



Department
of Energy &
Climate Change

UNITED KINGDOM'S NATIONAL
REPORT ON COMPLIANCE
WITH EUROPEAN COUNCIL
DIRECTIVE
(2011/70/EURATOM)

August 2015

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Executive Summary

This report has been prepared by the United Kingdom (UK) to meet the requirement of Article 14.1 of the European Council Directive 2011/70/Euratom (Directive establishing a community framework for the responsible and safe management of spent fuel and radioactive waste ('the Directive')). ENSREG has produced guidance on the format of reports to demonstrate compliance, which is used as the basis for this report. As identified in the ENSREG guidance, the report explains UK implementation of Articles 4 to 10 of the Directive. Articles 11 and 12 are addressed by the production of the UK's National Programme Lead Document.

This report provides information on the approach taken in the UK (through the implementation of Articles 4 to 10) to deliver the UK's National Programme.

The content of this report is based on current policies and approaches. As is required by the Directive should the current UK Government amend any existing policies or legislation that result in significantly different approaches the European Commission will be notified.

This report demonstrates the UK's implementation of the Directive through an approach that seeks to ensure continuous improvement to nuclear safety in the UK.

Chapter 1: Introduction

- 1.1. Article 14.1 of Council Directive 2011/711/Euratom [Ref 1] of 19th July 2011 establishing a community framework for the responsible and safe management of spent fuel and radioactive waste (the 'Directive') requires that:

“Member States shall submit a report to the Commission on the implementation of this Directive for the first time by 23rd August 2015, and every three years thereafter, taking advantage of the review and reporting cycles under the Joint Convention”.

- 1.2. This is the first UK report as required under Article 14 of the Directive. It demonstrates implementation of the Directive and how the objectives of that Directive are being fulfilled. The report is based on the guidelines for production of Member States' reports produced by ENSREG.
- 1.3. While covering the full scope of the UK's spent fuel and radioactive waste inventory this report places a greater focus on the higher hazard materials.

Current and potential sources of Spent Fuel and radioactive waste

- 1.4. The present-day UK nuclear industry reflects the UK's prominent role in the development of nuclear technology since the 1950s and in more recent times a policy to develop a new generation of nuclear power stations as part of the future energy mix in England and Wales.
- 1.5. The UK therefore has a diverse range of nuclear facilities relevant to the Directive, with a broad spread of locations, functions and lifetimes. The UK's nuclear programme therefore includes:
 - the operational and decommissioning power stations;
 - the operation of research facilities;
 - fuel manufacturing;
 - spent fuel storage and reprocessing; and
 - radioactive waste processing, storage and disposal facilities.
- 1.6. Radioactive substances have been, and continue to be, used in electricity generation, defence, industry, medicine and research & development. The last of these has been extensively used to support the expansion and improvement of nuclear power through, for example, new reactor types and various fuel cycles.
- 1.7. Additionally, the UK has had programmes for reprocessing spent nuclear fuel (both from UK reactors and from overseas customers) at the Sellafield and Dounreay sites (though it should be noted that the reprocessing programme at Dounreay has now ceased).
- 1.8. The UK also has other types of non-nuclear energy activities that generate radioactive waste and disused radioactive sources. For example; radioactive wastes produced at hospitals, educational facilities and other non-nuclear industries. While this report's primary focus is on arisings of radioactive waste

that occur from the UK's nuclear industry, due to the higher hazard levels, it also, where appropriate, seeks to cover waste from the non-nuclear sector.

Nuclear Sector

- 1.9. The Energy Act 2004 [Ref 2] created the Nuclear Decommissioning Authority (NDA) and gave it the responsibility for operating and decommissioning all the civil UK nuclear sites that were then in state ownership. It is responsible for 17 of the UK's 19 historical nuclear sites, their liabilities and assets, including the first generation of Magnox power stations [Ref 3], various research and fuel facilities, the Low Level Waste Repository (LLWR), and the largest, most complex site, Sellafield.
- 1.10. Reprocessing of spent fuel is undertaken at Sellafield. Sellafield is an extensive site with a wide range of facilities and buildings of varying age. There are over 80 facilities that hold a significant amount of nuclear material and radioactive wastes. The site was originally established to support the UK nuclear deterrent and civil nuclear reactor programmes and subsequently developed to reprocess reactor fuel and store radioactive waste.
- 1.11. The facilities range from very old (late 1940s) to more modern facilities. Sellafield is a major industrial complex which houses two principal reprocessing lines – one for oxide fuel and one for Magnox fuel. These lines require a significant number of other plants to prepare the fuel for reprocessing and to process and store the product from reprocessing and the waste streams. Sellafield has significant legacy plants and waste streams. There are also four Magnox reactors on the Sellafield site at Calder Hall, which are permanently closed and are being defuelled.
- 1.12. Dounreay was the UK's site for liquid sodium cooled fast reactors. Two fast reactors were built on the site – the Prototype Fast Reactor (PFR) and the Demonstration Fast Reactor (DFR). Both are permanently shut down. PFR has been defuelled, although there is still fuel in its pond. DFR is still in the process of being defueled. The Fuel Cycle Area (FCA) was used to reprocess fuel from the fast reactors on the site and is now permanently shut down and decommissioning. There is still some fuel in the FCA and the intent is to transfer this and fuel from the reactors to Sellafield.
- 1.13. The UK had two reactor research sites at Harwell and Winfrith, with research reactors at both sites. These have been closed for many years and some have been fully decommissioned. There are three reactors at Harwell and two at Winfrith that are currently being decommissioned.
- 1.14. The UK's last fusion research reactor to operate, the CONSORT II reactor, operated by Imperial College, was a low power (100 kW thermal) research reactor. It first achieved criticality in 1965 and permanently shut down in 2007. Decommissioning plans for the reactor are in an advanced state and defuelling of all fuel elements was completed in 2015 with eventual delicensing of the site planned for 2023.
- 1.15. Spent fuel is stored at many of the sites described above, including the reactor sites. When fuel is removed from the reactor core at the operational reactor sites it is stored in ponds, with the exception of Wylfa, which has dry fuel store cells. Where fuel is to be reprocessed, there can be significant amounts of fuel stored on site, depending on shipment schedules and the need for cooling before transportation. On the Magnox sites with shutdown reactors that are in the process of being defueled. The bulk of the spent fuel is stored in the reactor

and the inventory in the cooling ponds at any time is minimised. Spent fuel is also stored at Sellafield prior to being reprocessed.

- 1.16. All nuclear sites store radioactive waste. Waste at all sites other than Sellafield is either low level waste or intermediate level waste. Low level waste is transferred to the existing UK Low Level Waste Repository for disposal or may be managed *via* alternative routes depending on its material and/or radiological characteristics, e.g. disposal to a suitable permitted landfill site. Intermediate level waste is stored on site for future treatment and immobilisation during decommissioning. Such activities are underway on the decommissioning Magnox sites. Sellafield has a significant programme of waste immobilisation. High level waste requires continuous cooling and Sellafield is the only site which generates and stores this type of waste, which is in liquid form. Sellafield also has a programme for immobilisation of this waste stream.
- 1.17. The NDA sites are the current location of most of the radioactive wastes listed in the UK Inventory. As strategic authority, the NDA's core objective is to ensure that these sites are decommissioned safely, securely, cost-effectively and in ways that reduces the hazard and protects the environment. The NDA is the body that secures and allocates funding for decommissioning and clean-up of the UK civil, public-sector nuclear sites, including long-term radioactive waste management, working with a wide range of stakeholders in the UK and overseas to ensure that:
 - The right options are considered and chosen in line with relevant Government policy;
 - the right plans are in place for the long-term;
 - the right contract models incentivise the safest and most cost-effective clean-up;
 - the right skills and resources are available;
 - the right technology is developed;
 - local communities are supported during and after the clean-up mission.
- 1.18. The NDA's strategy is underpinned by a commitment to encourage the highest reasonably practicable standards of safety, security and environmental responsibility and an open and transparent approach to secure the support and trust of stakeholders.
- 1.19. Day-to-day management of the 17 sites for which the NDA is responsible is contracted out to individual Site Licence Companies (SLCs). As operators and holders of relevant licences and permits, the SLCs have prime responsibility for the safety of their sites. The role of the NDA is to ensure that the activities of the SLCs are consistent with NDA core objectives. Included in these arrangements is the Low Level Waste Repository (LLWR) the national disposal site for LLW which is owned by the NDA and operated on its behalf by a SLC.
- 1.20. Two of the original NDA sites - Springfields and Capenhurst – were subsequently sold to private enterprises to enable them to continue in operation and to expand the businesses (nuclear fuel manufacturing and enrichment) already being performed there while transferring the associated non-historical decommissioning liabilities from the NDA to the private sector.

- 1.21. Other major sources of radioactive waste are the privately operated nuclear power plants. These consist of seven Advance Gas-Cooled Reactors (AGR) and the one Pressurised Water Reactor (PWR) nuclear power plants, all of which were privatised in 1996 and are now owned by EDF Energy Nuclear Generation (EDFE). There are contracts in place under which the NDA takes ownership of the SNF produced by the AGR fleet. The PWR SNF will stay in the ownership of EDFE until it is finally disposed of in a Geological Disposal Facility (GDF). Similarly, all the radioactive waste produced by the operation and decommissioning of these plants remains the responsibility of EDFE until they are accepted for disposal.

UK's Nuclear "New Build" Programme

- 1.22. The UK envisages a new generation of nuclear power plants are to be built in England and Wales. Because these plants are still at the planning stage, the SNF and the radioactive waste that they will produce are not yet "committed". For that reason the waste does not appear in the current version of the UK Inventory. No nuclear new build is being proposed for Scotland or Northern Ireland.

Non-nuclear Sector

- 1.23. The non-nuclear industry is defined as those organisations that produce radioactive waste and are not part of the nuclear industry. Most non-nuclear industry organisations use radioactive materials as a vital part of their day-to-day operations. Other organisations process material that contains natural radioactivity, for instance the oil and gas extraction and mineral sands industries. Common to all of these organisations is that they generate waste containing radioactivity which requires management and that may be subject to regulation.
- 1.24. Future decommissioning of offshore Oil and Gas platforms will significantly increase the amount of naturally occurring radioactive material (NORM) waste needing to be managed. The UK is currently implementing the UK NORM waste strategy to help ensure that robust arrangements exist to ensure suitable management of such wastes in the future.

National programme

- 1.25. The activities that constitute the UK programme are well established and consist of a range of existing strategies, plans and approaches. Due to the complexity of the UK programme the UK have produced a 'lead document' which provides information and guidance on key supporting documentation that establishes the UK's programme. The production of this lead document meets the requirement of Article 12 of the Directive in that:

"The national programme together with the national policy may be contained in a single document or in a number of documents."

- 1.26. The UK's lead document is publically available on the Government website and has been submitted to the Commission along with this report.

Government and Regulatory bodies

- 1.27. Three devolved administrations for Scotland, Wales and Northern Ireland were established in the late 1990s. These devolved administrations are able to exercise powers in relation to certain areas, including environmental protection and radioactive waste management. This creates the potential for some differences in the way that certain categories of waste are managed across the

UK. While Northern Ireland has no nuclear facilities, radioactive waste arising from the non-nuclear sector is managed in line with UK Government and Devolved Administrations' policy for LLW.

- 1.28. When the term 'UK Government' is used in this document it refers to the Government at Westminster, responsible for all matters relating to England and for those matters where powers have not been conferred on Welsh Ministers or devolved to Scottish Ministers or to Northern Ireland Ministers and departments. Examples of reserved matters (excepted in relation to Northern Ireland) include nuclear security and nuclear safety.
- 1.29. The principal regulator of nuclear safety, nuclear security and the inland transport of civil radioactive is the Office for Nuclear Regulation (ONR). In England and each of the devolved administrations there is a dedicated environmental regulator (for England the Environment Agency (EA), for Scotland the Scottish Environment Protection Agency (SEPA), for Wales Natural Resources Wales (NRW) and for Northern Ireland the Northern Ireland Environment Agency (NIEA)). The environment agencies are each responsible for the regulation of the accumulation of radioactive substances and the disposal of radioactive wastes at all sites, with the exception of the accumulation of radioactive wastes at nuclear sites for which ONR is the regulator.
- 1.30. Two distinct pieces of key environmental legislation apply to the management of radioactive wastes in the different countries of the UK; the Radioactive Substances Act 1993 (RSA93) [Ref 21] in Scotland and Northern Ireland, and; the Environmental Permitting Regulations 2010 (EPR10) [Ref 20] in England and Wales. The practical effects of these two pieces of legislation are consistent. Consequently, the safety and environmental performance of all the activities covered by the Directive across the whole UK is managed to a consistent set of legal requirements, technical standards and associated regulatory expectations.

Department of Energy and Climate Change

- 1.31. The Department of Energy and Climate Change (DECC) and its Secretary of State and Ministers are accountable to Parliament for nuclear safety matters. In addition, DECC has a number of policy roles in respect of the nuclear industry. These include responsibility for energy policy generally (i.e the role of nuclear power) and for ensuring the nuclear safety framework remains appropriate, international treaties and conventions, as well as the international nuclear liability regime. It also has Governmental responsibility for those parts of the UK civil nuclear industry still owned by the Government. More generally DECC is responsible for UK radioactive waste policy.
- 1.32. Specifically, and relevant to this report, the UK Government is a contracting party to:
 - Convention on Nuclear Safety;
 - Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.
- 1.33. DECC is responsible for ensuring that the UK complies with these Conventions and relevant EU Directives. In carrying out its responsibilities, DECC will, where appropriate, seek information on nuclear safety-related matters from ONR and on environmental protection (including security of radioactive sources at non-nuclear sites) from the environment agencies of England, Scotland, Wales and Northern Ireland.

Nuclear Decommissioning Authority

- 1.34. The Nuclear Decommissioning Authority (NDA) is a Non-Departmental Public Body created under The Energy Act 2004. The NDA's sponsoring department is the Department of Energy and Climate Change (DECC) and, for matters affecting Scotland, has additional obligations to Scottish Ministers. NDA operates under a Management Statement and Financial Memorandum, which sets out the relationship between DECC, Scottish Government and the NDA.
- 1.35. NDA's core objective is to ensure that the historic civil public sector nuclear legacy sites are decommissioned safely, securely, cost effectively and in ways that protect the environment. As part of this, NDA is also required to scrutinise the site decommissioning plans of EDFE for their existing nuclear fleet; and, since October 2006, NDA has been the UK body responsible for implementing geological disposal of higher activity radioactive waste. NDA is also responsible for delivering the Low Level Radioactive Waste Strategy [Ref 10] for the whole of the UK's nuclear industry, which it published in 2010. This strategy was subsequently reviewed in 2014 and a revised strategy is scheduled to be published during 2015.
- 1.36. The Energy Act 2004 requires the NDA to review and publish its Strategy [Ref 4], at least every five years, to cover the duration of its mission and to summarise the current position at the time of publication. The next NDA Strategy is due to be published before the end of March 2016 and a consultation document published in September 2015. NDA delivers its mission through others, primarily Site Licence Companies (SLCs) which are licensed to operate its nuclear sites. Through competition NDA awards contracts in which the winning bidder the Parent Body Organisation (PBO) owns the Site Licence Company for the period of the contract.
- 1.37. NDA delivers its mission under strategic themes that provide a framework for government spent fuel and radioactive waste management policy to be delivered:
- *Spent Fuels* – The NDA inventory of spent nuclear fuels is diverse and consists of large quantities of Magnox and oxide fuels, with smaller quantities of non-standard fuel types referred to as 'exotic fuels'. Historically the UK's approach has been to reprocess spent fuel, but the facilities for this are ageing or, in some cases shut down. Some of the facilities have been operated on a commercial basis. NDA has published strategies for management of Magnox, oxide and exotic fuels [Ref 3; 5; 6]
 - *Nuclear Materials* - The UK holds large stocks of civil uranium and plutonium, much of which is managed by the NDA. All of the plutonium and most of the uranium in the UK arises from the reprocessing of spent fuel and some of these nuclear materials are foreign owned. The Site Licence Companies implement NDA's current strategy of continued storage on NDA's sites, whilst UK Government considers credible options for future management. NDA has published its strategy for plutonium and uranium [Ref 7; 8].
- 1.38. *Integrated Waste Management* – Strategic decisions about waste management are informed by the following key principles:
- risk reduction is a priority
 - centralised and multi-site approaches should be considered where it may be advantageous

- the waste hierarchy should be used as a framework for waste management decision making and enables an effective balance of priorities including value for money, affordability, technical maturity and the protection of health, safety, security and the environment.

1.39. NDA's strategy is to take a multi-site and UK-wide view, to include its own sites and the operations of other waste producers, including EDF Energy and MoD. The NDA's programme to develop a comprehensive Integrated Waste Management Strategy was published in 2012. Also, as noted in the Government's solid LLW Policy [Ref 9], the NDA is required to make LLW management [Ref 10] and disposal facilities available to other nuclear and non-nuclear industry producers of radioactive waste under appropriate commercial agreements. NDA also provides access for organisations across the UK to a Recognised Installation for the safe, secure management of high activity sealed sources pending disposal.

Radioactive Waste Management (RWM)

1.40. RWM was established as a wholly-owned subsidiary of the NDA on 1st April 2014 and is responsible for implementing Government policy on geological disposal of higher activity radioactive waste. As the developer of a GDF, RWM is responsible for safety, security and environmental protection throughout the lifetime of the programme. RWM's current work programme comprises three main activities:

- **Planning for implementation:** RWM is leading a national geological screening exercise as one of three initial actions being carried out to prepare for working with communities. From 2017, RWM will engage with communities to identify potential host sites.
- **Higher Activity Waste (HAW) Management;** RWM offers waste producer customers disposability assessments of proposals for packaging intermediate level waste for ultimate disposal in a GDF. RWM also provides strategic support to NDA and works proactively with waste owners to realise opportunities for the optimisation of the geological disposal system in combination with earlier phases of the waste management lifecycle. This is undertaken in order to minimise factors such as safety and environmental impacts, hazard, cost, risk and volume of waste to be managed in a geological disposal facility.
- **Science and Technology Programme;** RWM has an ongoing work programme to demonstrate that geological disposal of the UK inventory is feasible in a range of geological settings, support UK management of Higher Activity Wastes, and GDF siting activities, and develop and maintain RWM's scientific and technological capability.

Chapter 2: Implementation of the Articles of the Directive

Articles 1-3 – Subject, Scope and Definitions

- 2.1 Articles 1 to 3 of the Directive establish the subject, scope and definitions used and are reflected in the UK's implementation of the Directive. The active articles are 4-12 and the UK's implementation of them has been outlined below

Article 4 – General Principles

Article 4.1 – General Principles

Member States shall establish and maintain national policies on spent fuel and radioactive waste management. Without prejudice to Article 2(3), each Member State shall have ultimate responsibility for management of the spent fuel and radioactive waste generated.

