

National Waste Programme

Guidance on UK Low Level Waste Management Legislation

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Executive Summary

Low Level Radioactive Waste (LLW) management in the UK is regulated through enforcement of a range of national and international legislation. EU Directives and international treaty obligations are implemented through their transposition into UK law.

LLW management in the nuclear industry is subject to regulation by the Office for Nuclear Regulation (ONR) and the environment agencies. Aspects of its management may also be subject to planning permits and conditions enforced by relevant planning authorities. All aspects of LLW management and the LLW lifecycle are subject to regulation: storage (accumulation), packaging, transport, treatment and disposal.

This document:

- summarises the areas for which each regulatory authority is responsible
- provides an overview of the relevant legislation for each of these areas
- signposts to the legislation, further information and existing guidance documents

Appendix A lists the most relevant pieces of EU and UK legislation, including amendments. Appendix B lists relevant guidance documents and sources of further information for the legislation.

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1. Introduction

1.1 Scope and aim of this guidance

This guidance is intended to act as an introduction to the legislation which governs the management of solid Low Level Radioactive Waste (LLW) arising from nuclear sites in the UK. It aims to give those involved in LLW management at or from nuclear sites an overview of the key elements of the regulatory and legislative framework.

UK legislation enables certain radiological wastes to be classified as out-of-scope of regulation (provided that the radiological properties of the waste meet certain thresholds defined in law) and such wastes are not subject to regulation under the legislation that governs the management of radioactive waste. Such wastes however are subject to any pertinent legislation relating to their non-radiological properties. More information on this is provided in section 5.4.

This guidance is not intended for the operators of any facility intended for final disposal of solid LLW, as it does not cover the specific requirements governing the establishment or operation of such a facility (although some regulations discussed in this document are applicable in this case). Legislation governing the management of Higher Activity Waste (HAW), i.e. radioactive waste which requires geological disposal or long-term near-surface storage, is not discussed, although it is noted that some LLW may need to be managed as HAW, should it fail to meet the acceptance criteria for near-surface LLW disposal facilities. The legislation governing radioactive discharges to the environment (to air or water) shares some similarities with LLW legislation and is therefore mentioned briefly in this document, albeit the focus of this guidance is primarily on solid LLW.

1.2 Structure of this document

This document is structured as follows:

- Section 1 provides an introduction to the UK legislative framework
- Section 2 provides a summary of the UK Government's policy and strategy for LLW management
- Section 3 sets out the main international influences on UK legislation
- Section 4 describes the legislation enforced by the Office for Nuclear Regulation (ONR)
- Section 5 describes environmental regulation and legislation surrounding LLW management and disposal
- Section 6 gives a brief overview of the legislation governing the transportation of LLW

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- Section 7 provides a summary of the enforcement of LLW legislation by the regulators
- Appendix A lists the relevant legislation (Acts and Statutory Instruments) including any subsequent amendments
- Appendix B details published guidance documents on the legislation detailed in the report, including links to websites where the guidance can be accessed

1.3 UK Legislative Framework

The storage and disposal of radioactive waste in the UK is governed by a number of regulations set out under UK legislation, European Union (EU) regulations and international treaties. As a member state of the International Atomic Energy Agency, the UK also observes internationally agreed protocols on nuclear safeguards and safety standards. Directives issued by international bodies are implemented in the UK by their transposition into UK statutory instruments which become part of UK law.

Figure 1 shows the relationship between these legal requirements and the guidance on them. Guidance is produced by international organisations, the government and those responsible for enforcement. In addition to legislation and regulations, UK arrangements are also guided by UK government policy. The goal of regulation of the management of radioactive waste is to ensure that radioactive waste is managed appropriately, safely and securely, to ensure that people and the environment are protected from the potential hazard from radioactivity.

