on the performance of the disposal system.

• **Requirement R13: Waste acceptance criteria**

The developer/operator of a disposal facility for solid radioactive waste should establish waste acceptance criteria consistent with the assumptions made in the environmental safety case and with the requirements for transport and handling, and demonstrate that these can be applied during operations at the facility.

• **Requirement R14: Monitoring**

In support of the environmental safety case, the developer/operator of a disposal facility for solid radioactive waste should carry out a programme to monitor for changes caused by construction, operation and closure of the facility.

The fundamental protection objective, the principles and requirements have supporting text providing detailed explanations of the regulators’ expectations. Where necessary, the explanatory text provides specific guidance relevant to either a near-surface disposal facility or a geological disposal facility.

In developing the Guidance on Requirement for Authorisation due consideration was given to the basic principles for radioactive waste management set out in the IAEA Safety Fundamentals, published under the RADWASS programme, and to the Standards and Guides which flow from them.

2.3.1.3 **Joint Guidance**

The safety and environmental regulators (HSE, EA and SEPA) are developing a series of joint guidance on the management of higher activity radioactive waste. This process includes the publication of successive modules of technical guidance (eg on radioactive waste management cases and on waste minimisation, characterisation and segregation) for trial use and comment prior to finalisation. Earlier joint guidance described new regulatory arrangements for the conditioning and packaging of ILW. Waste producers are being required to provide an assessment of the disposability of the waste to be packaged before approval to package the waste is given by the regulators. This assessment is based on regulatory oversight of a ‘letter of compliance’ process implemented by the NDA’s Radioactive Waste Management Directorate which provides the basis for standards and specifications for waste packaging; and the assessment of operators’ ILW packaging against a generics safety assessment for a geological disposal facility.

The conditioning of radioactive wastes on nuclear licensed sites in the UK is regulated by the HSE under the terms of the conditions attached to the nuclear site licence. When assessing the suitability of a nuclear site licensee’s safety case to treat radioactive waste, HSE consults the relevant environment agency. As part of this assessment process, HSE takes full and meaningful account of any environmental issues as advised to them, before issuing a consent or agreement. HSE seeks the relevant agency’s advice in order to be satisfied that the proposal adequately addresses long-term environmental protection concerns, particularly those regarding the long-term disposability of the proposed waste form.

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45 Available from the HSE website at http://www.hse.gov.uk/nuclear/wastemanage.htm
3. WASTE MANAGEMENT STRATEGY AND CURRENT PRACTICE

3.1 Waste classification and quantities

In the UK, radioactive waste is classified under the following broad categories, according to its heat-generating capacity and activity content:

- **High-level, or heat-generating, waste (HLW)**, in which the temperature may rise significantly as a result of their radioactivity, so that this factor has to be taken into account in designing storage or disposal facilities.

- **Intermediate-level waste (ILW)** with radioactivity levels exceeding the upper boundaries for low-level waste, but which do not require heating to be taken into account in the design of storage or disposal facilities.

- **Low-level waste (LLW)**, is now defined as radioactive waste having a radioactive content not exceeding 4 gigabecquerels per tonne (GBq/te) of alpha or 12 GBq/te of beta/gamma activity. This definition is a general definition which does not relate to specific disposal sites.

- **Very Low Level Radioactive Waste (VLLW)**, a sub-category of LLW is 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.

  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”.

  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.

Most of the radioactive waste that arises in the United Kingdom originates from the nuclear power industry. This includes waste from the manufacture of fuel, reactor operations, decommissioning, spent fuel reprocessing and related research and development activities. Waste also arises from the defence programme, of which the major components are nuclear weapons production and the nuclear submarine
propulsion programme. In addition, many medical, industrial, educational and research establishments produce small quantities of radioactive waste.

The 2007 UK Radioactive Waste Inventory recorded that approximately 3.84 million m$^3$ of radioactive waste existed as at 1 April 2007 or was predicted to arise from the future operation of existing facilities. Of this 3.47 million m$^3$ was LLW, 364,000 m$^3$ was ILW and 1420 m$^3$ was HLW.

3.2 Waste management strategy

3.2.1 Managing Radioactive Waste Safely

In 2001 the Government initiated the Managing Radioactive Waste Safely (MRWS) programme. The aim was to find a practicable solution to the UK’s higher activity wastes that achieved long-term protection of people and the environment, inspired public confidence and ensured effective use of public monies. To assist the MRWS process and make recommendations, the Government set up an independent Committee on Radioactive Waste Management (CoRWM) in November 2003.