- 2.2 UK policy for the management of radioactive waste was established by the Command Paper 2919 which established general provisions including those in relation to the import and export of radioactive waste, the policy on substitution, etc. However, the Command Paper, while in places still valid, has been superseded on specific policy by the following:

Implementing Geological Disposal: A framework for the long term management of higher activity radioactive wastes. In July 2014 the Government published a White Paper (which supersedes the 2008 White Paper Managing Radioactive Waste Safely: a Framework for Implementing Geological Disposal) that sets out the UK Government's framework for managing higher activity radioactive waste in the long term through geological disposal. This will be implemented alongside ongoing interim storage and supporting research. See: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332890/GDF_White_Paper_FINAL.pdf

Welsh Government Policy on the Management and Disposal of Higher Activity Radioactive Waste. In May 2015 the Welsh Government confirmed a policy for the geological disposal of HAW, and for spent fuel and other nuclear materials which may be declared as waste, as part of a joint programme with England and Northern Ireland. See: <http://gov.wales/docs/desh/policy/150519-policy-on-the-management-and-disposal-of-higher-activity-radioactive-waste-en.pdf>

Welsh Government Consultation: Geological Disposal of Higher Activity Radioactive Waste: Community Engagement and Implementation Processes. The Welsh Government is currently consulting on proposals for engaging with potential volunteer host communities in Wales. The consultation period is due to end in August 2015. The results of the consultation will inform the development of Welsh policy. See: <http://gov.wales/consultations/environmentandcountryside/geological->

[disposal-of-higher-activity-radioactive-waste-community-engagement-and-implementation-processes/?lang=en](#)

Consultation on an Implementation Strategy for Scotland's Policy on Higher Activity Radioactive Waste. This proposed Strategy has been prepared to support Scotland's Higher Activity Radioactive Waste Policy that was published in 2011. The document sets out how Scotland intends to deliver a policy of long-term management of higher activity radioactive waste. The strategy sets out key phases of work that will be undertaken to develop disposal options, alongside ongoing storage and supporting research. All storage and disposal options will be subject to robust regulatory control. See: <http://www.gov.scot/Publications/2014/12/8263>

Strategy for the management of Naturally Occurring Radioactive Material (NORM) waste in the United Kingdom (published July 2014) The strategy is designed to facilitate effective management of LLW arising from NORM. The key elements of the strategy are (i) to reform the regulatory framework to ensure it is clear, coherent and effective; (ii) to remove policy barriers to the development of a robust and efficient market for NORM waste management; and (iii) to support efforts by waste producers and the waste management supply chain to generate better data and information about current and future NORM waste arisings. See: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/335821/Final_strategy_NORM.pdf

UK Strategy for the Management of Solid Low-Level Radioactive Waste from the Non-Nuclear Industry in the UK (Anthropogenic radionuclides) (published 12 March 2012). The Strategy ensures, *inter alia*, that waste producers and regulators are aware of how regulations should be applied to this LLW from the non-nuclear industry, particularly the need for waste management plans, waste minimisation at source and use of the waste hierarchy. See: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48291/4616-strategy-low-level-radioactive-waste.pdf

Scotland's Higher Activity Radioactive Waste Policy 2011 (published in January 2011). Sets out the Scottish Government's Policy for the long term management of higher activity waste in Scotland. See: <http://www.gov.scot/Publications/2011/01/20114928/0>

Consultation on an Implementation Strategy for Scotland's Policy on Higher Activity Radioactive Waste. This proposed Strategy has been prepared to support Scotland's Higher Activity Radioactive Waste Policy that was published in 2011. The document sets out how Scotland intends to deliver a policy of long-term management of higher activity radioactive waste. The strategy sets out key phases of work that will be undertaken to develop disposal options, alongside ongoing storage and supporting research. All storage and disposal options will be subject to robust regulatory control. See: <http://www.gov.scot/Publications/2014/12/8263>

UK Strategy for the Management of Solid Low-Level Radioactive Waste from the Nuclear Industry (first published August 2010 by NDA). The NDA is responsible for maintaining and implementing the UK's national strategy for LLW from the nuclear industry. The Strategy targets the better application of the waste hierarchy to reduce the amount of solid LLW generated and hence

reduce the reliance on disposal, especially at the national LLW Repository (LLWR). See: <http://www.nda.gov.uk/publication/uk-strategy-for-the-management-of-solid-low-level-radioactive-waste-from-the-nuclear-industry-august-2010/> (N.B. Following a recent review a revised and updated edition will be published by DECC in 2015).

UK Policy on In March 2007 the long term management of solid LLW in the UK. The policy establishes the principle that a UK nuclear industry-wide LLW strategy be implemented to optimise the use of the Low Level Waste Repository (LLWR) and other suitable facilities for the disposal of LLW. See: <http://www.decc.gov.uk/media/viewfile.ashx?filepath=whatwedo/uk-energy-supply/energymix/nuclear/radioactivity/llw-policystatement070326.pdf&filetype=4>

Managing the Nuclear Legacy (published in July 2002). This White Paper includes the UK's policy for the management of spent fuel. See: <http://webarchive.nationalarchives.gov.uk/+http://www.dti.gov.uk/nuclearcleanup/ach/whitepaper.pdf> (N.B. shortly after this Report is submitted it is expected that a revised strategy will be published – this will be available on the NDA website at <http://www.nda.gov.uk>)

Article 4.2 – General Principles

Where radioactive waste or spent fuel is shipped for processing or reprocessing to a Member State or a third country, the ultimate responsibility for the safe and responsible disposal of those materials, including any waste as a by-product, shall remain with the Member State or third country from which the radioactive material was shipped.

- 2.3 This principle is delivered through the Transfrontier Shipment of Radioactive Waste and Spent Fuel Regulations 2008 (SI 2008/3087) [Ref 11] which transposes Council Directive 2006/117/Euratom [Ref 12] on the supervision and control of shipments of radioactive waste and spent fuel into, out of, or through the European Community.

Article 4.3 – General Principles

National policies shall be based on all of the following principles:

(a) the generation of radioactive waste shall be kept to the minimum which is reasonably practicable, both in terms of activity and volume, by means of appropriate design measures and of operating and decommissioning practices, including the recycling and reuse of materials;

- 2.4 This principle is delivered through the UK's general radioactive waste management policy which is based on the same principles as apply more generally to environmental policy. More specifically, radioactive wastes are managed and disposed of in ways which protect the public, workforce, and

the environment. Within this approach the UK's policy and regulatory framework aims to ensure that:

- (a) *“radioactive wastes are not unnecessarily created in accordance with the waste hierarchy;*
- (b) *wastes created are safely and appropriately managed and treated, and*
- (c) *they are then safely disposed of at appropriate times and in appropriate ways”*

Article 4.3 - National policies shall be based on all of the following principles:

(b) the interdependencies between all steps in spent fuel and radioactive waste generation and management shall be taken into account;

2.5 This is implemented through the following:

- Joint ONR, EA and SEPA guidance to nuclear site operators: “Fundamentals of the management of radioactive waste – An introduction to the management of higher-level radioactive waste on licensed nuclear sites”. [Ref 13]
- Production of a Radioactive Waste Management Case (“RWMC”) for higher activity wastes is a key recommendation of the joint guidance. The RWMC should indicate in summary form how the key elements of long-term safety and environmental performance will be delivered for the management of the waste stream or streams covered and demonstrate how interdependencies are taken account of among all steps in the generation and subsequent management of radioactive waste. [Ref 14]
- EA’s guidance Radioactive Substances Regulation SR RGN2 [Ref 15] “the regulation of radioactive substances on nuclear licensed sites” which requires operators to take an integrated approach to waste management including consideration of material that will become waste in the future over the lifetime of the facility. This information is also requested when an applicant first applies for an environmental permit.
- The role of the UK’s NDA’s RWM in advising licensees on the packaging and conditioning of higher-activity wastes. RWM undertakes disposability assessments to ensure that waste generators’ proposals for conditioning and packaging of radioactive wastes are consistent with current concepts for geological disposal. The EA, SEPA and the ONR make use of the output of the disposability assessments to assist them in regulating management of higher activity radioactive waste.
- The UK’s Low Level Waste (LLW) Policy (2007) [Ref 16] which requires nuclear operators to have a plan for the management of their low-level waste holdings and predicted future arisings that is part of a wider integrated waste management strategy, and is compatible with proposed end states. On non-nuclear sites, the management plans are proportionate to the scale of the

waste production and holdings, as agreed with the relevant environmental regulator.

Article 4.3 - National policies shall be based on all of the following principles:

(c) spent fuel and radioactive waste shall be safely managed, including in the long term with passive safety features;

- 2.6 License Conditions 23, 32 and 34 [Ref 64] establish the responsibilities of licensees for accumulation and disposal of spent fuel and radioactive waste and provide the ONR with the necessary tools to ensure that operators fulfil their duties to achieve these objectives.
- 2.7 Additionally, the UK's environment agencies' Guidance on Requirements for Authorisation provide the necessary framework for ensuring the environmental protection aspects are adhered to:
- for geological disposal [Ref 17]
 - for near-surface disposal [Ref 18]
- 2.8 These documents set out the requirements for the development of an environmental safety case for such disposals, including during operation and post-closure.

Article 4.3 - National policies shall be based on all of the following principles:

(d) implementation of measures shall follow a graded approach;

- 2.9 The UK's graded approach is implemented through the nuclear site licensing conditions under NIA65 [Ref 19]; the environmental permitting regime under EPR10 [Ref 20]; and, authorisations under RSA93 [Ref 21] for major nuclear facilities is consistent with the objectives of this Article. For non-nuclear facilities the graded approach is consistent with environmental permitting under EPR10 and authorisations under RSA93 and the exemptions provisions under EPR10/RSA93 for very low risk activities.

Article 4.3 - National policies shall be based on all of the following principles:

(e) the costs for the management of spent fuel and radioactive waste shall be borne by those who generated those materials;

- 2.10 The 'polluter pays' principle is a key component of UK environment policy. Specifically the UK's 2007 Policy for LLW establishes that waste managers, working on behalf of waste owners, are responsible for the safe and environmentally responsible management and disposition of specific radioactive wastes in accordance with regulatory requirements, and the funding thereof.
- 2.11 In Scotland the requirement under the Scottish HAW Policy requires that nuclear site operators in Scotland must make provision, including financial

provision, in their plans for the long-term management of the waste they produce.

- 2.12 The Energy Act 2008 [Ref 22] requires operators of new nuclear power stations to have secure funding arrangements in place to meet the full costs of decommissioning, waste management and disposal costs. Section 45 provides that operators must submit a Funded Decommissioning Programme (“FDP”) for the approval of the Secretary of State where they apply for a nuclear site licence to construct a nuclear installation. Breach of an FDP is a criminal offence.
- 2.13 The responsibility for the costs for the management of the spent fuel and radioactive waste arising from the UK’s civil nuclear legacy falls to the UK Government via the NDA which is sponsored by the Department of Energy and Climate Change. The NDA contracts with each Site Licence Company (SLC), the operators of the sites within its portfolio, to carry out decommissioning work. More detail on this issue is provided under Articles 5 and 9 covered later in this report.

Article 4.3 - National policies shall be based on all of the following principles:

(f) an evidence-based and documented decision-making process shall be applied with regard to all stages of the management of spent fuel and radioactive waste.

- 2.14 Nuclear site operators are required by the regulators as an integral part of the safety case to produce RWMCs. ONR, EA and SEPA have provided joint guidance on their expectations for a RWMC which should provide a summary on how the key elements of long-term safety and environmental performance will be delivered for the management of the waste stream or streams covered [Ref 23]. Permit holders are required to demonstrate the application of BAT (or in Scotland, BPEO / BPM) to the management and disposal of radioactive wastes.
- 2.15 The environmental permitting process under EPR10 and the authorisation process under RSA93, provide a documented decision-making process for disposals of radioactive waste from or on nuclear sites and for the accumulation and disposal of radioactive wastes from non-nuclear sites. There is supporting guidance on making applications and the EA’s requirements in relation to the management of waste (Radioactive Substances Regulation RGN2 for nuclear sites: RSR RGN3 for non-nuclear sites) [Ref 15].
- 2.16 The environment agencies’ guidance on requirement for authorisation (GRAs) include specific requirements for environmental safety cases for near-surface and geological disposal facilities.

Article 4.4 – National policies shall be based on all of the following principles:

Radioactive waste shall be disposed of in the Member State in which it was generated, unless at the time of shipment an agreement, taking into account the criteria established by the Commission in accordance with Article 16(2) of Directive 2006/117/Euratom, has entered into force between the Member State concerned and another Member State or a third country to use a disposal facility in one of them.

Prior to a shipment to a third country, the exporting Member State shall inform the Commission of the content of any such agreement and take reasonable measures to be assured that:

- (a) the country of destination has concluded an agreement with the Community covering spent fuel and radioactive waste management or is a party to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management ('the Joint Convention');*
- (b) the country of destination has radioactive waste management and disposal programmes with objectives representing a high level of safety equivalent to those established by this Directive; and*
- (c) the disposal facility in the country of destination is authorised for the radioactive waste to be shipped, is operating prior to the shipment, and is managed in accordance with the requirements set down in the radioactive waste management and disposal programme of that country of destination.*

2.17 The UK's general policy on the export and import of radioactive waste is set out in Command Paper 2919: Review of Radioactive Waste Management Policy (White Paper published July 1995) which states that the Government's general policy is that radioactive waste should not be imported to or exported from the UK except:

- For the recovery of reusable materials, provided that this is the genuine prime purpose;
- For treatment that will make its subsequent storage and disposal more manageable, in cases:
 - (a) Where the processes are at a development stage; or,
 - (b) Which involve quantities which are too small for the processes to be practicable in the country of origin.

2.18 Where such processes would add materially to the wastes needing to be disposed of in the UK the presumption should be that they will be returned to the country of origin. Additionally, waste may be imported for treatment and disposal in the UK:

- If it is in the form of spent sources which were manufactured in the UK; or,
- If it is waste from small users, such as hospitals, situated in:
 - (a) EC Member States which produce such small quantities of waste that the provision of their own specialised installations would be impractical;
 - (b) Developing countries which cannot reasonably be expected to acquire suitable disposal facilities.

- 2.19 This approach is further supported by the UK's 2007 Policy on LLW; and the Transfrontier Shipment of Radioactive Waste and Spent Fuel Regulations 2008 (SI 2008/3087) [Ref 11] which transpose Council Directive 2006/117/Euratom [Ref 1]. Regulation 12 establishes the criteria under which authorisations and consents for shipments of radioactive waste, including that arising from the processing of spent fuel, may be granted.
- 2.20 In addition, the UK is a Contracting Party to the Joint Convention which allows for the use of facilities in another Contracting Party in certain circumstances. The principles set out in the Joint Convention (Joint Convention INFCIRC/546 1997 [Ref 24] – Preamble, paragraph (xi) refers) are adhered to by the UK.

Article 5 – National Framework

Article 5 – National Framework

1. Member States shall establish and maintain a national legislative, regulatory and organisational framework ('national framework') for spent fuel and radioactive waste management that allocates responsibility and provides for coordination between relevant competent bodies. The national framework shall provide for all of the following:

(a) national programme for the implementation of spent fuel and radioactive waste management policy;

(b) national arrangements for the safety of spent fuel and radioactive waste management. The determination of how those arrangements are to be adopted and through which instrument they are to be applied rests within the competence of the Member States;

National Programme

- 2.21 Articles 11 and 12 specifically require that Member States have a National Programme for implementing their policies on the responsible and safe management of spent fuel and radioactive waste. The UK has a well-established and highly detailed programme, located in a number of different documents, and supported by the relevant legislative and regulatory framework. As a result, the UK Government and Devolved Administrations have produced a lead document to provide clarity on the UK approach. This lead document has been submitted along -side this report to the Commission for consideration. *Figure 5.1* illustrates the broad responsibilities of Government, competent bodies and generators in facilitating the delivery of a national programme for the safe management of spent fuel and radioactive waste as required under Article 5.1 (a) and (f).

Devolved Administrations

- 2.22 Three devolved administrations for Scotland, Wales and Northern Ireland were established in the late 1990s. These devolved administrations are able to exercise powers in relation to certain areas, including environmental protection and radioactive waste management. This creates the potential for some differences in the way that certain categories of waste are managed

across the UK. While Northern Ireland has no nuclear facilities, radioactive waste arising from the non-nuclear sector is managed in line with UK Government and Devolved Administrations' policy for LLW.

- 2.23 When the term 'UK Government' is used in this document it refers to the Government at Westminster, responsible for all matters relating to England and for those matters where powers have not been conferred on Welsh Ministers or devolved to Scottish Ministers or to Northern Ireland Ministers and departments. Examples of reserved matters (excepted in relation to Northern Ireland) include nuclear security and nuclear safety.

Principal legislation for nuclear installations

- 2.24 The Energy Act 2013 (TEA13) [Ref 25] is a principal part of the framework for the regulation of nuclear sites in the UK. It establishes ONR as a public corporation and defines its purposes and functions. It also allows ONR to appoint inspectors and defines their powers. The ONR has various regulatory powers and duties which are described in the TEA13. These duties include the enforcement of the relevant Statutory Provisions (RSPs), which are: Part 3 of the TEA13 and nuclear regulations made under it (including the Nuclear Industries Security Regulations 2003 [Ref 26] and 'Class 7' aspects of the Carriage of Dangerous Goods Regulations 2009 [Ref 27]); the Nuclear Safeguards Act 2000 [Ref 28]; and particularly, in the context of this report, sections 1, 3-6, 22 & 24A of the Nuclear Installations Act 1965 (NIA65) [Ref 19].
- 2.25 Health & Safety at Work Act (etc) 1974 (HSWA) [Ref 29] - sets out general safety requirements on all employers, and therefore covers safety aspects for workers dealing with spent fuel and radioactive waste.
- 2.26 Nuclear Installations Act 1965 (NIA65) [Ref 19] - ONR's nuclear site licensing powers are contained in NIA65 and are described in para 2.35 below. The ONR issues a Licence Condition Handbook setting out 36 standard licence conditions attached to nuclear site licences.
- 2.27 Licence conditions 32-34 establish the responsibilities of licensees for accumulation and disposal of spent fuel and radioactive waste. Coordination under the UK's national framework is ensured through section 3(1A) NIA65 by which the ONR is required to consult the environmental regulators before granting a nuclear site licence. Through section 3(6A), ONR is required to consult the appropriate agency before varying a nuclear site licence in respect of a site in Great Britain, if the variation relates to or affects the creation, accumulation or disposal of radioactive waste.
- 2.28 The Ionising Radiations Regulations 1999 (IRR99) [Ref 30] are a relevant statutory provision made under HSWA and provides for the protection of all workers and members of the public, whether on licensed sites or elsewhere, from ionising radiations. IRR99 implements aspects of the Basic Safety Standards Directive and implements Council Directive 90/641/Euratom [Ref 31] on the operational protection of outside workers exposed to risk of ionising radiation during their activities in controlled areas.
- 2.29 The safety aspects of radioactive waste management on nuclear sites are regulated by ONR, however, EA, NRW and SEPA are responsible for disposals which also form part of the overall safety arrangements. For non-

nuclear sites the safety of radioactive waste management is overseen by SEPA and NIEA under the Radioactive Substances Act 1993 (RSA93) [Ref 21], by EA and NRW under the Environmental Permitting (England and Wales) Regulations 2010 (EPR10) [Ref 20], and the Health and Safety Executive (HSE) under IRR99 [Ref 30].

- 2.30 Environment Act 1995 (EA95) [Ref 32] sets the basis for the regulatory framework with respect to environmental protection. It establishes the EA and SEPA together with their funding arrangements. EA95 provided for the transfer of certain functions to the EA, including powers and duties in relation to radioactive substances regulation. Section 2(1)(e) transferred functions of the Chief Inspector as they relate to England and Wales under RSA93 to the EA (these functions have now been transferred into EPR10). Section 21(1)(e) gave responsibility for the functions of the Chief Inspector for Scotland under the RSA 93 to SEPA. The Natural Resources Body for Wales (Establishment) Order 2012 established NRW as a new statutory body. The Natural Resources Body for Wales (Functions) Order 2013 transferred the functions of the Environment Agency to the new body.
- 2.31 Environmental Permitting (England and Wales) Regulations 2010 (EPR10) – replaced RSA93 in England and Wales but did not introduce any major changes in the scope or nature of radioactive substances regulation except provision of a new power to allow staged regulation of geological disposal facilities. EPR10 requires prior authorisation, in the form of an environmental permit, to dispose of radioactive waste, including that from nuclear installations. It also requires an operator to hold an environmental permit for the keeping and use of radioactive material (other than by nuclear sites licensees) and for the accumulation of radioactive waste (other than on nuclear licensed sites). EPR10 empowers the EA and NRW to attach limits and conditions to any environmental permit that it issues. It also provides powers to the EA and NRW to enable transfer and partial transfer of permits between operators.
- 2.32 Radioactive Substances Act (RSA93) applies in Scotland, and requires prior authorisation to dispose of radioactive waste, including that from nuclear installations. It also requires an operator (other than nuclear sites licensees) to hold an authorisation for the accumulation of radioactive waste. RSA93 empowers SEPA to attach limits and conditions to any authorisation that it issues.
- 2.33 Radioactive Substances Act (RSA93) also applies in Northern Ireland, and requires prior authorisation in the form of a certificate of authorisation, to dispose of radioactive waste. It also requires an operator to hold a certificate of registration for the keeping and use of radioactive material. RSA93 empowers the Chief Inspector to attach limits and conditions to any authorisation and/or registration issued. There are no powers to enable transfer and partial transfer of permits between operators.

Article 5.1 – National Framework

c) a system of licensing of spent fuel and radioactive waste management activities, facilities or both, including the prohibition of spent fuel or radioactive waste management activities, of the operation of a spent fuel or radioactive waste management facility without a licence or both and, if appropriate, prescribing

conditions for further management of the activity, facility or both;

(d) a system of appropriate control, a management system, regulatory inspections, documentation and reporting obligations for radioactive waste and spent fuel management activities, facilities or both, including appropriate measures for the post-closure periods of disposal facilities;

(e) enforcement actions, including the suspension of activities and the modification, expiration or revocation of a licence together with requirements, if appropriate, for alternative solutions that lead to improved safety;

Nuclear Safety Licensing

- 2.34 Figure 5.2 illustrates the regulatory licensing and permitting responsibilities within the United Kingdom. There are three key relevant licences/permits:
- the nuclear site licence, regulated by ONR;
 - the environmental permit (EP) regulated by EA (England) and NRW (Wales); and,
 - authorisations regulated by SEPA (Scotland) and NIEA (Northern Ireland).
- 2.35 Nuclear Site Licence - A nuclear site licence is required for operating certain kinds of nuclear installation in the civilian nuclear sector. Such installations include nuclear power stations, research reactors, nuclear fuel manufacturing and reprocessing, and the storage of radioactive matter in bulk (see the NIA65 and Nuclear Installation Regulations 1971 [Ref 33]). Under section 1(1) NIA65 it is prohibited to operate a nuclear installation without a licence and under section 1(7) any person who contravenes this prohibition is guilty of an offence. Contravention of Licence Conditions attached to a nuclear site licence is also an offence under section 4(10) NIA65.
- 2.36 Once granted, the nuclear site license is the principal and immediate method of statutory control over a licensee's operations. Licence Conditions define the areas of nuclear safety and radioactive waste management to which the licensee should pay attention to ensure safe operation of the site. While some conditions impose specific duties, others require the licensee to devise and implement adequate arrangements in particular areas. The issues covered range from arrangements for ensuring the safety of plant and for controlling operations to management issues such as radioactive waste management and the supervision and training of staff. The nuclear installation licensing system applies throughout the lifetime of a civil nuclear site including installation, commissioning, operation, and decommissioning.
- 2.37 Environmental permits (England and Wales) - EPR10 (regulation 12) contains the requirement to hold an environmental permit for a radioactive substances activity (as defined in the Regulations) and regulation 38 makes it an offence to operate without a permit or to contravene a permit. Schedule 23 contains the definition of 'radioactive substances activities' for which an environmental permit is required. Non-nuclear operators must hold an environmental permit for accumulation and disposal of radioactive wastes. Nuclear site licensees require an environmental permit for disposal of radioactive waste and for the keeping or use of mobile radioactive sources. Environmental permits for the disposal of radioactive waste include schedules addressing limitations and conditions, improvement and additional information requirements, and where

appropriate individual disposal routes. EPR10 does not prescribe specific disposal routes for solid radioactive wastes.

- 2.38 Authorisations (Scotland and Northern Ireland) – Under RSA93 section 32 (1) makes it an offence to accumulate or dispose of radioactive waste without an authorisation or to contravene any condition contained in the authorisation. Section 13 prohibits any person disposing of radioactive waste without an authorisation granted by SEPA or NIEA. Similar provisions exist in section 14 prohibiting the accumulation of radioactive waste outside of nuclear licensed sites without an authorisation from SEPA or NIEA.

Enforcement (Safety)

- 2.39 Under section 82 TEA13 [Ref 25] ONR is required to make adequate arrangements for the enforcement of the relevant statutory provisions (which include the system of nuclear site licensing under NIA65). ONR is an enforcing authority of the HSWA. HSWA is also used by the Health and Safety Executive to regulate the use of radioactive materials in the non-nuclear sector. Under both TEA13 and HSWA, inspectors may issue prohibition notices. A prohibition notice effectively permits an inspector to suspend activities where there is, or will be, a risk of serious personal injury. By issuing a prohibition notice, an inspector may direct that an activity (being an activity which, as carried on or likely to be carried on, involves/will involve a risk of serious personal injury) shall not be carried on until certain steps (set out in the notice) have been taken e.g. any identified breaches of the relevant statutory provisions have been remedied.
- 2.40 Under NIA65 [Ref 19] ONR has the power to attach Licence Conditions to sites and to enforce compliance with such Conditions. Under LC 31 ONR has the power to direct licensees to shut down any plant, operation or process on the site for such period as ONR may specify. Following a direction to shut down the plant the licensee will require consent from ONR to restart operations. Under section 4(1) NIA65 ONR is entitled to exercise its power to attach Licence Conditions to a licence not only when it is first granted but also at any time thereafter. Under section 4(5) ONR may also vary or revoke any licence conditions currently attached to a licence. These powers effectively allow ONR to modify the obligations with which a licensee must comply as part its licence. Under section 3(12) NIA65, ONR may from time to time vary a nuclear site licence by excluding from the licence any part of the licensed site which the licensee no longer needs for any use requiring such a licence provided that ONR is satisfied that there is no danger from ionising radiations from anything on that part of the site.
- 2.41 Under section 5(1) NIA65 ONR may at any time revoke a nuclear site licence and a licensee may at any time surrender a nuclear site licence. However such revocation or surrender does not relieve the licensee of its obligations in relation to the site (such obligations being enforceable by ONR and supported by criminal sanctions) until such time as ONR is satisfied that there has ceased to be any danger from ionising radiations from anything on the site or until a new nuclear site licence has been granted for the site.
- 2.42 In addition to the actions taken by ONR, HSE inspectors can also use the powers conferred by sections 20, 21 and 22 of the HSWA74 [Ref 29] to improve health and safety standards at non-nuclear sites.

Nuclear Safety Supervision

2.43 TEA13 and HSWA74 enable ONR to appoint inspectors and give them regulatory powers of inspection and investigation. ONR carries out its regulatory activities through consistent and proportionate regulation of nuclear safety by focusing on four core activities. These core activities reflect ONR's regulatory philosophy and are:

- securing sustained compliance;
- influencing improvements in safety;
- making balanced judgements; and,
- engaging with its stakeholders.

2.44 In order to achieve these core activities, ONR carries out interventions such as inspection, assessment and investigation to secure compliance or to permit certain activities. ONR also has a range of regulatory tools to help ensure compliance with national legislation. These include:

- Improvement notices - If an inspector is of the opinion that a relevant statutory provision or a licence condition has been contravened, and that contravention will continue or be repeated, the inspector can serve a notice that requires the contravention to be remedied. ONR has chosen to put in place administrative arrangements which require a corporate decision before any such notice can be issued;
- Prohibition notices - If an inspector is of the opinion that an activity is being or is likely to be carried out which risks causing serious personal injury, the inspector can serve a notice to prohibit the activity. In practice, this power is rarely used by ONR as there are more appropriate powers available under the LCs; and,
- Prosecution - In England and Wales, ONR and an inspector have the power to institute proceedings for an offence under TEA13, HSWA74 or any of the relevant statutory provisions, including appropriate parts of NIA65. In Scotland, an inspector can recommend to the Crown Office Procurator Fiscal's Service that a prosecution is initiated. Again, ONR's own administrative arrangements require a corporate decision to be made for the exercise of this power.

2.45 As well as placing requirements on the licensee, the standard 36 LCs [Ref 64] also include requirements for regulatory interactions between ONR and the licensees. These are used within specific LCs and provide ONR with the following powers:

- Direction - A direction is issued by ONR when it requires the licensee to take a particular action. For example, LC31(1) gives ONR the power to direct a licensee to shut down any plant, operation or process. Such a direction would relate to a matter of major or immediate safety importance.
- Specification - The standard LCs give ONR discretionary controls with regard to a licensee's arrangements and these are implemented through

specifications. For example, in LC23(2), if ONR specifies, the licensee is required to refer operating rules to its nuclear safety committee for consideration.

- Notification - The standard LCs give ONR powers to request the submission of information by notifying the licensee of the requirement. For example in LC21(8) the licensee shall, if notified by ONR, submit a safety case and shall not commence operation of the relevant plant or process without the consent of ONR.
- Consent - A consent is required before the licensee can carry out any activity which is specifically identified in the licence as requiring prior consent. For example, consent is required before a reactor is allowed to be started up again following its periodic shutdown. Before being granted a consent, the licensee must satisfy ONR that the proposed action is safe and that all procedures necessary for control are in place.
- Approval - An approval is used to freeze a licensee's arrangements. Once approved, the procedures cannot be changed without a further approval from ONR, and the procedure itself must be carried out as defined; failure to do so would infringe the licence condition and would be an offence. For example, for nuclear power stations, ONR has approved operating rules important to safety in order to ensure that licensees cannot change these without seeking ONR's approval of the change.
- Agreement - An agreement issued by ONR allows a licensee, in accordance with its own arrangements, to proceed with an agreed course of action. For example, LC22 requires a licensee to have adequate arrangements to control any modifications or experiment carried out on any part of the existing plant or processes which may affect safety. Such arrangements require that modifications or experiments are classified according to their safety significance and are divided into stages where appropriate. Hence, the licensee submits a safety case justifying the modification and cannot proceed until ONR has written agreeing to this proposal.

Environmental Regulators

- 2.46 EA95 allows EA and SEPA to investigate breaches of conditions or limits set in an environmental permit. The environmental regulators have the power to remove radioactive waste from any premises (sections 2(1)(h) and 2(2) for EA and NRW, and sections 21(i) and 21(2) for SEPA). In Wales, the EA's powers have been transferred to NRW.
- 2.47 EA and NRW have a range of powers under EPR10 [Ref 20] to take enforcement action. Regulations 20, 22(1) and 25 deal respectively with variation and revocation and surrender of an Environmental Permit. Regulations 36 and 37 give EA and NRW the power to issue Enforcement Notices and Suspension Notices. Under regulations 36 and 37, EA and NRW may specify the steps that must be taken to remedy the contravention/remove the risk when issuing an enforcement/suspension notice.
- 2.48 SEPA has a range of powers under RSA93 [Ref 21] to take action. Section 17 allows authorisation conditions to be varied or limitations in or revoking authorisations granted under section 13 or section 14 at any time. Section 21

gives the power to issue an Enforcement Notice requiring the holder of an authorisation granted under section 13 or section 14 to take steps to remedy matters constituting a failure to comply with the limitations or conditions. Under section 22 SEPA can issue a Prohibition Notice requiring the holder of an authorisation granted under section 13 or section 14 to take steps to remove a risk of imminent pollution of the environment or harm to human health. SEPA also has the power under this section to suspend the authorisation (wholly or partly).

- 2.49 NIEA has a range of powers under RSA93 to take action. Section 17 allows the Chief Inspector to revoke or vary an authorisation granted under section 13 or section 14 at any time. Section 21 enables the Chief Inspector to issue an Enforcement Notice if he is of the opinion that the person to whom the authorisation has been granted is failing to comply with or is likely to fail to comply with any limitation or condition in the authorisation. If the Chief Inspector is of the opinion that the continuing to carry out an activity involves an imminent risk of pollution of the environment or of harm to human health he may serve a Prohibition Notice to stop operations either completely or until appropriate actions are taken.

Regulatory inspection, documentation and reporting

- 2.50 Section 85 of TEA13 allows ONR to direct an inquiry in relation to any matter which it thinks necessary for the purpose of carrying out its functions. Under section 83 ONR may appoint inspectors and Schedule 8 sets out inspectors' powers including those to issue improvement and prohibition notices.
- 2.51 Section 108 of the EA95 contains the EA's, NRW's and SEPA's powers of entry and examination. These powers include a power to 'enter at any reasonable time (or, in an emergency, at any time and, if need be, by force) any premises which [a person duly authorised by one of the environmental regulators] has reason to believe it is necessary for him to enter'. Under EPR10, regulation 34 states that the regulator (EA or NRW) must make appropriate periodic inspections of regulated facilities. In Scotland, SEPA determines its frequency of regulatory inspections based upon the output of a Dynamic Regulatory Assessment Model and a Risk Assessment Tool.
- 2.52 Licence Condition 6 (included in nuclear site licences by the ONR using powers in the NIA65), requires the licensee to maintain adequate records to demonstrate compliance with the licence conditions. Licence Condition 25 requires that licensees make adequate records of operations, inspections and maintenance of any plant which may affect safety, including nuclear fuel and radioactive waste.
- 2.53 Regulation 60 under EPR10 gives the EA and NRW power to require persons to provide information for the purpose of carrying out their functions. Environmental Permits Condition 1 requires operators to maintain records demonstrating compliance with the permit; Condition 4.1 requires the operator to hold records; Condition 4.2 contains reporting requirements, and Condition 4.3 contains the requirement to notify EA or NRW of breaches of potential breakdown, contamination or breach of permit.
- 2.54 RSA93 Authorisations Conditions for both nuclear and non-nuclear sites include a requirement for record keeping (2.4 nuclear and 2.9 non-nuclear), and provision of information (2.5 nuclear and 2.11 non-nuclear).

Post Closure

- 2.55 Under NIA65 revocation or surrender of a licence does not relieve the licensee of its obligations in relation to the site (such obligations being enforceable by ONR and supported by criminal sanctions) until such time as ONR is satisfied that there has ceased to be any danger from ionising radiations from anything on the site or until a new nuclear site licence has been granted for the site.
- 2.56 Under EPR10 an Environmental Permit is required for a broad range of activities, including disposal. The permit requirements would continue to bind the permit holder following 'closure' until surrender of a permit is accepted by the EA. In addition, Regulation 23 applies where the regulator (EA) has decided to revoke an environmental permit and considers it appropriate to require the relevant permit holder to:
- avoid a pollution risk resulting from the operation of the regulated facility; or,
 - return the site of the regulated facility to a satisfactory state, having regard to the state of the site before the facility was put into operation.
- 2.57 Under RSA93 the authorisations contain equivalent conditions however there are no post closure controls. However, the Operator would not be issued with a cancellation certificate by NIEA or have their authorisation revoked by SEPA if the regulators were not satisfied that there was no longer potential for environmental harm.
- 2.58 In addition, the institutional measures after closure of a disposal facility are set out in the environment agencies' Guidance on Requirements for Authorisation (GRA), in particular Requirement R6, Section GH.64 and Requirement R7, Section GH.64 [Refs 34; 35].

Article 5.1 (f) – National Framework

(f) the allocation of responsibility to the bodies involved in the different steps of spent fuel and radioactive waste management; in particular, the national framework shall give primary responsibility for the spent fuel and radioactive waste to their generators or, under specific circumstances, to a licence holder to whom this responsibility has been entrusted by competent bodies;

- 2.59 Those that generate Spent Fuel and Radioactive Waste, in the case of NDA-owned licensed sites, are contractually obliged to deliver against Lifetime Plans. These plans are negotiated and agreed with the NDA. NDA's site licence companies are required to develop integrated waste strategies in a manner that does not foreclose prematurely future disposability. The detail of responsibilities and Lifetime Plans will be available as part of the National Programme which encompasses both nuclear and non-nuclear waste generators.
- 2.60 All three environment agencies (EA, SEPA and NRW) have a Memorandum of Understanding (MoU) with ONR which provides the basis for cooperative working and exchange of information between the two bodies covering joint working on licensed nuclear sites. Its objective is to facilitate the minimisation of the overall detriment due to radioactive waste management on licensed

sites, from generation to disposal. Under NIA65, ONR consults the EA, SEPA or NRW before:

- granting a nuclear site licence; or
- varying a nuclear site licence if the variation relates to or affects the creation, accumulation or disposal of radioactive waste.

2.61 There are a wide range of bodies and organisations that play a role in the delivery of the UK framework. Collectively, these fora provide for Governments, including devolved administrations, NDA and regulators engage and review the National Framework in a multilateral capacity. The relationships between organisations is summaries below (a more detailed account is provided in Annex 1):

- SEPA and the ONR operate in accordance with a MoU on Matters of Mutual Concern at licensed nuclear sites in Scotland [Ref 36]. ONR, EA and SEPA have developed joint regulatory guidance on radioactive waste management on nuclear sites [Ref 37].
- An annex to the EA/HSE MoU [Ref 38] covers specific arrangements relevant to regulation of non-nuclear sites and sets out the relationship between HSE's regulatory role under the IRR99 and the EA's regulatory role under EPR10. In Scotland, the safety of radioactive waste management on non-nuclear sites is for SEPA under RSA93 and HSE under IRR99.
- ONR and NDA - ONR is the independent regulator of the nuclear licensed sites and therefore the site licence companies that have been granted the site licence. This includes sites within the NDA estate and those which are not. The statutory duties of NDA in relation to health and safety legislation arise because NDA is a duty holder as the owner of the nuclear assets and liabilities across its estate.
- ONR cooperates (as appropriate) with NDA in various waste management fora at a national level in the interests of minimising potential conflicts and identifying potential synergies. A memorandum of understanding sets out a framework for such cooperation.
- ONR is accountable to DECC in providing regulatory assurance as to the safety and security on nuclear licensed sites. ONR submits an annual report to DECC Ministers which includes the status of safety and security cross the industry.
- EA / SEPA / NRW and DECC – EA and SEPA regulate nuclear licensed sites owned by the NDA but do not regulate the NDA directly. The EA has agreements with NDA, in the form of a MoU, to provide advice on the development of NDA strategy. This is supported by an agreement for cost-recovery. The EA also has an agreement with RWM, under EA95 section 37, to provide advice and scrutiny and arrangements for charging. Under such an agreement, the EA, working with the ONR, undertakes scrutiny of the NDA's work on geological disposal and disposability assessments of waste generators packaging proposals. The agreement also provides for EA to charge for its advice to RWM on the wider implementing geological disposal programme. In Wales responsibility for regulating nuclear licensed sites rests with NRW which has an ongoing

arrangement with the EA in securing support to its delivery of regulatory services.