In October 2006 the Government accepted CoRWM’s recommendations on geological disposal, coupled with safe and secure interim storage for legacy wastes. It also supported the recommendation to explore how a site selection approach based on voluntarism (an expression of interest by local communities in hosting a facility) and partnership with local communities could work in practice. As the next stage in the MRWS programme, in June 2007 the UK Government and devolved administrations for Wales and Northern Ireland consulted on proposals for the way in which a site will be chosen for the long-term disposal of higher activity radioactive waste.

On 12 June 2008 the UK Government and the devolved administrations for Wales and Northern Ireland published the Managing Radioactive Waste Safely White Paper (policy statement) (copy available at www.defra.gov.uk/environment/radioactivity/mrws/index.htm). Local Authorities in England were invited to enter into discussions with Government, without commitment, about hosting a geological disposal facility. Welsh authorities were informed, and may choose to enter into discussions, though their Government is currently neutral on geological disposal. The Scottish Executive is not a sponsor of the MRWS programme but continues to support long-term interim storage for higher activity radioactive waste and an on-going programme of research and development.

The Managing Radioactive Waste Safely White Paper sets out the technical programme to design and deliver a geological disposal facility and the process and criteria to be used to decide the siting of a facility. The key issues included were:
- the approach to compiling and updating the UK Radioactive Waste Inventory and using it as a basis for discussion with potential host communities;
- the Nuclear Decommissioning Authority’s technical approach for developing a geological disposal facility, including the use of a staged implementation approach and ongoing research and development to support delivery;
- the arrangements to ensure sound regulation, scrutiny and control of the geological disposal facility;
- the process for issuing invitations and providing information to communities;
- how a partnership arrangement can be used to support a voluntarism approach;
- the use of affordable and value for money Engagement and Community Benefits Packages as part of the voluntarism and partnership approach;
- the initial sub-surface screening criteria and the way in which Government will apply these criteria;
- a refined set of criteria for assessing and evaluating candidate sites and details of further consultation on the way in which these criteria should be applied.
To date 3 local authorities have expressed an interest in enter into without commitment discussions with Government about the possibility of hosting a geological disposal facility for higher activity waste at some point in the future. These discussions are continuing.

In June 2007 the Scottish Government announced its policy for higher activity radioactive wastes is to support “near surface, near site long-term storage facilities where the waste is monitorable and retrievable and the need for transporting it over long distances is minimal.” The Scottish Government is developing a Detailed Statement of its policy on which it will consult in Autumn 2009.

3.2.2 Low-level waste policy review

In 2007 the government issued a UK policy for managing solid low level radioactive waste setting out priorities for managing existing and future wastes from the nuclear energy industry and other sources. The Nuclear Decommissioning Agency (NDA) develop and publish a plan for the optimal use of the country’s existing LLW repository near Drigg, Cumbria, which must include an assessment of when a future replacement might be required.

LLW management plans must take into account current and future quantities of LLW, and their radiological and non-radiological properties. Plans must be based on a risk-informed approach, to ensure safety and protection of the environment. Waste managers must seek to minimize waste through steps including waste avoidance, volume reduction, recycling and re-use. Plans must be based on an assessment of all practicable options for long-term waste management.

On the 5th of June 2009 the NDA launched a consultation for the draft strategy for the Management of Solid Low Level Radioactive Waste from the UK Nuclear Industry. The proposed strategy will provide continued capability and capacity for the safe, secure and environmentally responsible management and disposal of LLW in the UK, for both the nuclear and non-nuclear industries through:

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

3.3 Waste management issues at national level

The UK Government sought views on its proposed approach to site selection based on voluntarism and partnership in the Managing Radioactive Waste consultation June – November 2007. Taking account of the comments received, the UK Government decided to issue a public invitation to communities to express an interest in taking part in the siting process at the same time as the publication of the White Paper. The UK Government worked with the devolved administrations for Wales and Northern Ireland and the Nuclear Legacy Advisory Forum (NuLeAF) (a Special Interest Group of the Local Government Association) to publicise the invitation widely at the outset, particularly within local government. The UK Government continues to review what further activities to raise awareness of the invitation may be needed.

Recognising the need to provide potentially interested communities and others with accessible information on geological disposal, the UK Government worked with other sponsors of the White Paper

47 At the time of writing the draft strategy and the environmental and sustainability report which underpins it are both available from www.nda.gov.uk.
and NuLeAF to set up a dedicated website for the MRWS Programme. This provides or links to detailed information on radioactive waste and its long-term management and is intended to be accessible to people with all levels of background knowledge.

3.4 Research and Development

3.4.1 Research infrastructure

Research and development on radioactive waste management is carried out by a number of organisations in the UK. The main ones and the areas covered are:

- The NDA is responsible for carrying out research to underpin its activities. This responsibility is being carried both through direct funding, and co-ordinating work programmes of others. To help with this role a Research Board on Decommissioning and Clean-up in the UK is being established. This is discussed in more detail in section 4.4.

- NDA fund and co-ordinate research into the long-term management of wastes, including the behaviour of waste forms. Much of the work involves international collaboration.

- HSE co-ordinate a wide-ranging programme, most of which is funded by waste producers.

- The Environment Agency’s radioactive waste research and development programme focuses on requirements for the regulatory aspects of radioactive waste disposal within the Agency’s broad remit for environmental protection.

- SEPA has a small research budget, to fund research directly. SEPA also provides funding to the Scotland and Northern Ireland Forum of Environmental Research (SNIFFER) to support research projects in co-operation with other government bodies and regulators.

- Defra research funding addresses aspects such as radioactive waste inventory, contaminated land and radon.

- Nuclear site operators carry out research (over and above the HSE co-ordinated programme) into various aspects concerned with the management of their own wastes, including wasteform characterisation, retrieval and treatment.

National Nuclear Laboratory

In July 2008 the Government announced the formation of a National Nuclear Laboratory based around the capability already previously in Nexia Solutions Ltd signalled its commitment to protect the UK’s national nuclear technology capability. Following this in March 2009, the UK Government announced that a consortium made up of Serco, Battelle and the University of Manchester was the preferred bidder in a competition to manage the National Nuclear Laboratory.

The National Nuclear Laboratory is already supporting that commitment by employing a strategy that proactively sustains and develops nuclear technology skills to deliver for customers and maintain capabilities of strategic national importance.
National Nuclear Laboratory operates at six locations in the UK:

- Sellafield and Workington in Cumbria
- Springfields in Lancashire
- Risley in Cheshire
- Harwell in Oxfordshire
- Stonehouse in Gloucestershire

The National Nuclear Laboratory will also continue to build relationships with academia and strengthen the quality of nuclear related skills coming into the industry via our University Research Alliances (URAs) with the University of Manchester, Sheffield University and Leeds University.

3.4.2 Contents of R&D plans

NDA research in support of its decommissioning mission is described in section 4.4. However the NDA also has responsibility for delivering a focused Research & Development programme to support geological disposal and optimised packaging solutions.

In June 2008 the NDA published a Research and Development Strategy to Underpin Geological Disposal of Higher-activity Radioactive Wastes. While there is sufficient research work available to be confident that geological disposal is technically achievable, this strategy sets out further research during the geological disposal facility development process that will

- refine concepts;
- improve understanding of chemical and physical interactions in a disposal facility;
- address specific issues raised by regulators;
- support development of site-specific safety cases; and
- optimise facility design and delivery.

3.5 Financing of Radioactive Waste Management

3.5.1 Framework and responsibilities

3.5.2 Status of financing schemes

Please see section 4.5 for details of funding for waste management and decommissioning.

4. DECOMMISSIONING STRATEGY AND CURRENT PRACTICE

4.1 Decommissioning strategy

The Nuclear Decommissioning Authority (NDA) was set up in 2005 to take responsibility for the decommissioning and clean up of the UK’s civil public sector nuclear sites previously owned and operated by British Nuclear Fuels Plc (BNFL) and the United Kingdom Atomic Energy Authority, (UKAEA). These sites are operated under contract to the NDA. The intention is to introduce competition into the

48 More information on the NNL is available from www.nnl.co.uk.
management and operation of the NDA sites as a means of improving contractor performance and providing better value to taxpayers who are funding the decommissioning and clean up programme. To date the management of the LLWR and Sellafield have been successfully competed.