- EA / SEPA and the Food Standards Agency in respect of arrangement under RSA93 as amended by the Food Standards Act 1999 [Ref 39]. In addition, the Food Standards Agency acts as consultee to the EA and SEPA through arrangements agreed under EPR10 and RSA93. On radioactive waste matters, the Food Standards Agency also works closely with the Welsh Government.

Article 5.1 – National Framework

(g) national requirements for public information and participation;

- 2.62 The UK Government and Devolved Administrations are committed to the principles of openness and transparency and recognise the fundamental importance of effective communication with workers and the general public. This commitment includes actively seeking the views of members of the public on new or changing Government policies by providing opportunities for stakeholder meetings or fora and/or to respond to public consultations where considered appropriate. Guidance on the principles that Government Departments and other public bodies should adopt for engaging stakeholders when developing policy and legislation is available at <https://www.gov.uk/government/publications/consultation-principles-guidance>.
- 2.63 Government takes responses received during a consultation into consideration when making related decisions.
- 2.64 The UK Government's policies and strategies on spent fuel and radioactive waste management are available from the UK Government website, as are the other various publications on this topic. See: <https://www.gov.uk/government/publications>.
- 2.65 Advice to Government from independent advisory committees such as CoRWM is also made publicly available. The UK's Radioactive Waste and Materials Inventory, which is published on a triennial basis on the NDA's website, provides information in a format that is accessible to the non-specialist. See: (<http://www.nda.gov.uk/ukinventory>).
- 2.66 Opportunities for public participation in decision-making related to spent fuel and radioactive waste management are part of a range of regulatory provisions, with key examples outlined in the following paragraphs.

Public information and participation regimes

- 2.67 Under the Freedom of Information Act 2000 [Ref 40], the Environmental Information Regulations 2004 [Ref 41], the Freedom of Information (Scotland) Act 2002 [Ref 42] and the Environmental Information (Scotland) Regulations 2004 [Ref 43], members of the public have the right to request information held by public bodies (subject to considerations such as national security and commercial sensitivity), including all the regulators of the UK's nuclear and non-nuclear industry and the NDA. The Aarhus Convention and EU Directive 2003/4/EC [Ref 44] on public access to environmental information are implemented in part in the UK via the Environmental Information Act 2004.

- 2.68 The UK has implemented the requirements for public participation in decision-making established under the Aarhus Convention, and reflected in EU Directive 2011/92/EU [Ref 45] on the assessment of the effects of certain public and private projects on the environment (“the EIA Directive”) via a range of legislative measures including the Town and Country Planning (Environmental Impact Assessment)(England and Wales) Regulations 1999 [Ref 46], the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 [Ref 47] and the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 [Ref 48].
- 2.69 Proposals for new nuclear power stations and installations for the processing, storage or disposal of spent fuel and radioactive waste are capable of being EIA development. Applications for planning consent for EIA development, and their accompanying environmental statements, are subject to publication and consultation requirements that provide opportunities for public participation. The regulatory provisions outlined in this paragraph also require transboundary consultation in certain circumstances in line with the Espoo Convention.
- 2.70 In addition, the EIADR99 (as amended) require an assessment of the environmental impact of decommissioning a nuclear power station and the submission of an environmental statement, with associated public consultation, prior to ONR granting consent.
- 2.71 Opportunities for public participation are also comprised in processes relating to:
- particular plans and programmes and their associated environmental reports in accordance with the Environmental Assessment of Plans and Programmes Regulations 2004 (“SEA Regulations”) [Ref 49], which implement Directive 2011/92/EU [Ref 45] (on the assessment of the effects of certain plans and programmes on the environment). The SEA Regulations also require transboundary consultation in certain circumstances in line with the Espoo Convention.
 - appropriate assessments prepared for a relevant plan or project in line with the Conservation of Habitats and Species Regulations 2010 (“Habitats Regulations”) [Ref 50] which implement Directive 92/43/EEC [Ref 51] (on the conservation of natural habitats and of wild fauna and flora).
- 2.72 Under the Planning Act 2008 [Ref 52], the UK Government can designate national policy statements (NPSs) which provide the policy framework that must be taken into account in decisions on whether to give consent to specified kinds of development. Before the UK Government designates an NPS, it must undertake an Appraisal of Sustainability (AoS), which is an overall assessment of sustainability that includes potential social, economic and environmental impacts, and may also include the assessment requirements in the SEA and Habitat Regulations. Opportunities for public participation are provided within the overall process for designation of an NPS. In 2011, the then UK Government designated a National Policy Statement for Nuclear Power Generation, and in the 2014 White Paper ‘Implementing Geological Disposal’ [Ref 53] outlined the UK Government’s intention to designate a generic NPS in respect of GDFs in England.

2.73 The construction of new nuclear power stations, geological disposal facilities for radioactive waste, and deep boreholes to determine the suitability of sites for geological disposal facilities, are 'nationally significant infrastructure projects' (NSIPs) under the Planning Act 2008. Applications for development consent for an NSIP are considered by the Planning Inspectorate, which makes recommendations to the relevant Secretary of State on whether to grant or refuse development consent. Prior to making an application, the applicant for development consent for an NSIP must undertake consultation with local communities, local authorities, statutory bodies and other interested stakeholders. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 provide for more specific implementation of the EIA Directive in relation to NSIPs, and impose obligations to ensure that those consulted as part of the pre-application process required by the Planning Act 2008 are informed that the development is EIA development and how they can obtain and comment on the EIA.

Specific regimes

2.74 The UK's regulatory regime also comprises legislation that requires the NDA and regulators to provide the public with information on particular aspects of their activities in regards to spent fuel and radioactive waste management. This includes:

- The Energy Act 2004 places obligations on NDA to consult widely with regard to its strategy and annual plans, and to publish the resulting approved documents;
- EPR10 (England and Wales) and RSA93 (Scotland and Northern Ireland) require the UK's environmental regulators to maintain public registers and provide information relating to environmental permitting, and undertake formal consultations on major regulatory decisions;
- The Energy Act 2013 requires ONR to publish strategic level data on its regulatory activities;
- REPP101 establishes a framework of emergency preparedness measures to ensure that members of the public are informed in advance about what to do in the event of a radiation emergency, and are provided with information if a radiation emergency occurs.
- There are also a range of regulatory requirements to ensure workers are provided with information. For example:
 - (a) The Health and Safety at Work etc. Act 1974 and regulations made under that Act (such as Management of Health and Safety at Work Regulations 1999) requires training of employees by employers, and the provision of information to employees 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. In addition, every employer has a duty to give information to persons who are not employees about the way in which the undertaking is conducted to the extent that it may affect their health and safety.

- (b) The HASS Regulations require the provision of information and training to workers in order to inform them of the precautionary measures required when dealing with HASS, including appropriate procedures for handling orphan sources, and have subsequently been incorporated into EPR10

Article 5.1 – National Framework

(h) the financing scheme(s) for spent fuel and radioactive waste management in accordance with Article 9.EN 2.8.2011 Official Journal of the European Union L 199/53

2.75 The legislative framework governing financial capabilities is listed below:

- When granting a nuclear site licence, ONR will need to be satisfied that all requirements relevant to the site's suitability for the proposed installation have been met. Once a licence is granted, the licensee is responsible for on-going compliance. Standard licence condition 36 states that the licensee shall provide and maintain adequate financial and human resources to ensure the safe operation of the licensed site.
- EPR10 Environmental Permit Condition 1.1.1 (b) requires that the operator shall manage and operate the activities using sufficient competent persons and resources.
- RSA93 Nuclear Authorisations (Scotland) Condition 2.2.1 and Non-Nuclear Authorisations (Scotland) Condition 2.7.1 require an operator to provide for and maintain adequate financial and human resources.
- RSA93(NI) Condition in Authorisation requires an Operator disposing of radioactive waste to have a management system, organisational structure and resources sufficient to achieve compliance with the limitations and conditions in the Authorisation.
- NDA – Since April 2005, decommissioning the UK's civil public nuclear legacy has been the responsibility of the NDA. The NDA is a Non-Departmental Public Body (NDPB) set up under the Energy Act 2004 to ensure that the UK's 17 designated civil public sector nuclear sites are decommissioned and cleaned up safely and efficiently. The NDA is funded by DECC and through revenue generated from commercial activities such as spent fuel management. The NDA is nominated to act as agent for UK Government to provide oversight of EDFE plans, budgets and funding claims for the eventual decommissioning of its existing fleet of eight nuclear power stations. Certain of these liabilities are funded by the Nuclear Liabilities Fund (NLF), established by government in 2005 as part of the restructuring of British Energy Group Plc (now EDFE). The NLF is backed by the UK Government, and a key function of the NDA is to ensure that EDFE's plans represent value for money, that funds are disbursed appropriately, and that any recourse to public funds is minimised

Article 5.2 – National Framework

Member States shall ensure that the national framework is improved where

appropriate, taking into account operating experience, insights gained from the decision-making process referred to in Article 4(3)(f), and the development of relevant technology and research

- 2.76 As noted under Article 4.1 the requirements placed on the licensee through the licence and through health and safety legislation are non-prescriptive and goal setting. A benefit of this is that it minimises the need to make legislative changes to the UK regime, as usually any changes can be accommodated through the licensee's arrangements for compliance with the safety requirements. This in turn allows for the UK regime to be responsive to changes in technology, international best practice / standards and lessons learned from international incidents. An example of this is the issue of new standards by the International Atomic Energy Agency (IAEA) or WENRA reference levels. These do not usually require a change to safety requirements, but the licensee is required to review its arrangements and make any necessary changes. New or revised nuclear safety standards can therefore be introduced quickly and without the need for legislative change.
- 2.77 In 2008, a Government review of nuclear regulation proposed a number of recommendations for improvement, which the Government accepted. As a result, the national framework has recently been revised by the introduction of TEA13 - which resulted in the revision of HSWA74 and NIA65 but did not change the regulatory requirements on duty holders. The parts of TEA13 relating to nuclear regulation came into force on 1 April 2014.
- 2.78 The UK remains committed to learning from its experiences and the experience of others as part of our approach of seeking continuous improvements to nuclear safety. In particular, as a contracting party to the Convention on Nuclear Safety and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, the UK periodically subjects its nuclear safety framework to international peer review to identify any shortcomings that need to be addressed [Ref ⁵⁴]. The UK continues to play an active role in the review meetings of these conventions so that any examples of best practice can be identified and, where appropriate, adopted in the UK. Additionally, the UK took a leading role at the 6th Review Meeting of the Convention on Nuclear Safety in seeking changes to the Convention's peer review processes so that they were strengthened to help ensure the continued robustness of international peer review.
- 2.79 As a Member State of IAEA, the UK is and will continue to be subject to IAEA Integrated Regulatory Review Service (IRRS) missions. The UK has invited a series of modular missions in 2006, 2009 and 2013 and, as a matter of practice, the UK volunteers for IRRS missions. These processes help to ensure that the UK regulatory regime continues to meet worldwide best practice. As an indication of the commitment of the UK to using these missions to improve its regulation, the 2013 mission determined that all ten recommendations, and 12 of 13 suggestions made by the 2009 IRRS mission, had been effectively addressed and therefore could be considered closed.
- 2.80 The UK invited IAEA to undertake a further mini-mission in 2014 to review progress made with the 25 findings as confirmed in the 2013 report and 1

outstanding recommendation. That mission was completed in November 2014 and concluded that 21 out of 26 of the findings could be closed. Furthermore, all 12 findings relating specifically to radioactive waste and decommissioning were closed based on evidence or progress made and confidence of the full implementation. The UK remains committed to the IRRS missions as a tool for enhancing stakeholder confidence, improving the national framework and as a means for demonstrating our commitment to continuous improvement. The UK is also agreed for an Operational Safety Review Team (OSART) mission to the UK to peer review the safety at the Sizewell B nuclear site.

- 2.81 In addition, specific action taken in the UK to help maintain and improve the effectiveness of the framework include:
- ONR, through its oversight of compliance with Licence Conditions, encourages licensees in the identification of the safety drivers, safety issues, and the on-going development and use of relevant technology. In particular, Licence Condition 15 requires that “the licensee shall make and implement adequate arrangements for the periodic and systematic review and reassessment of safety cases” [Ref 55].
 - Licence Condition 15 complements Licence Condition 23 [Ref 55] which requires that *‘the licensee produces an adequate safety case to demonstrate the safety of that operation and to identify the conditions and limits necessary in the interests of safety’*. In a waste management context, the safety case will include a radioactive waste management case [or RWMC] – see also Articles 4(3)(b) & (f) above and 7(2) below). Together these requirements require the licensee to apply the lessons learnt from operational experience and or technological advance to its safety case and the RWMC.
 - Environmental permits (nuclear and non-nuclear) under EPR10 include improvement conditions. Compliance with these conditions is overseen by the EA in England and NRW in Wales. Similar provisions are included in the RSA93.

Research

- 2.82 Under Section 88 of TEA13 [Ref 25], the ONR may carry out research connected to its purposes, or make arrangements for such research to be carried out on its behalf. Where it considers it appropriate, the ONR must publish the results of its research. In addition, the ONR is empowered to provide, or make arrangements for, the provision of training in connection with its purposes. This, and on-going dialogue with licensees, helps determine what research is undertaken by the licensees thereby providing the opportunity to influence its strategic direction.
- 2.83 Under EA95 [Ref 32], Section 37, the EA and SEPA are required to make arrangements for the carrying out of research and related activities (whether by themselves or by others) in respect of matters to which its functions relate. This requirement also applies to NRW. The EA undertakes research relating to its role in regulating radioactive waste disposal.
- 2.84 Under the Energy Act (2004) [Ref 2] the NDA is required to promote and, where necessary, carry out research in relation to its primary function of

decommissioning and clean up. There are close links between R&D and other Energy Act requirements on NDA regarding supply chain development and skills. NDA strategy is that, where possible, R&D is undertaken by the Site Licence Companies (SLCs) and their supply chain. Where necessary the NDA will directly maintain a strategic R&D programme. Overall strategic coordination is provided by NDA. R&D plays a critical role in solving the wide range of complex, often unique decommissioning challenges that need to be addressed.

FIGURE 2.1: ORGANISATIONAL RESPONSIBILITIES [FOR SPENT FUEL AND RADIOACTIVE WASTE MANAGEMENT ACROSS THE NDA ESTATE]

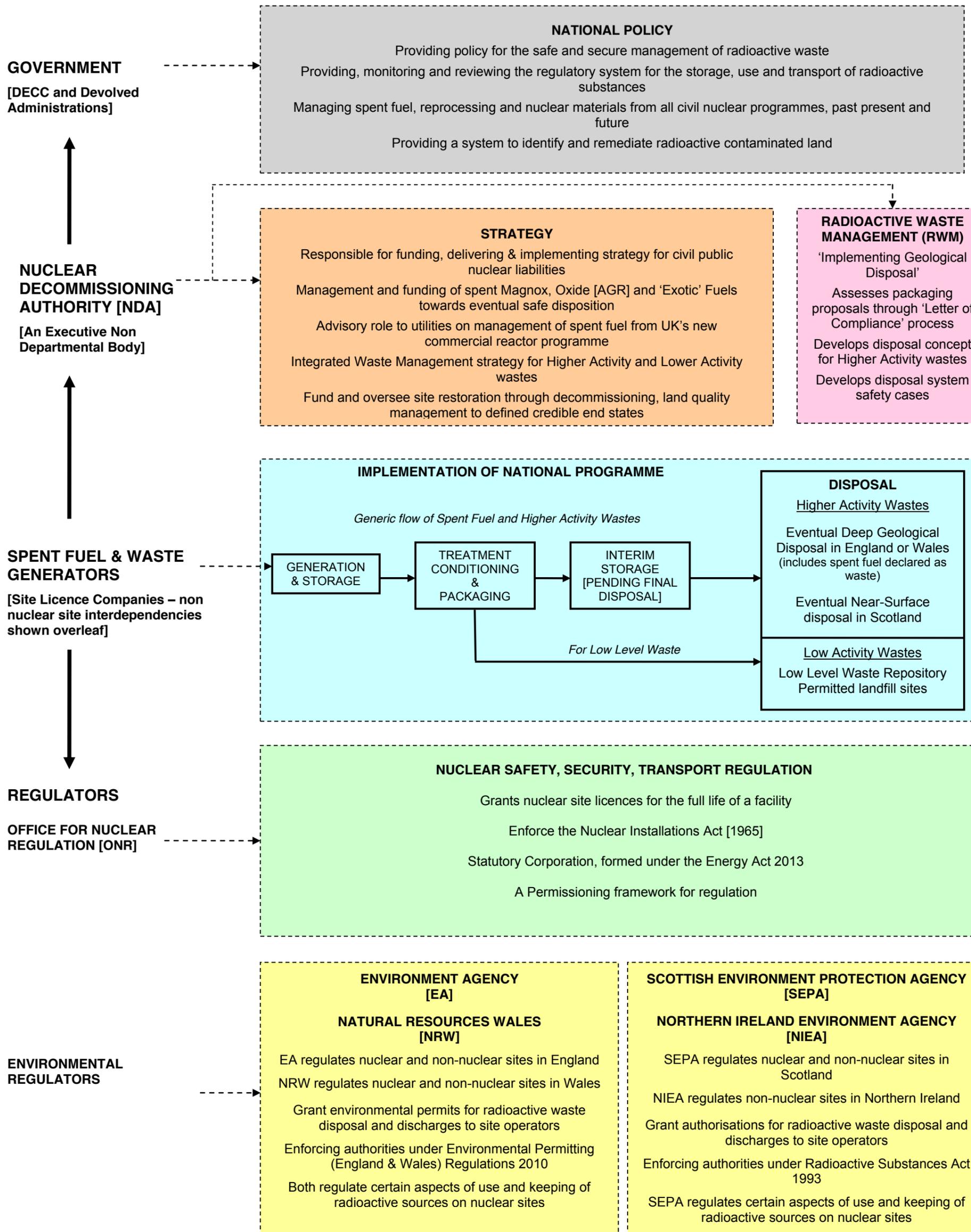
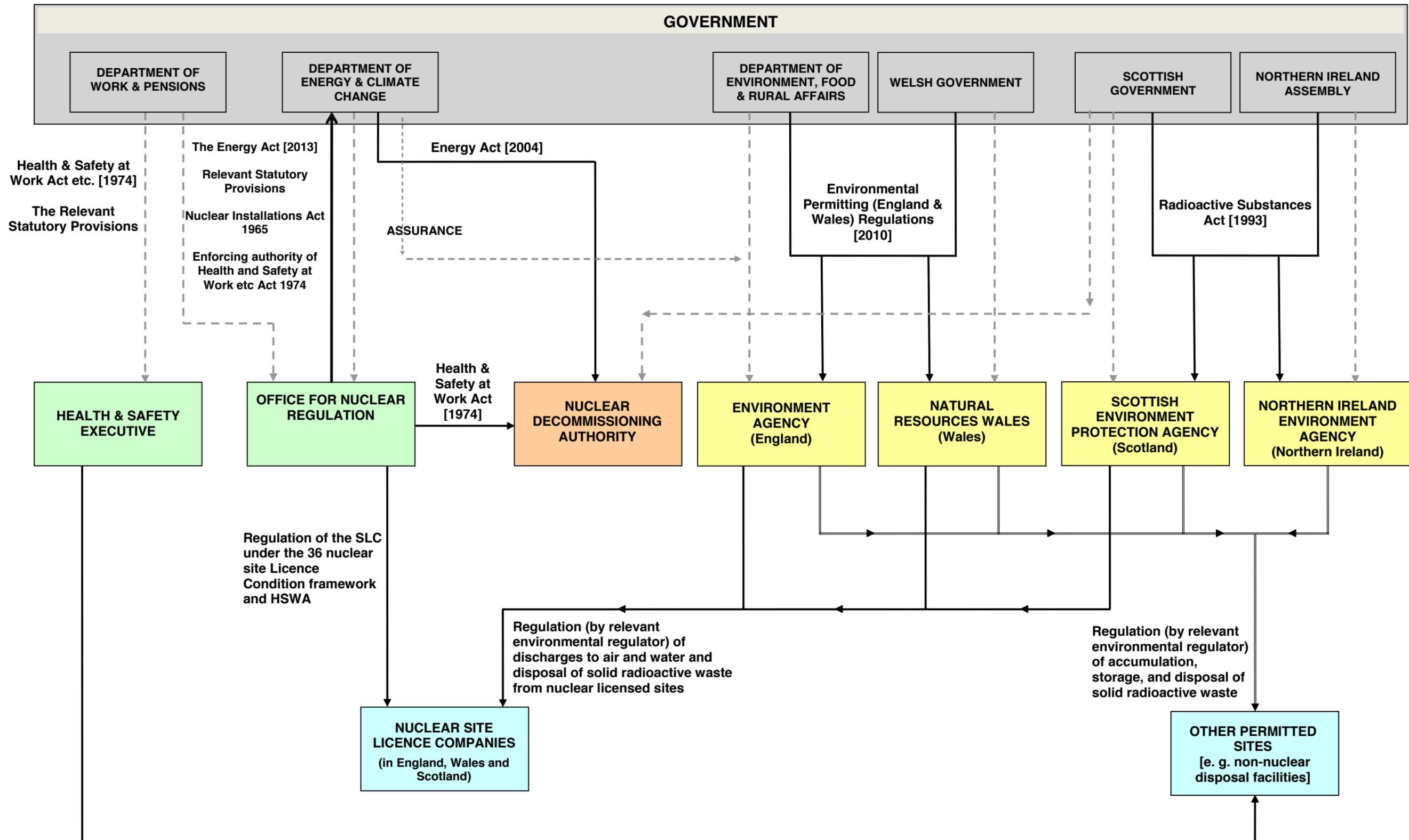


FIGURE 2.2: LEGISLATIVE FRAMEWORK FOR SAFE SPENT FUEL AND RADIOACTIVE WASTE MANAGEMENT



Article 6 – Competent Regulatory Authority

Article 6.1 - Competent Regulatory Authority

Each Member State shall establish and maintain a competent regulatory authority in the field of safety of spent fuel and radioactive waste management.

Office for Nuclear Regulation

2.86 ONR was established as an independent public corporation by TEA13 [Ref 25]. Under the legislation, ONR has five designated purposes:

- nuclear safety;
- nuclear site health and safety;
- nuclear security;
- nuclear safeguards;
- transport.

2.87 In this report, the focus is on the first purpose – nuclear safety. This purpose is the protection of persons against the risk of harm from ionising radiation from nuclear sites. The second purpose – nuclear site health and safety – relates to all other potential risks to health and safety.

2.88 Under TEA13, ONR has been set up as body corporate which is managed by its own Board. The ONR must do whatever it considers appropriate to ensure nuclear safety, through provisions in the regulatory regime, are able to do so without any undue influence in its regulatory decision making. The position of Chief Nuclear Inspector is enshrined in legislation.

Environment Agency (EA)

2.89 The EA is responsible in England for the enforcement of environmental protection legislation in the context of sustainable development. Under the Environmental Permitting (England and Wales) Regulations 2010 [Ref 20], the EA is responsible in England for regulating disposals of solid radioactive waste on or from nuclear licensed sites and for non-nuclear premises using radioactive substances. EA regulatory activities include, for example:

- Assessing applications for new, or variations to existing, environmental permits for nuclear sites and non-nuclear sites;
- Reviewing nuclear site and non-nuclear environmental permits to verify they are still appropriate and setting appropriate limits and conditions;

- Inspecting sites, equipment, plants and arrangements;
- Investigating incidents and accidents and taking enforcement action if necessary.
- The EA is the competent authority for authorising shipments of radioactive waste into and out of England in accordance with the Transfrontier Shipment of Radioactive Waste and Spent Fuel 2008 [Ref 11]. (NRW, SEPA and NIEA are the competent authorities for their respective parts of the UK).

Natural Resources Wales (NRW)

- 2.90 From 1 April 2013, NRW became responsible for the enforcement of environmental protection in Wales including regulating radioactive substances (disposal of solid radioactive waste from nuclear licensed sites and non-nuclear premises using radioactive substances). The regulatory function for radioactive substances will be delivered in Wales by NRW.
- 2.91 The EA under an agreement with NRW, will provide technical support to ensure continuity of effective regulation while NRW develops its own expertise. NRW's capability to deliver the non-nuclear regulatory function is expected to be developed in the near term; EA is expected to continue to support NRW in the delivery of nuclear regulation in Wales for the foreseeable future.

Scottish Environment Protection Agency (SEPA)

- 2.92 SEPA is Scotland's environmental regulator and is responsible in Scotland for regulating accumulation and disposals of radioactive waste from nuclear licensed sites and non-nuclear premises using radioactive substances. SEPA regulates the nuclear site operator (referred to as a Site Licence Company, SLC), through the Radioactive Substances Act 1993 [Ref 21] and other environmental legislation. It does not regulate the 'parent company' or the NDA, unless their management impacts on the conditions of the site operator's licence. The Energy Act 2004 requires SEPA (along with other regulators) to be a statutory consultee on the NDA's strategy and three-year business plan.

Northern Ireland Environment Agency (NIEA)

- 2.93 NIEA regulates the accumulation and disposal of radioactive waste from non-nuclear premises. There are no nuclear installations in Northern Ireland. It does however, have its own regulatory framework that mirrors that of the rest of the UK, as described in more detail with Section 6 of this report.

Health and Safety Executive (HSE)

- 2.94 Under the Health and Safety at Work Act 1974 [Ref 29], HSE was set up to regulate Health and Safety for England, Wales and Scotland. These arrangements are still current as Health and Safety is not a devolved issue. HSE regulate the use of ionising radiation in the non-nuclear sector.
- 2.95 HSE require those who are working with ionising radiation (i.e. generating the waste/disposing and handling of the waste/fixing and maintaining equipment for these purposes) to ensure that radiation exposures are kept as low as

reasonably practicable and do not exceed dose limits specified in the Ionising Radiation Regulations 1999 [Ref 30].

Article 6.2 - Competent Regulatory Authority

Member States shall ensure that the competent regulatory authority is functionally separate from any other body or organisation concerned with the promotion or utilisation of nuclear energy or radioactive material, including electricity production and radioisotope applications, or with the management of spent fuel and radioactive waste, in order to ensure effective independence from undue influence on its regulatory function.

Office for Nuclear Regulation

- 2.96 ONR's independence as a regulator is currently ensured under TEA13, where ONR is given direct responsibility for the enforcement of the nuclear safety regulatory system. ONR is designated as a public corporation with its own Board to set the direction of the organisation and to ensure appropriate governance.
- 2.97 The Secretary of State for Energy and Climate Change is accountable to Parliament for nuclear safety in Great Britain. ONR therefore provides assurance through factual information and advice to this minister on nuclear safety matters, but operates its regulatory functions separately from Government and ministers. Government cannot direct ONR with respect to regulatory functions in a particular case – i.e. Government is unable to influence the individual regulatory decisions taken by inspectors – thereby ensuring that regulatory decisions are independent.
- 2.98 Through agreements published on the ONR and the Government website, the relevant Permanent Secretary, who acts as the Principle Accounting Officer, has designated the accounting officer role to the Chief Executive of ONR. The ONR CE, as Accounting Officer, is therefore directly accountable to Parliament for an appropriate budget for ONR, and giving evidence, if summoned before the Public Accounts Committee, on ONR's stewardship of public funds.
- 2.99 The ONR Board is responsible for ensuring that any statutory or administrative requirements for the use of public funds are complied with, and that the ONR Board operates within the limits of its statutory authority and any delegated authority agreed with DWP. ONR must publish an annual report of its activities together with its audited accounts after the end of each financial year. The annual report and accounts must be laid in Parliament and made available on ONR's website.

Environmental Regulators

- 2.100 EA is governed by an independent Board that is accountable to the Secretary of State for Environment, Food and Rural Affairs. The Board delegates responsibility for the day-to-day management of the organisation to the EA's Chief Executive. The Board provides the functional separation between the EA's day-to-day regulatory decision-making and Government. The EA is independent of the undertakings that it regulates and has no role in promoting

nuclear technology and no responsibilities for developing or operating facilities for radioactive waste disposal or spent fuel management.

- 2.101 NRW is accountable to an independent Board appointed by and accountable to the Welsh Ministers. Day-to-day management of the organisation is delegated to NRW's Chief Executive. NRW is independent of the undertakings that it regulates and has no role in promoting nuclear technology and no responsibilities for developing or operating facilities for radioactive waste disposal or spent fuel management.
- 2.102 SEPA is a Non-Departmental Public Body established under section 20 of EA95 [Ref 32]. SEPA operates at arm's length from the Scottish Government but is accountable through Scottish Ministers to the Scottish Parliament. SEPA has an Agency Board that is accountable to Scottish Ministers. The day-to-day management of the organisation is delegated to the Chief Executive of the Board. As Scotland's environmental regulator, SEPA has no role in the promotion or utilisation of nuclear energy or radioactive material, including electricity production and radioisotope applications, or with the management of spent fuel and radioactive waste.
- 2.103 Under RSA93(NI) [Ref 21], the Chief Inspector is responsible for implementing the regulatory regime in NI. The Chief Inspector is appointed by the Department of Environment which has no role in promoting nuclear technology. NIEA is an Executive Agency within the Northern Irish Department of Environment and leads on advising on and implementing the Government's environmental policy and strategy including radioactive waste management, in Northern Ireland.

Article 6.3 – Competent Regulatory Authority

Member States shall ensure that the competent regulatory authority is given the legal powers and human and financial resources necessary to fulfil its obligations in connection with the national framework as described in Article 5(1)(b), (c), (d) and (e).

- 2.104 ONR is funded through a combination of a funding from DWP (section 16 ONR/DWP Framework Document) [Ref 56] and cost-recovery from duty holders. ONR recovers some 98% of its costs from the licensees it regulates. ONR is able to do this as section 24A of NIA65 enables ONR to charge fees to nuclear licensees to recover the expenses incurred through its regulation of the nuclear site licensing regime. In addition, further expenses are recovered from licensees in respect of safety research programmes agreed between ONR and the industry. Further fees regulations made under HSWA74 allow ONR to charge for other safety regulation carried out on licensed nuclear sites, including the GDA process. ONR has other charging powers with respect to nuclear security and the transport of radioactive materials.
- 2.105 As mentioned above, ONR will recover relevant costs from the licensees in line with the relevant statutory provisions. Should ONR's income be significantly reduced for any reason the Government will ensure that ONR has sufficient resources to discharge its functions, thereby also making certain that the Government complies with its international duties to make sure that the regulator is adequately resourced.

- 2.106 ONR uses a work recording system to identify the effort and expenses of its staff attributable to each licensee. Since the establishment of ONR as a public corporation in April 2014, the ONR is solely responsible for recruitment and retention of its staff. ONR has undertaken successful recruitment exercises since becoming an independent body in April 2014, and has built a complement of approximately 330 nuclear safety specialists.
- 2.107 Although there have been recent successes in recruitment, maintaining staff levels and assimilating and training new recruits will remain a challenge. ONR is implementing knowledge management processes to ensure a managed succession plan for all core capability skills and is investing significantly in the development of staff through bespoke management programmes. ONR is also looking to work more strategically with the supply chain to have better access to scarce technical skills and resource for limited periods to meet exceptional demands.
- 2.108 The ONR does not use technical support organisations in the way many other regulators do. Most of the expertise to regulate nuclear safety is available to ONR through its own staff. To maintain this situation, ONR periodically reviews its expertise and its likely needs for the near and intermediate term, and adjusts its recruitment and training activities accordingly.
- 2.109 When specialist advice and/or additional resources are needed to respond to a high workload, or the specialism is not available in ONR, the ONR has an extramural support budget and framework agreements to enable contracts to be placed quickly with known independent and reliable specialist help. The work done under these contracts is to produce technical assessments to a specification prepared by ONR. ONR uses the outcome of the technical assessments to inform its regulatory assessment and its staff make any necessary regulatory decisions.
- 2.110 The framework agreement was set up in order to secure access to independent technical expertise at a time when the needs of the nuclear industry are increasing and in response to a recommendation of the IAEA's IRRS in 2006, which stated that ONR should have access to scientific and technical support in the same way it is available to many other nuclear regulators in other countries. The support framework, which was set up with 31 contractors from the UK and overseas, operated successfully for 15 months. Approximately half of contracted technical support was commissioned through the framework. It is envisaged that this will increase in future years as work on assessment of new reactor designs begins.

Environmental Regulators.

- 2.111 Environment Agency - The Environment Act, 1995 (EA95) [Ref 32], contains EA's general powers to carry out its functions, including powers to bring criminal proceedings. Section 108(4) provides the EA's powers of entry which may be exercised at any reasonable time or, in an emergency, at any time and if necessary, by force. The same Section provides powers that enable the EA to, for example, undertake investigations, take samples, measurements and photographs, take possession of articles or substances, and require production of records and information.
- 2.112 The EA's powers of entry may be used for the purpose of determining compliance with an environmental permit; or, when exercising or performing

one or more of its pollution control functions, for example, regulation of radioactive substance activities under EPR10; or for determining whether, and, if so, how such a function should be exercised or performed.

- 2.113 Section 37 of EA95 also allows the EA to enter into agreements to provide advice on environmental matters and to charge a fee for such advice. Sections 41 and 43 allow EA to impose charges for environmental permits and recover costs for regulatory activities related to environmental permits. Sections 49 and 50 allow EA to borrow money from Government and for Government to guarantee EA loans.
- 2.114 It is an offence under EPR10 [Ref 20], Regulation 38, to undertake a radioactive substances activity without an environmental permit. It is also an offence to fail to comply with the requirements of an enforcement notice, a prohibition notice or suspension notice.
- 2.115 EPR10, Regulation 57 provides the EA with a power to prevent or remedy pollution. Regulation 57(1) states that "*If the regulator considers that the operation of a regulated facility under an environmental permit involves a risk of serious pollution, it may arrange for steps to be taken to remove that risk*". In addition EA95 [Ref 32], Section 37(1) provides powers for the EA to "*...do anything which, in its opinion, is calculated to facilitate, or is conducive or incidental to, the carrying out of its functions.....*". The powers and offences also apply to the NRW in Wales.
- 2.116 For its nuclear regulation (including support to NDA strategy etc) the EA has developed a Medium Term Action Plan for Nuclear Site Regulation (MTAP). Originally published in 2010 the MTAP, derived from the EA's Corporate Strategy and Supporting Strategies, the EA's Corporate Plan, Radioactive Substances Regulation Strategy and the Nuclear Industry Sector Plan, sets out an integrated action plan for the delivery of the EA's nuclear business nationally over a five year period. It translates the EA's Corporate Strategy and its five goals into an action plan which guides the development of annual regulatory, work and project plans. It sets out the strategic perspective for nuclear regulation in support of the EA's Corporate Goals and outcomes. It takes account of specific site needs and cross functional activities which feed into the annual planning and review process and is intended to inform the development of, and integrate, the EA's cross functional programmes, and guide site-related regulatory and project plans.
- 2.117 The EA's MTAP is broken down into six programmes:
- Operational sites regulation
 - Decommissioning and clean-up
 - New reactor build (including Generic Design Assessment)
 - Managing higher activity wastes (including geological disposal)
 - Radiation Incident Management
 - 'Enabling' activities (eg workforce planning, knowledge management and research & development).

- 2.118 The programmes are implemented as appropriate through site-focussed Site Regulatory Plans and cross-cutting project plans. Individual Performance Plans for EA staff include, as appropriate, objectives linked to the site regulatory and project work which flow from the MTAP. To ensure the MTAP remains a live document, it is subject to annual review. The review process identifies any new issues, changes in priorities, completed activities and any need for revision of the EA's nuclear service level. The MTAP will, for the foreseeable future, reflect NRW's needs for technical support in relation to regulation of nuclear sites in Wales.
- 2.119 Sections 108 to 110 of EA95 lay down SEPA's regulatory powers of entry, and offences in relation to radioactive substances are laid down in RSA93. It is an offence to undertake a radioactive substances activity without the relevant authorisation. It is also an offence to fail to comply with or contravene an authorisation condition or fail to comply with the requirements of an Enforcement or Prohibition Notice.
- 2.120 SEPA is funded by a combination of grant-in aid from the Scottish Government, direct charging from nuclear sites and application / subsistence fees for non-nuclear sites. SEPA has the power under sections 41 and 43 of EA95 to introduce a charging scheme.
- 2.121 NIEA – Section 31 of RSA93 [Ref 21] details the powers entry and inspection of inspectors appointed under Section 4 of the Act. These powers are used to determine compliance with conditions and limitations in the authorisations issued to enable the accumulation and disposal of radioactive waste. It is an offence to undertake a radioactive substance activity without the relevant authorisation. It is also an offence to fail to comply with or contravene an authorisation condition or fail to comply with the requirements of an Enforcement or Prohibition Notice.
- 2.122 The NIEA has an annual Radioactive Substances Inspection Plan which sets audit and inspection frequencies. The Plan is subject to review and forms part of the NIEA's Corporate and Business Plan. RSA93 Section 43 enables the Department of the Environment to introduce and from time to time revise a charging scheme in respect of applications for and variations to authorisations.