The NDA developed a national Strategy for how it will undertake its mission, including decommissioning and clean up, which was approved by government in 2006.49 The NDA also annually produces a three year rolling Business Plan which sets out how the NDA intends to implement this strategy in the short terms and the allocation of resources across its estate.

This business plan reflects site operators lifetime plans, which the NDA requires be underpinned by integrated and optimised waste strategies to ensure the ongoing need for waste treatment and disposal routes to support the delivery of these plans is identified and addressed. The NDA’s Annual Report and Accounts provides details of how the NDA budgets are spent.50

4.2 Status of decommissioning projects

The NDA has responsibility for the decommissioning of the UK’s publicly owned civil nuclear sites. The NDA is responsible for 19 designated former UKAEA and BNFL facilities:

- Sellafield - a large, complex nuclear chemical facility that has supported the nuclear power programme since the 1940s, and has undertaken work for a number of organisations including United Kingdom Atomic Energy Authority (UKAEA) and the Ministry of Defence (MoD). Operations at Sellafield include processing of fuels removed from nuclear power stations; Mixed Oxide (MOX) fuel fabrication; and storage of nuclear materials and radioactive wastes alongside decommissioning.
- Dounreay – established in the mid-1950s as a research reactor site with fuel production and processing facilities. There were three reactors, the last of which ceased operation in 1994. These facilities are currently undergoing decommissioning and it is anticipated the site will reach its interim end state in around 2025.
- Harwell - established in 1946 as Britain’s first Atomic Energy Research Establishment. The site accommodated five research reactors of various types. Decommissioning is well underway – two of the reactors have been completely removed, and the fuel has been removed from the remaining three which are now being decommissioning. More than 100 other facilities have been removed from the site and others are being decommissioned. It is expected that decommissioning will be completed around 2025.
- Winfrith - established by the UKAEA in 1958 as an experimental reactor research and development site. During its history, eight research reactors of various types have operated on the site. Six of the reactors have been removed from the site; the two remaining have had fuel removed and are in various stages of decommissioning. Parts of the Winfrith site have been delicensed and it is expected that the remaining decommissioning will be completed by around 2018.
- Springfields - established in the mid 1940s the site manufactures nuclear fuel products for the UK’s nuclear power stations and for international customers. Fuel manufacture is

49 This is available from www.nda.gov.uk along with information on further strategy development which will inform the required five yearly of NDA’s strategy which will conclude in 2010/2011.


51 More information on these sites and the decommissioning plans is available from www.nda.gov.uk and in the NDA’s Strategy.
scheduled to continue until 2023. In parallel with ongoing fuel manufacture, Springfields is also decommissioning redundant facilities on the site.

- Capenhurst - a uranium enrichment plant and associated facilities that ceased operation in 1982 and decommissioning is advanced. The site currently also has an ongoing role in storing nuclear materials.
- Low Level Waste Repository near Drigg - 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. Plutonium Contaminated Materials have been removed from the site for long-term storage at nearby Sellafield.
- 11 Magnox reactor power stations which were first connected to the national grid between 1956 and 1971. The two most modern, Oldbury and Wylfa continue to generate electricity while the remaining 9 are undergoing de-fuelling and decommissioning having shut down between 1989 and 2006. It is currently planned that these sites will be placed into an extended period of care and maintenance following the removal of ancillary plant and the retrieval of operational wastes prior to final dismantling of the reactors themselves and the consignment of higher activity wastes.

As a result of the solvent restructuring of British Energy (BE) in 2002-05 the NDA is also charged with oversight of BE’s nuclear liabilities associated with its current fleet of 7 AGR and 1 PWR power stations. This is because the Government have underwritten the funding of such liabilities in the event that the segregated decommissioning fund runs out. Under this BE, as the owner and licensee, are responsible for developing strategies and plans and the execution of decommissioning work, including ensuring the resultant wastes are acceptable for disposal. The NDA’s role is to ensure that these represent value for money, that no funds go to supporting BE’s commercial business. BE are currently planning for the decommissioning of their sites but as yet no station has moved into the pre-closure phase.

Information on the expected arising of radioactive waste from nuclear operations and decommissioning within the UK is presented in the UK Radioactive Waste Inventory. Current volumes of LLW expected to arise over the next century are currently estimated to exceed anticipated capacity in the national Low Level Waste Repository near the village of Drigg in Cumbria and this is one of the key drivers for the development of UK Strategy for the management of solid LLW from the nuclear industry described in section 3.3.

4.3 Decommissioning issues at national level

In the UK, decommissioning on a licensed nuclear site is regulated by HSE under the nuclear site licensing regime. All the conditions attached to the licence apply to decommissioning activities. For decommissioning, the key element is the need for strategic planning. Licence Condition 35, which requires the licensee to make and implement adequate arrangements for the decommissioning of any plant that may affect safety, also requires the licensee to have decommissioning programmes. HSE has the power to direct the licensee to commence decommissioning in the interests of safety.

In consultation with the environment agencies, HSE carries out five yearly (‘quinquennial’) reviews (QQR) of licensees’ decommissioning strategies to ensure that they remain soundly based as circumstances change. When the QQR has been completed, HSE prepares and issues, in consultation with the environment agencies, a public statement. In addition, EIADR99 requires HSE to consult the public before it gives its consent to the commencement of dismantling and decommissioning of power reactors.

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32 This inventory is updated periodically and the latest version - the 2007 inventory is available from www.nda.gov.uk/ukinventory.
A nuclear licensed site cannot be delicensed until HSE is satisfied that there is no danger from ionising radiation. Decommissioning is the process to achieve this end.

4.4 Research and development

4.4.1 Research Infrastructure

The NDA promotes and, where necessary, funds generic research relevant to the NDA mission. This funding is done either indirectly, via our Site Licence Companies (SLCs), or directly via either its Direct Research Portfolio (DRP) or RWMD’s R&D department. The majority of the R&D is carried out by the SLCs and their supply chain. The DRP funds research which either informs strategy development or answers a generic multi-site issue, typically associated with encouraging innovation or maintaining key technical skills relevant to the NDA mission. All research projects are aligned with strategy topics from the NDA Strategy Management System. In 2007/2008 direct funding of R&D by the DRP was £8.4million.

The NDA also requires that the Lifetime Plans developed by the operators of its sites are technically underpinned and that any R&D gaps are identified. This is demonstrated by the Technical Baseline and Underpinning Research and Development document produced by each site. The NDA also promotes the sharing of information and good practice by means of the Nuclear Waste Research Forum (NWRF) and its associated sub-groups. A National R&D Board which includes key stakeholders (e.g. Government, Research Councils, Regulators) and independent members provides governance of the overall process.

The NDA has a relationship with a number of R&D supply chain organisations. In particular, the NDA engages with the National Nuclear Laboratory to coordinate the retention of key technical skills to support the NDA’s mission on decommissioning and clean-up.

4.4.2 Contents of R&D plans

The NDA Direct Research Portfolio (DRP) is organised into four areas:

- University Interactions
- Waste Processing
- Materials Characterisation
- Actinides and Strategic Nuclear Materials

The first area, University Interactions, is concerned with maintaining key technical skills and encouraging innovation from within Universities. The other three areas are concerned with improving the technical baseline of existing strategies and technically underpinning alternative strategies. Overall the portfolio covers a wide range of projects ranging from fundamental understanding of the long-term stability of waste forms to developing processes to remove waste heels from redundant reaction vessels. Major current research projects include investigating alternative encapsulants for problematic wastes, improving the segregation of contaminated soils and building rubble during clean-up operations and investigating the options for the reuse or disposal of the UK’s plutonium stock.

The NDA recently held a technology demonstration competition with the supply chain to demonstrate technologies that have the potential to be of benefit across the NDA’s mission. The contract was awarded to TWI, a Cambridge-based materials engineering specialist, to investigate how modern high power lasers can be used to remove contaminated surfaces of concrete and cut up metal pipe work and process vessels.
4.5 Financing

4.5.1 Framework and responsibilities

Each operator is expected to produce and maintain a decommissioning strategy and plans for its sites, and this is a requirement under nuclear site licences. Such strategy should take into account all relevant factors, assessing and presenting them in a transparent way underpinned by objective information and arguments. These include the need to providing adequate funding.

The NDA has responsibility for contracting the operation of commercial and waste management operations on designated sites and for the eventual decommissioning of those sites. The current estimate for the cost of the clean-up programme for these sites is around £70 billion and the programme is likely to take over 100 years to complete. NDA is exploring ways in which the cost can be reduced and the timescales shortened, whilst still maintaining safety, security and environmental standards.