Article 7 – Licence Holders

Article 7.1 – Licence Holders

Member States shall ensure that the prime responsibility for the safety of spent fuel and radioactive waste management facilities and/or activities rest with the licence holder. That responsibility cannot be delegated.

Licence and Permit holder responsibility

- 2.123 It is UK policy that primary responsibility for the safety of spent fuel and radioactive waste management facilities and/or activities rest with the licensee or permit holder. That responsibility cannot be delegated. Requirements for the safety of spent fuel and radioactive waste management

facilities or activities are set out in ONR's Licence Conditions and in the EA's, NRW's and SEPA's permit or authorisation conditions.

- 2.124 Nuclear site licences - Section 1(1) NIA65 [Ref 19] prohibits operation of a nuclear installation without a licence and section 1(7) makes breach of this prohibition a criminal offence. Under section 4(10) contravention of any conditions attached to the licence is also a criminal offence, and the licensee is liable for such contravention regardless of whether it was committed by the licensee or by another person. Section 3(1) states that "a nuclear site licence may be granted only to a body corporate and is not transferable". This ensures that the licensee cannot delegate any of its obligations set out in the licence.
- 2.125 Environmental Permits - Regulation 12 of EPR10 [Ref 20] contains the requirement for an environmental permit and regulation 38 makes it an offence to operate without a permit or to contravene a permit. EPR10, Schedule 23, Part 2 (11), contains the definition of 'radioactive substances activities' for which an environmental permit is required and sets out exemption provisions for such activities that do not require an environmental permit. Nuclear site licensees also require an environmental permit for the disposal of radioactive waste and for the keeping or use of mobile radioactive sources.
- 2.126 Authorisations – RSA93 [Ref 21] prohibits the accumulation (Section 14) or disposal (Section 13) of radioactive waste except in accordance with an authorisation granted by SEPA or NIEA.

Article 7.2 – Licence Holders

Member States shall ensure that the national framework in place require licence holders, under the regulatory control of the competent regulatory authority, to regularly assess, verify and continuously improve, as far as is reasonably achievable, the safety of the radioactive waste and spent fuel management facility or activity in a systematic and verifiable manner. This shall be achieved through an appropriate safety assessment, other arguments and evidence.

- 2.127 Nuclear Installations under NIA65 [Ref 19] – Licence Condition 15 requires the licensee to have adequate arrangements for the periodic and systematic review and reassessment of safety cases, ONR inspectors using their powers under TEA 13 and HSWA74, may request a licensee to submit these arrangements for approval. ONR inspectors may also direct a licensee to carry out a review and reassessment of safety and submit a report on the subject. ONR inspectors may require such reports to be at regular intervals, or in relation to a particular period or area of operations. The purpose of this Licence Condition is to ensure that the licensee periodically stands back and reviews the safety case, with the objective of seeing if there are any reasonably practicable improvements that could be made. ONR use their powers to ensure compliance with this Licence Condition to require that licensees continuously improve nuclear safety at their installations. Licence Condition 17 also requires the licensee to establish and implement management systems which give due priority to nuclear safety.

- 2.128 Licence Condition 15(4) specifically gives the power to ONR to direct the Licensee to carry out a review of safety and submit a report at such intervals as we may specify. This clause provides the primary powers to ensure that the Licensee carries out periodic reviews at such intervals as we may specify.
- 2.129 Inspection of compliance against Licence Condition 15 is a cornerstone regulatory activity on nuclear licensed sites, and a key element of inspection planning. ONR's warranted inspectors inspect licensee arrangements for periodic review of safety in a graded manner depending on the level of risk and hazard posed by spent fuel and waste storage and processing activities. Routine inspection of this nature includes some or all of these issues depending on the nature of facility. This is described in further detail within the Technical Inspection Guide for Licence Condition 15 [Ref 57]:
- Verification that arrangements for periodic safety review [PSR] includes a programme specifying their periodicity. In some cases the licensee arrangements may include "interim reviews", "site-wide reviews", and "corporate reviews"
 - Verification that arrangements emphasise 'continuous improvement' with respect to the safety of facilities
 - Confirmation that the PSR adequately demonstrates that the safety case remains valid; that implications of all modifications have been addressed, and in addition, that other developments, such as the implication of and learning from plant incidents, have been taken into account.
 - Confirmation that PSR arrangements provide for reassessments of the safety cases should be undertaken on a longer term planned basis unless a review has indicated a need for a shorter or more immediate timescale. Typical outcomes may include the revision and re-issue of the safety case incorporating all safety submissions made since the case was last issued ('safety case consolidation').
 - Scrutiny of licensee's arrangements for prioritising safety improvements arising from the PSR, and that those improvements are implemented so far as is reasonably practicable.
- 2.130 Periodic Safety Reviews differ greatly in scope and scale among UK licensees. The PSRs for plant or facilities whose safety case is more complex, or which presents greater potential hazards, will attract more regulatory attention assessment and inspection. Consequently those where the hazard and complexity is less will, as part of a graded approach, receive a lower level of regulatory scrutiny that is appropriate to the risks.
- 2.131 For licensed sites where there is a defined site closure programme to achieve an end-state in the near term, ONR inspectors continue to seek assurance that licensees continue to seek, so far as is reasonably practicable, improvements, justifiably balanced against reducing hazard and risk where this is the predominant mission of the licensee.
- 2.132 Management of Health and Safety at Work Regulations 1999 [Ref 58] Regulations 3 and 5 implement specific requirements of the Framework Directive 89/39/EEC [Ref 59] and require all employers to carry out a health

and safety risk assessment (including for the purpose of complying with licensing requirements) and to review and amend such assessments and wider arrangements as necessary.

- 2.133 Environmental permits under EPR10 permit conditions require nuclear site licensees and non-nuclear operators to apply BAT in managing radioactive wastes. In the UK Government's Environmental Permitting Guidance for Radioactive Substances Regulation (September 2011) [Ref 60], the term BAT is taken to mean 'the latest stage of development (state of the art) of processes, of facilities or of methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste. The Guidance also states that '.....BAT for a particular process will change with time in the light of technological advances, economic and social factors, as well as changes in scientific knowledge and understanding.
- 2.134 In environmental permits, there are explicit requirements that nuclear and non-nuclear operators keep their arrangements for radioactive waste management under review and revise in light of new changes, new information and knowledge. Under EPR10 [Ref 20] regulation 34 requires the EA and NRW periodically to review permits and to inspect regulated facilities. The EA and NRW can, and does, specify improvement requirements in environmental permits.
- 2.135 RSA93 Nuclear Authorisations (Scotland) section 2.2.1.7 - Operators are required to have a management system and resources which are sufficient to achieve compliance with an authorisation and which include "internal audit and review of the Authorisation Holder's management system and its efficacy." SEPA would expect this condition to lead to continuous improvement in the safety of radioactive waste management where practicable. For non-nuclear authorisations (2.5.1) Operators are required to have in place and implement written procedures to ensure compliance with an authorisation. The written procedures must include a procedure for monitoring, reviewing and updating the written procedures as required in response to changes in circumstances.
- 2.136 Under RSA93(NI) [Ref 21], the authorisation does not include any specific improvement conditions. However, the requirement to use Best Practicable Means is considered by NIEA to be a form of on-going review as "best practicable" should reach a higher standard as technology improves.

Article 7.3 – Licence Holders

As part of the licensing of a facility or activity the safety demonstration shall cover the development and operation of an activity and the development, operation and decommissioning of a facility or closure of a disposal facility as well as the post-closure phase of a disposal facility. The extent of the safety demonstration shall be commensurate with the complexity of the operation and the magnitude of the hazards associated with the radioactive waste and spent fuel, and the facility or activity. The licensing process shall contribute to safety in the facility or activity during normal operating conditions, anticipated operational occurrences and design basis accidents. It shall provide the required assurance of safety in the facility or activity. Measures shall be in place to prevent accidents and mitigate the consequences of accidents, including verification of protection procedures that would have to fail before workers and the general public would be significantly affected by ionising

radiation. That approach shall identify and reduce uncertainties.

- 2.137 NIA65 [Ref 19] – Licence Condition 23 requires that all operations that may affect safety are supported by a safety case and that the safety case identifies the conditions and limits that ensure that the plant is kept in a safe condition. This includes a requirement for the licensee to produce a Radioactive Waste Management Case (“RWMC”) for higher activity wastes. The RWMC is an integral part of the safety case required by LC23 and must, among other things, provide a reasoned judgement on whether the conditioned wastes will meet the anticipated requirements for acceptance from a potential disposal site operator.
- 2.138 Licence Condition 17 provides that the safety case must include documentation to justify safety during the design, construction, manufacture, commissioning, operation and decommissioning phases of the installation.
- 2.139 Licence Condition 11 requires the licensee to have adequate arrangements in place for dealing with an accident or emergency on the site and any effects thereof. These arrangements are subject to approval by ONR. Under Licence Condition 11(4) the licensee must ensure that all relevant persons, bodies or local authorities whose assistance or cooperation may be required in an emergency are consulted in making the arrangements. Under Licence Condition 11(5) the licensee shall ensure that emergency arrangements are rehearsed regularly and under Licence Condition 11(6) the licensee is required to ensure that all employees who have a role in the emergency arrangements are properly instructed in the performance of the arrangements, including equipment required and precautions to be observed.
- 2.140 Regulations 4 and 5 of the Radiation (Emergency Preparedness and Public Information) Regulations 2001 (REPRIR) [Ref 61] contain a similar requirement for operators (which includes licensees under the NIA65) to assess the risk of accidents, to take steps to prevent and mitigate the consequences of accidents, and to prepare emergency plans. REPRIR also state that operators must regularly review and test emergency plans and must implement the plans without delay when an emergency occurs. Under REPRIR the operator must inform the relevant regulatory body of its risk assessment and, upon request, provide a copy of the emergency plan.
- 2.141 EPR10 [Ref 20], Schedule 23, Part 4 addresses public safety by implementing the parts of the EU BSS that address limiting exposure of members of the public to ionising radiation. Environmental permit conditions and limits reflect the need to comply with the BSS requirements. The EA has produced a set of guidance documents to explain to operators how to comply with conditions in their environmental permits. The scope and nature of the information required to support an application for an environmental permit is set out in the EA guidance to nuclear site licensees and to non-nuclear operators. This guidance includes requirements for radiological assessments of potential public exposures. The EA’s guidance is available on its website.
- 2.142 The EA’s guidance [Ref 62] ‘How to comply with your EPR RSR environmental permit – open sources and receipt, accumulation and disposal of radioactive waste on non-nuclear sites’ (September 2012) expects an permit holder’s management system to include ‘procedures for dealing with

incidents and accidents involving open sources or radioactive waste'. Permit holders must consider how to reduce the risk of accidents and must investigate any incident that happens and keep a record of the investigation. Similar guidance applies to sealed sources.

- 2.143 For non-nuclear sites, before surrender of an environmental permit, the EA or NRW must ensure that the necessary measures have been taken to return the site of the regulated facility to a satisfactory state. This will generally mean that an operator should aim to restore a site to the condition it was in before the facility was put into operation. An operator proposing surrender of an environmental permit for a radioactive substances activity on a non-nuclear site will need to show there is no significant risk to people or the environment.
- 2.144 The UK environmental regulators' Guidance on Requirements for Authorisations (GRA) set out environmental safety requirements for near-surface and geological disposal facilities through development, operation, closure and into the post-closure period. The GRAs recognise that the environmental safety case for a radioactive waste disposal facility should be proportionate to the hazard presented by the waste.
- 2.145 RSA93 requires the licensing of the keeping and use of radioactive material as well as the accumulation (non-nuclear sites only) and disposal of radioactive waste. Licensing under RSA93 contributes to the safety of the general public from a facility or an activity during normal operating conditions in a number of ways. Prior to granting a licence SEPA and NIEA require information to be supplied in an application form. The application process involves assessment of information supplied, liaison with the prospective operator and includes a site visit. The level of scrutiny and engagement will be commensurate with the complexity of the operation and magnitude of the hazard. If a licence is granted it will include relevant conditions and limitations that reflect, among other things, the requirements of this Article (as appropriate) and the requirements of the BSS.
- 2.146 Measures during design – The Safety Assessment Principles [Ref 63] provide 'Key Engineering Principles' which constitute the basis of an inspector's assessment as to the adequacy of measures to prevent accidents during the design process. Inspectors are required, through the SAPs, to consider the application of each principle in the context of a facility's life-cycle. For example, spent fuel and waste management facilities should be designed with decommissioning in mind, and in accordance with radioactive waste management principles:
- Engineering Key Principle 1 – The underpinning safety aim for any nuclear facility should be inherently safe design, consistent with the operational purposes of the facility
 - Engineering Key Principle 2 – The sensitivity of the facility to potential faults should be minimised during design
 - Engineering Key Principle 3 – A nuclear facility should be so designed and operated that defence in depth against potentially significant faults or failures is achieved by the provision of several layers of protection (defence-in-depth)

- Engineering Key Principle 4 – The safety functions to be delivered within the facility should be identified by structured analysis
 - Engineering Key Principle 5 – Safety measures should be identified to deliver the required safety functions
- 2.147 The EA's REPs include similar engineering principles that apply to nuclear and non-nuclear environmental permit holders and inform EA's regulatory assessments of an operator's arrangements for protection of people and the environment.
- 2.148 Licensees are expected to apply defence in depth concept to any design of spent fuel or waste management facility regardless of whether the facility is new, under modification or under decommissioning, with an emphasis on safety measures designed to prevent the accident occurring. ONR's SAPs expect licensees to make provision for controlling faults that develop within the design basis and to mitigate consequences should a fault progress outside of the design basis. The extent to which a licensee can incorporate preventative safety measures, in preference to mitigating measures, may justifiably be dominated by restrictions posed by the age of a facility, the nature of the risk it presents [if the design activity pertains to an overall decommissioning or hazard reduction programme]. ONR inspectors would seek evidence that licensees have demonstrably reduced risk so far as is reasonably practicable through alternative measures in the defence-in-depth hierarchy applied in a graded manner.
- 2.149 ONR inspectors further expect licensees to design passive safety measures with greatest preference over those which are automatically initiated or manually initiated or indeed administrative in nature. Where a design has predominant emphasis on active safety measures or administrative controls, inspectors would seek evidence of a robust demonstration that the costs associated with passive measures would be grossly disproportionate to the safety benefit to be derived.
- 2.150 As part of the overall approach which is based on reducing the risks so far as is reasonably practicable, operators have a duty to seek to learn the lessons from past experience, both domestically and internationally, so that continuous improvements to nuclear safety can be developed and implemented.
- 2.151 Prevention of accidents during operation – Licence Condition 23 [Ref 64] requires that operations are at all times controlled and carried out in compliance with Operating Rules; operating rules are limits and conditions necessary in the interests of safety as defined in Licence Condition 23(1). Operating Rules constitute the safety envelope within which a spent fuel or radioactive waste management facility is operated; inspectors undertake inspections to verify that operational plant is operated in accordance with Operating Rules and that the Operating Rules provide for an adequate margin of safety, justified through an adequate underpinning safety case fault analysis. Licence Condition 27 is complementary to Licence Condition 23 in that it requires that licensees should ensure a plant is not operated, inspected, maintained or tested unless suitable and sufficient safety mechanisms, devices and circuits are properly connected and in good working order.

- 2.152 Licence Condition 24 further requires that licensees ensure that all operations which may affect safety are carried out in accordance with written instructions operating instructions.
- 2.153 ONR inspectors typically undertake ‘System inspections’ of spent fuel and radioactive waste management facilities within which the requirements of Licence Conditions 23, 24 and 27 are examined together to verify that an operation(s) are controlled within the safety case defined safety envelope with appropriate instructions and safety measures:
- 2.154 Technical Assessment Guides and Technical Inspection Guides for Licence Conditions 23, 24 and 27 are available on ONR’s website [Ref 64].
- 2.155 Measures for mitigating consequences of accidents – The Safety Assessment Principle AM.1 requires that a nuclear facility should be so designed and operated to ensure that it meets the needs of accident management and emergency preparedness. Licence Condition 11 [Ref 64] in particular requires that licensees shall make and implement adequate arrangements for dealing with any accident or emergency arising on the site and their effects.
- 2.156 REPIR [Ref 61] regulations place specific duties on licensees to undertake hazard identification and risk evaluation through to development and testing of duty holders’ offsite emergency plans.
- 2.157 Environmental permits issued by the EA and NRW for non-nuclear facilities contain conditions that require the permit-holder to have and maintain an accident management plan. The EA and NRW are consultees under REPIR for emergency plans prepared by operators of nuclear sites and some non-nuclear sites, carriers of radioactive materials, and local authorities. The EA and NRW may also be asked about contingency plans prepared under the IRR99 and other relevant provisions.
- 2.158 Section 5.5 of the EA’s REPs sets out the principles that apply to emergency preparedness and response. The principles apply to nuclear and non-nuclear holders of environmental permits and need to be addressed in a way that is proportionate to the hazard presented by a permit holder’s activity. The principles cover facility design, emergency plans and remediation. In addition to these principles, under Principle ENDP15, environmental permit holders should use Best Available Techniques (BAT) to prevent and/or minimise releases of radioactive substances to the environment, either under routine or accidental conditions.

Article 7.4 – Licence Holders

Member States shall ensure that the national framework require licence holders to establish and implement integrated management systems, including quality assurance, which give due priority for overall management of spent fuel and radioactive waste to safety and are regularly verified by the competent regulatory authority.

- 2.159 Nuclear site licence LC17 ‘Management systems’ requires licensees’ [Ref 64] management systems to meet the requirements of national and international quality management Codes and Standards. In addition to including all the

relevant elements of those documents, the management system is also the vehicle by which all other arrangements required to be made under the nuclear site licence are identified, referenced and controlled. Any significant changes to the Licensees' organisational structures or resources are controlled by arrangements made to meet the requirements of LC36 'Control of Organisational Change' [Ref 64]. ONR's Technical Inspection Guidance or TIG(NS-INSP-GD-017) [Ref 65] is placed in the public domain. The purpose of the guidance is to facilitate a consistent and effective regulatory approach to Licence Condition (LC) 17 compliance inspection. It describes ONR's expectations for 'adequate' quality management arrangements and should be used by Inspectors when carrying out their duties in this area. It is therefore of use to licensees. The guidance contained in this document is consistent with IAEA Safety Standard No GS-R-3 [Ref 66] (The Management System for Facilities and Activities) and is applicable to the activities of all licensees.