The NDA is funded directly by UK Government and from income from commercial operations such as electricity generation, fuel fabrication and spent fuel management on its sites. Initially the revenue from commercial operations made up approximately half of the NDA’s total budget although this proportion will reduce over time as operational facilities enter decommissioning.

At £8.44 billion over the three years from 2008/09 to 2010/11, the NDA budget includes the highest ever level of Government spending on nuclear decommissioning.

British Energy’s (BE’s) liabilities associated with it existing nuclear fleet is funded from two sources, the arrangements for which were established as part of the solvent restructuring of BE in 2002-05:

- In respect of management of spent AGR fuel loaded into its reactors prior to its restructuring on 14 January 2005 and covered under historic contracts with BNFL (now the NDA), payments are made by the Department of Business, Innovation and Skills (BIS) under the terms of the Historic Liabilities Funding Agreement (HLFA);

- In respect of decommissioning of its existing power stations (including waste disposal), certain spent fuel management services beyond the scope of the historic contracts, and for Sizewell B spent fuel beyond the status quo at the time of restructuring, costs are met from the Nuclear Liabilities Fund (NLF). This is set out in the Nuclear Liabilities Funding Agreement (NLFA) and the Contribution Agreement. In the event that the NLF runs out of money then Government will contribute. The NLF is ring-fenced from Treasury and NDA and is administered by 5 Trustees, two selected by BE and three by Government. The fund currently stands at c. £8bn comprised of (i) contributions made by BE prior to its restructuring, (ii) contributions since restructuring, (iii) the proceeds from the sale of Government’s shareholding in BE. These funding arrangements were accepted by the Competition Commission at the time of BE’s restructuring.

4.5.2 Status of financing schemes

The NDA requires its sites to develop Lifetime Plans describing the work to be undertaken by its contractors. These plans cover the work required to operate and decommission these sites and are used to inform the total liabilities for which the NDA is responsible and the expected expenditure profile associated with NDA’s decommissioning programme.

The NDA also acts on behalf of the Secretary of State for Energy and Climate Change in providing oversight of BE’s planning-for and execution of the discharge of those of its liabilities covered under the NLFA. This is in order to minimise Government’s exposure in the event that the existing fund, the NLF,
runs short. Essentially the NDA treats BE in a similar manner to its own sites, noting that BE is the owner and license and thus responsible for the discharge of its liabilities. The NDA is responsible for authorising the associated decommissioning plans and approving all payments from the NLF.

ACRONYMS AND ABBREVIATIONS

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<thead>
<tr>
<th>ACRONYM</th>
<th>DEFINITION</th>
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<tbody>
<tr>
<td>AGR</td>
<td>Advanced gas cooled reactor</td>
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<td>BAT</td>
<td>Best available technologies</td>
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<td>BE</td>
<td>British Energy plc</td>
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<tr>
<td>BERR</td>
<td>Department for Business, Enterprise and Regulatory Reform (Formerly DTI, now Department of Business, Innovation and Skills (BIS))</td>
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<tr>
<td>BIS</td>
<td>Department of Business, Innovation and Skills</td>
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<td>BNFL</td>
<td>British Nuclear Fuels plc</td>
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<td>BPEO</td>
<td>Best practicable environmental option</td>
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<td>BPM</td>
<td>Best practicable means</td>
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<td>BSS Directive</td>
<td>EC Basic Safety Standards Directive 96/29/Euratom</td>
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<td>CoRWM</td>
<td>Committee on Radioactive Waste Management</td>
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<td>DECC</td>
<td>Department of Energy and Climate Change</td>
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<td>Defra</td>
<td>Department for Environment, Food and Rural Affairs</td>
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<td>DFT</td>
<td>Department for Transport</td>
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<td>DGD</td>
<td>Dangerous Goods Division (of DTI)</td>
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<td>DOENI</td>
<td>Department of the Environment, Northern Ireland</td>
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<td>DRP</td>
<td>Direct research portfolio</td>
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<td>Department of Trade and Industry (replaced in June 2007 by BERR)</td>
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<td>DPW</td>
<td>Department for Work and Pensions</td>
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<td>EA95</td>
<td>The Environment Act 1995</td>
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<td>EC</td>
<td>European Commission</td>
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<td>EIA</td>
<td>Environmental impact assessments</td>
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<td>EIAADR99</td>
<td>Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulation 1999</td>
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<td>Environment Agency (EA)</td>
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<td>EPA90</td>
<td>Environmental Protection Act 1990</td>
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<td>EU</td>
<td>European Union</td>
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<td>Government</td>
<td>The UK Government and the devolved administrations, unless stated otherwise</td>
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<td>HASS Regulations</td>
<td>High-activity Sealed Radioactive Sources and Orphan Sources Regulations 2005</td>
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<td>HSE</td>
<td>Health and Safety Executive</td>
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<td>HLV</td>
<td>High Level Waste</td>
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<td>HSWA74</td>
<td>Health and Safety at Work etc. Act 1974</td>
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<td>IAEA</td>
<td>International Atomic Energy Agency</td>
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<td>ICRP</td>
<td>International Commission on Radiological Protection</td>
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<td>ILW</td>
<td>Intermediate Level Waste</td>
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<td>IRR99</td>
<td>Ionising Radiations Regulations 1999</td>
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<td>LLW</td>
<td>Low Level Waste</td>
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<td>LLWR</td>
<td>Low Level Waste Repository</td>
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<td>MHSW99</td>
<td>The Management of Health and Safety at Work Regulations 1999</td>
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<td>MoD</td>
<td>Ministry of Defence</td>
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<td>MoU</td>
<td>Memorandum of Understanding</td>
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<td>MOX</td>
<td>Mixed-oxide fuel</td>
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<td>MRWS</td>
<td>Managing Radioactive Waste Safely</td>
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<td>mSv</td>
<td>milliSieverts</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>ND</td>
<td>Nuclear Directorate (a part of HSE)</td>
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<td>NDA</td>
<td>Nuclear Decommissioning Authority</td>
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<td>NIA65</td>
<td>Nuclear Installations Act 1965 (as amended)</td>
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<td>NI</td>
<td>Northern Ireland Government</td>
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<tr>
<td>NIEA</td>
<td>Northern Ireland Environment Agency</td>
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<td>NII</td>
<td>Nuclear Installations Inspectorate (a part of HSE's Nuclear Directorate)</td>
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<td>NLF</td>
<td>Nuclear liabilities Fund</td>
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<td>NLFA</td>
<td>Nuclear Liabilities Funding Agreement</td>
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<td>NPP</td>
<td>Nuclear Power Plant</td>
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<td>NRPB</td>
<td>National Radiological Protection Board</td>
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<td>NuLeAF</td>
<td>Nuclear Legacy Advisory Forum</td>
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<td>OCNS</td>
<td>Office for Civil Nuclear Security (a part of HSE's Nuclear Directorate)</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
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<tr>
<td>OSPAR</td>
<td>The Convention for the Protection of the Marine Environment of the North East Atlantic (the “OSPAR” Convention), 1992</td>
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<td>QQR</td>
<td>Five yearly (‘quinquennial’) review</td>
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<td>REPPIR</td>
<td>Radiation (Emergency Preparedness and Public Information) Regulations 2001</td>
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<td>RIFE</td>
<td>Radioactivity in Food and the Environment</td>
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<td>SEPA</td>
<td>Scottish Environment Protection Agency</td>
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<td>Scottish Government</td>
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<td>SLC</td>
<td>Site Licensee Company</td>
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<td>SNIFTER</td>
<td>Scotland and Northern Ireland Forum of Environmental Research</td>
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<tr>
<td>Thorp</td>
<td>Thermal Oxide Reprocessing Plant, at Sellafield</td>
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<tr>
<td>TOR</td>
<td>Tolerability of Risk</td>
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<tr>
<td>UK</td>
<td>United Kingdom of Great Britain and Northern Ireland</td>
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<td>UKAEA</td>
<td>United Kingdom Atomic Energy Authority</td>
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<td>UK Radioactive Waste Inventory</td>
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<td>University Research Alliances</td>
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<tr>
<td>VLLW</td>
<td>Very Low Level Waste</td>
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<tr>
<td>WAG</td>
<td>Welsh Assembly Government</td>
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<tr>
<td>WAGR</td>
<td>Windscale Advanced Gas-cooled Reactor</td>
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