- 2.160 Environmental Permit – Environmental permits include condition 1.1.1(a) 'The operator shall manage and operate the activities: (a) in accordance with a written management system that is sufficient to achieve compliance with the conditions of this permit; ...' Operators must notify the EA in England or NRW in Wales of significant changes to company management arrangements under environmental permit condition 4.3.5. For non-nuclear operators to comply with this condition, the EA's published guidance explains the criteria that a management system should address.
- 2.161 The EA and the ONR have published joint guidance on how nuclear site licensees can meet the regulators' expectations for management arrangements through a single integrated management prospectus. The EA has also provided guidance on management arrangements in section 5.1 of the EA's REPs, and separately in guidance relating to management arrangements at nuclear sites [Ref 67]. Under EPR10 [Ref 20] Regulation 34, the EA must periodically review environmental permits and must make appropriate periodic inspections of regulated facilities. Periodically, the EA and the ONR undertake joint inspections and audits on nuclear licensed sites to address matters of mutual regulatory interest.
- 2.162 RSA93 Authorisations (Scotland) [Ref 21] - Condition 2.2.1 requires a nuclear site operator to establish a management system. Quality assurance is required by condition 2.2.1.7. Condition 2.5.1 places a similar requirement on a non-nuclear site operator. SEPA inspects non-nuclear sites to verify compliance with the conditions and limitations in authorisations. The inspection frequency, also set according to the outcome of a risk assessment, is usually less for non-nuclear sites than that for nuclear sites reflecting the lower risk.
- 2.163 RSA93 Authorisations (Northern Ireland) [Ref 21] – An authorisation requires the user to have a management system and organisational structure in place to help ensure compliance with conditions in the authorisation
- 2.164 The over-arching legislative framework also requires that all employers give due priority to health and safety. Sections 2 and 3 of HSWA74 [Ref 29] set out the general health and safety duties of employers. Section 2 places a duty on every employer in relation to health and safety of employees and section 3 makes it a duty of every employer to conduct his undertaking in such a way as to ensure, as far as is reasonably practicable, that other persons (non-employees) are not exposed to risks to their health and safety.

This is supplemented by MHSWR99 [Ref 58] which at regulation 5 requires every employer to make arrangements for the effective planning, organisation, control, monitoring and review of preventive and protective health and safety measures.

- 2.165 For UK nuclear sites, the obligation in Article 6 paragraph 4 of European Council Directive 2009/71/EURATOM [Ref 68] has been incorporated into UK law through variations to Nuclear Site Licences, introduced in 2011. This resulted in revisions to licence conditions dealing with management systems and organisational capability of licenced sites. Duties were placed on licensees to establish and implement management systems which gave due priority to safety; provide and maintain adequate financial and human resources to ensure the safe operation of the licensed site; and make and implement adequate arrangements to control any change to its organisational structure or resources which may affect safety.

Article 7.5 – Licence Holder

Member States shall ensure that the national framework require licence holders to provide for and maintain adequate financial and human resources to fulfil their obligations with respect to the safety of spent fuel and radioactive waste management as laid down in paragraphs 1 to 4.

- 2.166 In order to comply with regulatory requirements, a nuclear licensee must demonstrate to ONR's satisfaction that it has:
- lines of authority leading to adequate control and supervision over its activities – whether those activities are carried out by the licensee's own staff or by contractors;
 - staff resources at a level that maintains adequate safety margins and competent management of radioactive wastes;
 - a precise definition and documentation of staff duties relevant to safety and the management of radioactive wastes;
 - integration of the responsibilities that relate to health and safety into job functions;
 - appropriately trained and experienced staff, ensuring adequate in-house expertise; and
 - the provision of, or access to, a high level of health and safety expertise used in an active manner for the independent peer review of safety cases, internal audits and reviews.
- 2.167 This demonstration is primarily achieved by the provision of adequate arrangements to satisfy the requirements of the NIA65 [Ref 19] site licence conditions, along with other relevant legislative requirements such as MHSWR99 [Ref 58].

- 2.168 Nuclear site Licence Condition 36 [Ref 64] states that ‘The licensee shall provide and maintain adequate financial and human resources to ensure the safe operation of the licensed site.’
- 2.169 Environmental Permit Condition 1.1.1(b) requires “sufficient competent persons and resources”. The EA and NRW expect the management system adopted by non-nuclear permit holders to include ‘identification of resources required (in terms of staff, facilities and equipment’. EPR10 [Ref 20], Schedule 23, Part 5 implements the HASS Directive (Council Directive 2003/122/EURATOM) [Ref 69] which requires financial provisions for management of redundant sources. The EA and NRW can also impose conditions relating to financial provision in environmental permits to ensure safe management of radioactive waste.
- 2.170 RSA93 Authorisations (Scotland) - Condition 2.2.1 requires a nuclear site operator to provide for and maintain adequate financial and human resources: “The authorisation holder shall have a management system, organisational structure, procedures and resources which are sufficient to achieve compliance with the limitations and conditions of this authorisation”. Condition 2.7.1 requires a non-nuclear site operator to provide for and maintain adequate financial and human resources: “The Authorisation Holder, at all times from the date of this Authorisation shall have a management system and resources which are sufficient to achieve compliance with the limitations and conditions of this Authorisation.”
- 2.171 RSA93 Authorisations (Northern Ireland) – the authorisation has conditions requiring “sufficient resources”, adequate supervision by suitably qualified and experienced persons, provision for consultation with Radioactive Waste Advisers.
- 2.172 In addition, under regulation 7 of the MHSWR 99 every employer is required to appoint competent persons to assist him in undertaking the measures he needs to take to comply with the health and safety requirement and under regulation 13 every employer must, in entrusting tasks to his employees, take into account their capabilities as regards health and safety.
- 2.173 Several licence conditions set goals on training and the management of human resources. Licence Condition 10 requires the licensee to make and implement adequate arrangements for suitable training of all those on site who have responsibility for any operations which may affect safety. Licence Condition 12 requires the licensee to make and implement adequate arrangements to ensure that only suitably qualified and experienced persons perform duties that may affect safety. This includes the appointment of duly authorised persons to control and supervise specific safety related operation.
- 2.174 ONR’s role is to monitor the adequacy of, and compliance with, the arrangements made under the licence conditions. Under normal circumstances, ONR does not have any specific role in the selection, training and authorisation of staff to perform safety related duties. It does, however, have powers to intervene if, in its opinion, any person is unfit to perform the duties of a duly authorized person.
- 2.175 Training and human resource issues are addressed by nuclear inspectors when they are reviewing safety documentation against the SAPs. The SAPs give inspectors guidance on whether the legal requirement of the licence

conditions are being met, in particular that provisions are made for training staff who will have responsibility for the safety of the plant. These include a management system for training on the site, analysis of jobs and tasks, development of training methods, assessment of trainees, revision training as required, and regular evaluation of training. Thus, licensees have in place a systematic approach to training and assessment of personnel with safety roles. Analysis of tasks provides an input to the specification of personnel training. Emphasis is placed on training that enables staff to implement accident management strategies, utilising appropriate instrumentation and items of plant that are qualified for operation in severe accident environments.

Financial Resources

2.176 Financial resources that support the safety of facilities dealing with radioactive wastes and spent fuel are generally managed by licensees as part of normal operating costs, the principal elements of which tend to comprise:

- maintenance and enhancement of safety and environmental protection;
- plant monitoring and asset care;
- sampling, analysis and treatment of radioactive waste;
- materials and services (the costs of engineering, consumable components such as filters, transport costs and other miscellaneous charges such as insurance);
- staff costs (salaries and pension provisions), and
- depreciation (representing the proportion of the fixed assets written off in relation to their assumed life for accounting purposes).

2.177 Financial control processes determine the authority required before expenditure is committed. Where a licensee manages a liability on behalf of another organisation (eg for NDA), these processes generally include a link to the liability owner. Special financial provision is made for the particular liabilities relating to the reprocessing and storage of spent fuel, the storage and disposal of radioactive waste and decommissioning costs.

2.178 The site licensees retain primary responsibility for the safety of the sites for which they hold a licence. However, where sites are owned by NDA, under the site licensee's contract with NDA the costs outlined above will normally be recoverable costs which may be charged to NDA, provided they are incurred in compliance with the applicable contract and NDA's Programme Control Procedures. NDA is financed through a combination of direct funding from the UK Government and income from commercial activities on NDA's sites.

2.179 Restructuring of British Energy led to creation of the Nuclear Liabilities Fund which is dedicated to the discharge of certain, defined decommissioning related liabilities associated with the UK AGRs and Sizewell B. NDA scrutinises applications for funds from the NLF and applies a series of tests that ensure the NLF funds can only be used for the intended purpose.

2.180 Financial provisions to address the anticipated future liabilities associated with proposed new nuclear power stations in England and Wales are

overseen through the development, scrutiny and approval of Funded Decommissioning Plans.

- 2.181 Before ONR grants a nuclear site licence, it seeks assurance from DECC on the issue of liability. ONR relies on the views of DECC as it does not have any responsibilities to judge whether the liability provisions in place are acceptable – that responsibility remains with DECC.
- 2.182 The audited accounts of the UK's operators of spent fuel, reprocessing and radioactive waste management facilities include details of waste management costs and the provisions made to meet them. There is currently no available disposal route for HAW in the UK, so such wastes at present have to be kept in safe and secure interim storage awaiting development of the planned GDF. The costs of storing these wastes comprise:
- costs of managing the HAW that arises from the processes undertaken during a plant's operational life; and
 - costs of managing the HAW that arises from plant decommissioning.
- 2.183 The cost of managing radioactive waste during the operational phase of a facility is typically spread across materials, services and staff costs in the reported accounts. Materials and services costs in accounts tend to include the costs associated with disposals of LLW, with an estimated price that reflects both the short-term operational cost and onwards disposal costs.
- 2.184 Disposals of radioactive waste, including discharges to the environment, should only be undertaken in accordance with regulatory permits or authorisations. The Environment Agency, NRW and SEPA, recover their regulatory costs from operators – these costs cover the processes of granting, monitoring and enforcing authorisations or permits.
- 2.185 NDA requires its contracted site operators to prepare detailed plans for their sites to a prescribed format, known as Lifetime Plans (LTPs). LTPs cover commercial activities as well as decommissioning and clean-up costs. Each component of the plan for each site is described, along with the expected timing of each component and a forecast cost of delivering each component in the appropriate year on an undiscounted basis at current price levels.
- 2.186 Although the plans are extremely detailed, there is significant inherent uncertainty in the future cost estimates that underpin the provisions for management of spent fuel and radioactive wastes on the NDA sites. Some specific uncertainties that NDA and its SLCs are working to address include:
- site end-states;
 - inventory of material to be retrieved from legacy facilities;
 - performance of aged infrastructure that is reaching the end of its operational life;
 - contaminated land quantities and treatments required;
 - programming of work and risks arising from programme inter-dependencies; and

- disposition plans for wastes – HLW, ILW, and LLW – and spent fuels.
- 2.187 NDA's cost estimates are calculated as the sum of the LTP base estimates for all the sites in NDA ownership, including contingencies and risks; an additional estimate for risks managed directly by NDA rather than by SLCs; and an allowance for the disposition of waste and nuclear materials. Audited accounts of NDA are made available to the public via NDA's website and include more information.

Article 8 – Expertise and skills

Article 8 – Expertise and Skills

Member States shall ensure that the national framework require all parties to make arrangements for education and training for their staff, as well as research and development activities to cover the needs of the national programme for spent fuel and radioactive waste management in order to obtain, maintain and to further develop necessary expertise and skills.

National Arrangements

- 2.188 The UK nuclear sector currently employs around 44,000 people. A programme of continued operations, decommissioning and clean-up, together with a potential programme of new nuclear build, means the nuclear industry has a sustained demand for recruitment and training.
- 2.189 Skill gaps have been projected for the UK nuclear industry. Research led by Cogent, an industry-led skills council, analysed the workforce requirements for new nuclear power station build and operation. This research indicated that 1,000 new apprentices and 1,000 new graduates with a degree-level science, technology, engineering or mathematics qualification are required each year to support existing operations and new build activity throughout the industry and supply chain.
- 2.190 UK Government is working closely with Cogent, NSA Nuclear and industry to ensure the UK has a clear understanding of the key skills priorities for the nuclear sector and how those priorities can be met.
- 2.191 NSA Nuclear was set up in January 2008 specifically to develop the capability of the UK nuclear workforce. Working with existing training providers, it now provides more than 1,000 apprenticeships and 150 foundation degrees in the sector. Cogent and NSA Nuclear have developed training standards applicable to the whole industry. NSA Nuclear has also developed a Nuclear Skills Passport to provide employees and contractors in the nuclear sector a physical record of industry-specific training and qualifications.
- 2.192 NDA has a statutory duty under the Energy Act 2004 [Ref 2] to ensure adequate skills are available for it to carry out its duties, and an annual budget to develop those skills through a skills and capability strategy.
- 2.193 The National Nuclear Laboratory demonstrates the Government's commitment to protect and grow the UK's national nuclear technology capability and skills base. Some 500 staff at the £250-million purpose-built

facility run a wide range of radioactive and non-radioactive experimental programmes, as well as offering a wide range of analytical services.

- 2.194 At university level there has been a very positive response to the shortage of graduates entering the industry. A number of new postgraduate nuclear courses have been set up, with an increasing number of students taking up places. The nuclear content of some undergraduate courses is being enhanced and, for the first time for many years, there will be the chance to obtain a degree in nuclear engineering. The number of students undertaking postgraduate research is also increasing. Of particular note is Manchester University's establishment of the Dalton Nuclear Centre, which offers a range of courses and conducts research on nuclear topics.
- 2.195 ONR and the Environment Agencies make arrangements to ensure that their inspectors are able to competently carry out their duties. In the case of the ONR this is a statutory obligation under sections 11 and 18 of HSWA 74 [Ref 29]. For the EA and SEPA they are required under section 33 of EA 95 to "follow developments in technology and techniques for preventing or minimising, or remedying or migrating the effects of pollution of the environment" Although NRW is responsible for delivering radioactive substances regulation in Wales it will need to build its expertise in this area. In the meantime, by arrangement, the EA will provide regulatory services and will advise NRW.

Licensees/permit holders and their employees

- 2.196 NIA65 [Ref 19] - **Nuclear site licence** - LC 10 requires the licensee to make and implement adequate arrangements for suitable training of all those on the site who have responsibility for any operations which may affect safety and LC 12 requires the licensee to ensure that persons who perform duties which may affect safety are suitably qualified. LC 26 requires that no operations are carried out which may affect safety except under the control and supervision of suitably qualified and experienced persons.
- 2.197 In addition under section 2(2)(c) HSWA74, as part of the employer's broader duty to ensure the health, safety and welfare at work of every employee (so far as reasonably practicable), employers must provide adequate information, instruction, training and supervision to employees. This is supplemented by regulation 13 of the MHSWR 99 which contains detailed requirements as to training of employees in the area of health and safety. Such training must be provided to employees when they are first recruited and at any time when the employee may be exposed to new risks as part of their employment (for example due to a change of responsibility, introduction of a new technology or new equipment). The training must also be repeated on a regular basis, must be adapted to take new risks into account and must take place during working hours. The IRR99 [Ref 30] also contain a specific requirement at Regulation 14 for training of employees who are engaged in work with ionising radiation.
- 2.198 EPR10 [Ref 20] - **Environmental Permit** – Environmental permits include condition 1.1.1(b), which requires "sufficient competent persons and resources. The EA requires all environmental permit holder to cover in its management system identification of training needs for staff directly involved in work with open sources or waste and for staff who are not directly involved but whose work has the potential to impact on achieving compliance with the

permit conditions. The EA expects that staff who manage, supervise or work with open sources or radioactive waste must:

- understand the conditions of the permit;
- have the skills and ability to carry out their job;
- be given training appropriate to the nature of the work and the needs of the individual.

2.199 Environmental permits also include condition 1.1.4 which states ‘The operator shall manage and operate the activities in consultation with such suitable Radioactive Waste Advisers (RWAs) as are necessary for the purpose of advising the operator as to compliance with this permit.’ This condition is included where the environmental permit authorises the disposal of radioactive waste. A permit holder needs to be able to show that a RWA is suitable to give relevant advice to the business and the RWA has the specific knowledge, experience and competence required for giving advice on the particular radioactive waste management and environmental radiation protection issues for which the permit holder is making the appointment.

2.200 EPR10 [Ref 20], Schedule 23, Part 5, section 3 paragraph 7 identifies specific training and information needs in relation to HASS. The EA’s guidance covering environmental permits for sealed sources also identifies the need for training.

2.201 RSA93 [Ref 21] (Scotland) - **Authorisation** - Condition 2.2.3 (nuclear) requires:

“The Authorisation Holder shall appoint, retain and consult with such suitable Radioactive Waste Advisers as are necessary for the purpose of advising the Authorisation Holder as to compliance with the relevant limitations and conditions of this Authorisation”:

2.202 Condition 2.6.1 (non-nuclear) requires:

“The Authorisation Holder shall appoint and retain as part of the management system and consult with such suitable Qualified Experts as are necessary for the purpose of advising the Authorisation Holder as to compliance with the relevant limitations and conditions of this Authorisation”.

2.203 Conditions 2.2.3 and 2.3.1 include but are not limited to:

- permit holder must appoint suitable Radioactive Waste Advisers (Qualified Expert) if the permit is for the accumulation or disposal of radioactive waste.
- Environment agencies’ guidance on suitability of radioactive waste advisers paragraph 3.1 states that:

“a suitable radioactive waste adviser (RWA) is a radioactive waste adviser who has “the specific knowledge, experience and competence required for giving advice on the particular radioactive waste management and environmental radiation

protection issues for which the permit holder is making the appointment.”

- 2.204 RSA93 [Ref 21] (Northern Ireland) – includes a condition in the authorisation for suitably qualified and experienced persons. (This issue is covered in detail under Article 7(5))

Article 9 – Financial Resources

Article 9

Member States shall ensure that the national framework require that adequate financial resources be available when needed for the implementation of national programmes referred to in Article 11, especially for the management of spent fuel and radioactive waste, taking due account of the responsibility of spent fuel and radioactive waste generators.

- 2.205 The UK Government requires all nuclear operators to take the steps necessary to ensure that their work on decommissioning and radioactive waste management is adequately funded. For nuclear new build, the UK Government has issued guidance on the required funding arrangements for decommissioning and waste management [Ref 70] and, in 2008, established the Nuclear Liabilities Financing Assurance Board (NLFAB), an independent advisory non-departmental public body
- 2.206 The NDA is responsible for decommissioning the UK’s civil public nuclear legacy. Part of this responsibility includes maintaining and implementing the UK’s national strategy for the management of solid LLW from the nuclear industry, and for developing the programme for geological disposal of higher activity wastes [Ref 71]. The NDA is a Non-Departmental Public Body which is in the main part publicly funded; its total planned expenditure is voted annually by Parliament. It also generates some income from its commercial activities.
- 2.207 The work of the NDA continues to form the bulk of the cost of the delivery of the UK’s National Programme. The NDA’s Annual Reports and Accounts consider a number of scenarios with a range of possible outcomes and provide an estimate and forecast of the costs of fulfilling their decommissioning responsibilities.
- 2.208 Under the Energy Act 2008 [Ref 22], the funding decommissioning regime requires new nuclear power plant site licence holders to have in place a funded decommissioning programme which sets out how their plans for decommissioning, spent fuel and radioactive waste management and disposal will be financed. The funded decommissioning programme must be approved by Government before the operator can use the site.
- 2.209 For non-nuclear sites, operators are responsible under EPR10 for decommissioning and clean-up of their sites to a satisfactory state before surrender of their environmental permits. An application for surrender is required by Regulation 25 of EPR10 [Ref 20]. UK Government’s guidance for EPR10 provides the requirements that an operator needs to meet before the regulator will accept surrender of the permit. The guidance states that an operator proposing surrender of an environmental permit for a radioactive

substances activity on a non-nuclear site will need to show there is no significant risk to people or the environment.

Article 10 - Transparency

Article 10 – Transparency

1. Member States shall ensure that necessary information on the management of spent fuel and radioactive waste be made available to workers and the general public. This obligation includes ensuring that the competent regulatory authority inform the public in the fields of its competence. Information shall be made available to the public in accordance with national legislation and international obligations, provided that this does not jeopardise other interests such as, inter alia, security, recognised in national legislation or international obligations.

2. Member States shall ensure that the public be given the necessary opportunities to participate effectively in the decision- making process regarding spent fuel and radioactive waste management in accordance with national legislation and international obligations.

2.210 The UK's transparency policies and approaches have been set out in detail under Article 5 as it forms an integral part of the UK's Framework.

Article 11 – National Programmes

Article 11 – National Programmes

1. Each Member State shall ensure the implementation of its national programme for the management of spent fuel and radioactive waste ('national programme'), covering all types of spent fuel and radioactive waste under its jurisdiction and all stages of spent fuel and radioactive waste management from generation to disposal.

2. Each Member State shall regularly review and update its national programme, taking into account technical and scientific progress as appropriate as well as recommendations, lessons learned and good practices from peer reviews.

2.211 As this is the first report by the UK in relation to the National Programme it is 'unique' as it falls in the same year that the UK have produced the Lead Document for our National Programme for the first time. The Lead Document contains up to date information on our plans, strategies, approaches and our implementation of the Directive which when read in conjunction with this report provide a comprehensive picture of the actions being taken by the UK.

2.212 As a result Article 11.1 is delivered through the delivery of the strategies, approaches and actions covered in Articles 4 and 5 of this report. Annex 2 has been provided to help identify the key sections of the National Report and National Programme. In particular the NDA Business Plan for 2015 – 2018 [Ref ⁷²] provides detail on activities covering the majority of the UK's nuclear sites.

2.213 As Sellafield is the largest site in the UK containing the vast majority of the high hazard radioactive materials a summary of the successes during the 2014/2015 period have also been provided at Annex 3.

2.214 Article 11.2 is delivered through the on-going approach of the UK to seek continuous improvements in safety as is required by the Health and Safety At Work, etc Act 1974 (i.e the requirement to reduce the risk so far as is reasonably practicable) and further through:

- the requirement under the Energy Act for the NDA to review its Strategy at least every five years;
- the role of the UK's Radioactive Substances Policy Group in monitoring policy and strategy implementation;
- the role of CoRWM in providing independent advice to Government on the long-term-management of higher activity waste

Article 12 – Contents of National Programmes

Article 12 - Contents of national programmes

1. *The national programmes shall set out how the Member States intend to implement their national policies referred to in Article 4 for the responsible and safe management of spent fuel and radioactive waste to secure the aims of this Directive, and shall include all of the following:*

- a. the overall objectives of the Member State's national policy in respect of spent fuel and radioactive waste management;*
- b. the significant milestones and clear timeframes for the achievement of those milestones in light of the over- arching objectives of the national programme;*
- c. an inventory of all spent fuel and radioactive waste and estimates for future quantities, including those from decommissioning, clearly indicating the location and amount of the radioactive waste and spent fuel in accordance with appropriate classification of the radioactive waste;*
- d. the concepts or plans and technical solutions for spent fuel and radioactive waste management from generation to disposal;*
- e. the concepts or plans for the post-closure period of a disposal facility's lifetime, including the period during which appropriate controls are retained and the means to be employed to preserve knowledge of that facility in the longer term;*
- f. the research, development and demonstration activities that are needed in order to implement solutions for the management of spent fuel and radioactive waste;*
- g. the responsibility for the implementation of the national programme and the key performance indicators*
- h. an assessment of the national programme costs and the underlying basis and hypotheses for that assessment, which must include a profile over time;*
- i. the financing scheme(s) in force;*
- j. a transparency policy or process as referred to in Article 10;*
- k. if any, the agreement(s) concluded with a Member State or a third country on management of spent fuel or radioactive waste, including on the use of disposal facilities.*

2. *The national programme together with the national policy may be contained in a single*

- 2.215 The UK have produced and submitted separately our Lead Document for the National Programme which sets out our planned implementation of the management policies for the spent fuel and radioactive waste that fall within the scope of the Directive.
- 2.216 As the UK's nuclear and radioactive waste sector is complex the UK have produced a lead document that provides an overview of the UK's (United Kingdom of Great Britain and Northern Ireland) range of policies, strategies and approaches within the four countries (England, Scotland, Wales and Northern Ireland) that make up the multi-national state that is the UK.
- 2.217 The lead document, coupled with this national report, have been produced for the purposes of demonstrating compliance with articles 12 to 15 of the Directive rather than being produced as a public information document. However, in line with the UK Government's approach on transparency both documents will be made openly available on the UK Government website.
- 2.218 The lead document provides details on the most up to date (at the time of producing the lead document and this report) strategies, policies and corresponding milestones for delivery of their objectives. This report provides information on what actions is undertaken under Articles 4 to 10 to give effect to the objectives of the Directive and the UK's National Programme.

Annex 1: Coordination of Interdependencies under the National Framework

Coordination or advisory forum	Representation	Terms of Reference in the context of the National Framework
<p>Committee on Radioactive Waste Management [CoRWM] [Ref ⁷³]</p>	<p>CoRWM consists of a Chair and up to fourteen members, one of whom will be appointed by Ministers as Deputy Chair on the recommendation of the Chair. Members are not mandated representatives of organisational or sector interests.</p> <p>Relevant skills of the membership include: radioactive waste management, nuclear science, radiation protection, environmental law, environment issues, social science (including public and stakeholder engagement), geology / geochemistry / hydrogeology, finance / economics, civil engineering / underground construction technology, geological disposal facility performance / safety issues, materials science, environmental impact assessment, local Government, planning, regulatory processes and ethics.</p>	<p>A group of independent experts appointed by Government that scrutinises plans for the management of UK's higher activity waste, now and in the future</p> <ul style="list-style-type: none"> • Provides independent scrutiny on the Government's and Nuclear Decommissioning Authority's (NDA's) proposals, plans and programmes to deliver geological disposal, together with robust interim storage, as the long-term management option for the UK's higher activity wastes. • Provides appropriate and timely evidence-based advice on Government and NDA plans for the delivery of geological disposal under the Managing Radioactive Waste Safety programme. The work programme may include review of activities including waste packaging options, geological disposal delivery programmes and plans, site selection processes and criteria, and the approach to public and stakeholder engagement

Coordination or advisory forum	Representation	Terms of Reference in the context of the National Framework
		<ul style="list-style-type: none"> • Provides advice on other radioactive waste management issues as requested by sponsor? • Other parts of Government, the NDA and the regulatory bodies may request independent advice from CoRWM. • Sponsoring Ministers (from the Department of Energy and Climate Change (DECC) and the devolved administrations) will agree a three-year rolling programme and budget for CoRWM's work on an annual basis.
<p>Radioactive Substances Policy Group [RSPG]</p>	<ul style="list-style-type: none"> • Department for Energy & Climate Change • Scottish Government • Welsh Government • Department of Environment Northern Ireland • Environment Agency [EA] • Northern Ireland Environment Agency (NIEA) • Scottish Environment Protection Agency (SEPA); • Office for Nuclear Regulation [and Health and Safety Executive] • Nuclear Decommissioning Authority 	<ul style="list-style-type: none"> • Oversees the development of relevant policy, legislation and regulation in the UK, the European Union (EU) and internationally; • Co-ordinates, where appropriate, UK-wide activities and reviews; • Co-ordinates, where appropriate, advising on prioritisation of the UK's involvement in and contributions on EU and international activities. • Provides strategic advice and guidance on the application of policy, legislation and regulation; • Identifying emerging issues and any consequential action(s); • Provides a forum for exchange of information and views across the UK. • Monitors policy and strategy implementation.
<p>Strategy Development Implementation</p>		

Coordination or advisory forum	Representation	Terms of Reference in the context of the National Framework
Group [SDIG]	<ul style="list-style-type: none"> • Nuclear Decommissioning Authority (NDA) • Department of Energy and Climate Change (DECC) • Scottish Government • Welsh Government • Office for Nuclear Regulation (ONR) • Scottish Environment Protection Agency (SEPA) 	<ul style="list-style-type: none"> • Oversees the development and implementation of the NDA Strategy • NDA Strategy includes strategies on Spent Fuel and Radioactive Waste
Regulatory Interface Management Group [RIMG]	<ul style="list-style-type: none"> • Nuclear Decommissioning Authority and RWM • Environment Agency; • Scottish Environment Protection Agency (SEPA); • Office for Nuclear Regulation [and Health and Safety Executive] • Department for Communities and Local Government (CLG); and • Local Government Association's Nuclear Legacy Advisory Forum. 	<ul style="list-style-type: none"> • Discusses health, safety, environmental, transport, land-use / spatial planning, security and non-proliferation matters within the RIM Group's scope; • Considers the arrangements (such as memoranda of understanding and charging agreements) under which NDA RWM works with other RIM Group members; • Provides NDA RWM with assistance in the development of a co-ordinated Permissions Schedule for the implementation of a geological disposal facility for higher activity radioactive wastes; • Provides views, and to comment on the NDA's proposals, relating to the development of the NDA's delivery organisation; • Identifies and resolves, or proposes measures for the resolution of, any potential barriers to successful implementation of geological disposal that fall within the RIM Group's scope; • Liaises with other relevant committees and groups to ensure effective communication of the RIM Group's work and the avoidance of potential conflicts;

Coordination or advisory forum	Representation	Terms of Reference in the context of the National Framework
<p style="text-align: center;">Nuclear Industry Liaison Group</p>	<ul style="list-style-type: none"> • Nuclear site licence companies • DECC • EA • SEPA • NRW • NDA • ONR • Food Standards Agency • Ministry of Defence 	<ul style="list-style-type: none"> • To act as a key forum for dialogue between the environmental regulators and the nuclear operators on a sector basis on regulatory matters; • To identify, share and promote consistent approaches and best practice across the nuclear sector, and to share operational experience and learning from events; • To identify key impacts and outcomes for the nuclear sector, and means of targeting and reducing / eliminating these over the longer term; • To keep matters at a level of common interest, i.e. not to dwell on detailed regulatory matters in relation to specific sites.
<p style="text-align: center;">Small Users Liaison Groups</p>	<ul style="list-style-type: none"> • Representatives of various non-nuclear operators including medical sector, universities and radiopharmaceuticals • EA • NRW • SEPA • NIEA • HSE • DECC • Welsh Government • Society for Radiological Protection 	<ul style="list-style-type: none"> • A forum for effective liaison, communication and consultation between non-nuclear users of radioactive substances and the environmental regulators; • An improved understanding of environmental regulators' and users' objectives, priorities and constraints in respect to the management of radioactive waste, with the aim of improving both the clarity and consistency of regulation.

Annex 2: Summary of Progress with the Implementation of the National Programme

Requirement of Article 12	Progress in implementation
<p>a) <i>the overall objectives of the Member State's national policy in respect of spent fuel and radioactive waste management;</i></p>	<p>These are set out in the lead document and all activity covered by the national report contributes to the delivery of these objectives. The objectives of the UK's national policies can be summarised as:</p> <ul style="list-style-type: none"> • a system of regulation, licensing and permitting to oversee the safe and responsible management of the UK's waste inventory • a policy approach that seeks adherence to the principles contained in the UK's radioactive waste hierarchy is in place to ensure measures are taken to minimise the creation of new wastes • facilitate the construction and use of suitable disposal facilities for all kinds of waste (ie; both geological disposal and near surface facilities).
<p>b) <i>the significant milestones and clear timeframes for the achievement of those milestones in light of the overarching objectives of the national programme;</i></p>	<ul style="list-style-type: none"> • The UK's National Programme is set out in a number of policy, strategy and site planning documents. The significant milestones and timeframes for the various elements of the National Programme are reflected in these documents. . • As there are a number of initiatives in place to manage the UK waste inventory (which includes both nuclear and non-nuclear waste), the milestones and timeframes for achievement of these are summarised under Chapter 11 of the Lead Document. Future national reports under Article 14 of the Directive will provide updates on progress in implementation as appropriate. • In particular the 2014 White Paper on management of HAW and the LLW Strategy set out the UK's proposed approach for the management of the majority of UK waste and establishes the proposed timeline for the development of a GDF in the UK.
<p>c) <i>an inventory of all spent fuel and radioactive waste and estimates for future quantities, including those from decommissioning, clearly indicating the location and amount of the radioactive</i></p>	<ul style="list-style-type: none"> • The UK publishes its waste inventory on a periodic basis – this is covered in Chapter 3 of the Lead Document and can be viewed at: www.nda.gov.uk/ukinventory/. • The publication of the inventory shows the progression in reducing the levels of materials in the

Requirement of Article 12	Progress in implementation
<p><i>waste and spent fuel in accordance with appropriate classification of the radioactive waste;</i></p>	<p>UK as part of a planned programme of work spanning many different sites and sectors.</p> <ul style="list-style-type: none"> • In addition, the NDA Strategic Plan also sets out its objectives in terms of waste reduction and the proposals for managing the waste from its decommissioning activities. • The next inventory is due to be published during 2016 and will show the further progress made in managing the UK's inventory.
<p><i>d) the concepts or plans and technical solutions for spent fuel and radioactive waste management from generation to disposal;</i></p>	<ul style="list-style-type: none"> • <i>The detailed concepts and plans for technical solutions are set out in the relevant policy, strategy and site planning documents that comprise the UK's national programme.</i> • <i>The Lead Document in Chapters 4 to 10 and provides an overview of these plans and concepts, and signposts to the documents that contain greater detail (including on progress in implementation).</i> • <i>The sections of this report on Articles 4 and 5 provide an overview of the national policies and framework that have been put in place to inform the concepts and plans within the National Programme.</i>
<p><i>e) the concepts or plans for the post-closure period of a disposal facility's lifetime, including the period during which appropriate controls are retained and the means to be employed to preserve knowledge of that facility in the longer term.</i></p>	<ul style="list-style-type: none"> • Chapter 7 of the Lead Document sets out the UK's approach. Progress in delivery is covered in this report under Article 4 and 5, which includes details on the White Paper issued on the UK's plans for geological disposal. • The White Paper can be viewed at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332890/GDF_White_Paper_FINAL.pdf
<p><i>f) the research, development and demonstration activities that are needed in order to implement solutions for the management of spent fuel and radioactive waste;</i></p>	<ul style="list-style-type: none"> • Chapter 9 of the Lead Document and Paras 2.83 to 2.86 of the report sets out the steps being taken in the UK's to develop R&D. • In particular the report states that under the Energy Act (2004) the NDA is required to promote and, where necessary, carry out research in relation to its primary function of decommissioning and clean up. • The NDA's strategy is that, where possible, R&D is undertaken by the Site Licence Companies (SLCs) and their supply chain. Where necessary the NDA will directly maintain a strategic R&D programme

Requirement of Article 12	Progress in implementation
<p><i>g) the responsibility for the implementation of the national programme and the key performance indicators</i></p>	<ul style="list-style-type: none"> • The UK programme is diverse and includes all variants of radioactive waste including those from the non-nuclear sector. • The UK regulatory regime (the NIA65 and HSWA74) enshrine in law that prime responsibility for managing radioactive waste lies with the operator. • The UK's national policies and regulatory framework, covered under Articles 4 and 5 of this report, place responsibilities on Government, with regulators, the NDA and operators. • Key Performance Indicators are contained in the various strategies and documents referred in this report and the Lead Document. • The NDA's Business Plan for 2015 to 2018 provides an overview of the key activities being delivered by the NDA over the next 20 years. The business plan can be viewed at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416537/Approved_Business_Plan_2015-2018_.pdf • For the NDA estate as a whole the NDA's Annual Report and Financial accounts form an integral part of the mechanism used to assess progress against planned activities.
<p><i>h) an assessment of the national programme costs and the underlying basis and hypotheses for that assessment, which must include a profile over time;</i></p>	<ul style="list-style-type: none"> • Chapter 10 of the Lead Document and Article 9 of this report set out the measures for ensuring financial provisions are in place. • The bulk of cost for delivering the UK's National Programme come under the work of the NDA. • The NDA's Annual Reports and Accounts consider a number of scenarios with a range of possible outcomes and provide an estimate and forecast of the costs of fulfilling their decommissioning responsibilities.
<p><i>i) the financing scheme(s) in force;</i></p>	<ul style="list-style-type: none"> • Chapter 10 of the Lead Document and Article 9 of this report set out the provision in place for ensuring financial provisions are in place.
<p><i>j) a transparency policy or process as referred to in Article 10;</i></p>	<ul style="list-style-type: none"> • The key elements of the UK's transparency approach are set out in the lead document and under Articles 4, 5 and 10 of this report.

Requirement of Article 12	Progress in implementation
<p>k) <i>if any, the agreement(s) concluded with a Member State or a third country on management of spent fuel or radioactive waste, including on the use of disposal facilities</i></p>	<ul style="list-style-type: none"> • The Sellafield site currently holds materials belonging to other States. These have been outlined in both the lead document and this report. • The general principle applied is that the waste, or a substitute, will be returned to the State of origin within 25 years. • There are currently no agreements to use the GDF of another State or for another State to use any GDF in the UK.

Annex 3: Summary of progress with the Sellafield Site during 2014 to 2015 period.

At Sellafield, our priority is to address the long-standing hazards in the oldest facilities, the Legacy Ponds and Silos (LP&S), which date back to the 1950s. These buildings contain significant amounts of radioactive material deposited over many decades, for which records are often incomplete and unreliable and which were not designed with waste retrieval in mind.

The main focus over recent years has been to maintain and enhance the safety of these facilities and to develop the plans and additional facilities that will be needed to retrieve the waste for treatment, storage and eventual disposal. Progress during 2014-2015 in key areas include:

- Retrievals are now beginning to gather pace and that this year NDA have seen the start of radioactive sludge removal from the First Generation Magnox Storage Pond (FGMSP) to the newly constructed Sludge Packaging Plant. The FGMSP was constructed in the 1960s to store spent fuel from the UK's Magnox stations and contains accumulated waste material including sludge from corroded fuel cladding, fuel fragments, storage containers and assorted debris.
- Work has begun to examine and consolidate fuel within the pond prior to the start of fuel removal next year.
- More than 100 tonnes of contaminated equipment, approximately 90 tonnes of metal fuel and more than 100 cans of fuel fragments have been removed from the Pile Fuel Storage Pond.
- In the Sellafield operating plants, THORP had a mixed year, achieving good operational throughputs but being impacted by a number of unplanned outages and ultimately falling short of its production target.
- Magnox reprocessing and the vitrification plants operational targets were achieved and Sellafield now has the lowest stock of Highly Active Liquor for decades.

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