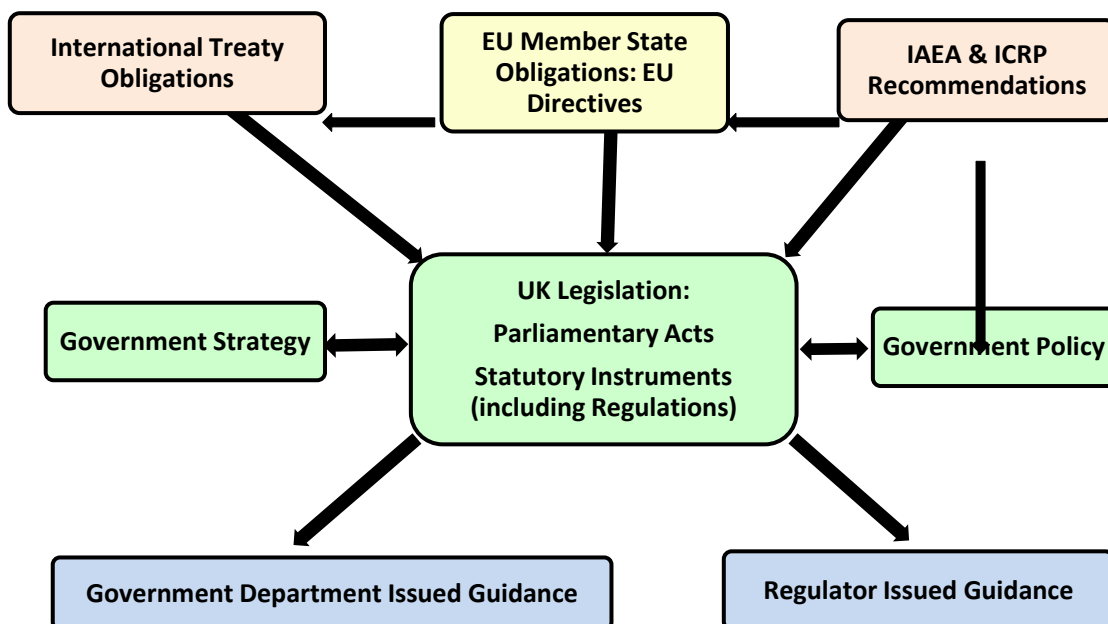


Figure 1: Relationship between UK legislation, policy and guidance and international treaties and recommendations

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1.4 The role of Government

The Department for Energy and Climate Change (DECC) and its Secretary of State and Ministers are responsible to Parliament for nuclear safety matters. In addition, DECC has a number of policy roles in relation to the nuclear industry. These include responsibility for general energy policy (including the role of nuclear power), 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. DECC is responsible for ensuring that the UK complies with certain international conventions (such as the Convention on Nuclear Safety and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management), as well as the EU Nuclear Safety Directive.

Due to the devolution of certain powers to the administrations of Scotland, Wales and Northern Ireland there are separate legal systems in place on matters relating to the management of radioactive materials. Where issues are devolved they remain consistent with the aims of the UK Parliament policies and legislation. Nuclear safety is not a devolved matter, and hence any legislation applies to the whole of the UK.

An **Act of Parliament** (also known as primary legislation) creates a new law or changes an existing law. The practical implementation of an Act is the responsibility of the appropriate government department. Acts of Parliament will often contain a broad framework, and will confer powers on Ministers to make more detailed orders, rules or regulations by means of statutory instruments.

Statutory instruments (SIs) form the majority of delegated, or secondary, legislation. Delegated legislation allows the provisions of an Act to be brought into force or changed without Parliament having to pass a new Act. Changes range from altering technical details, to adding greater detail to Acts. SIs are made in a variety of forms, most commonly, regulations, rules, Orders in Council and orders.

(Information from: <http://www.parliament.uk/about/how/laws/> Retrieved: 14/04/15)

1.5 Regulators

The key regulators enforcing the legal requirements for management and disposal of LLW at nuclear licensed sites are the UK environment agencies and the Office for Nuclear Regulation (ONR). The specific regulatory duties of each are described in sections 3 and 4 of this document.

ONR, formerly an agency of the Health and Safety Executive (HSE), is responsible for issuing licenses to nuclear sites and enforcing the nuclear and conventional safety law on UK nuclear licenced sites, and so holding duty holders to account on behalf of the public. Their responsibility on nuclear licensed sites includes the regulation of the accumulation of radioactive wastes on-site. ONR's **responsibility** also includes the safety and security of radioactive waste during transport.

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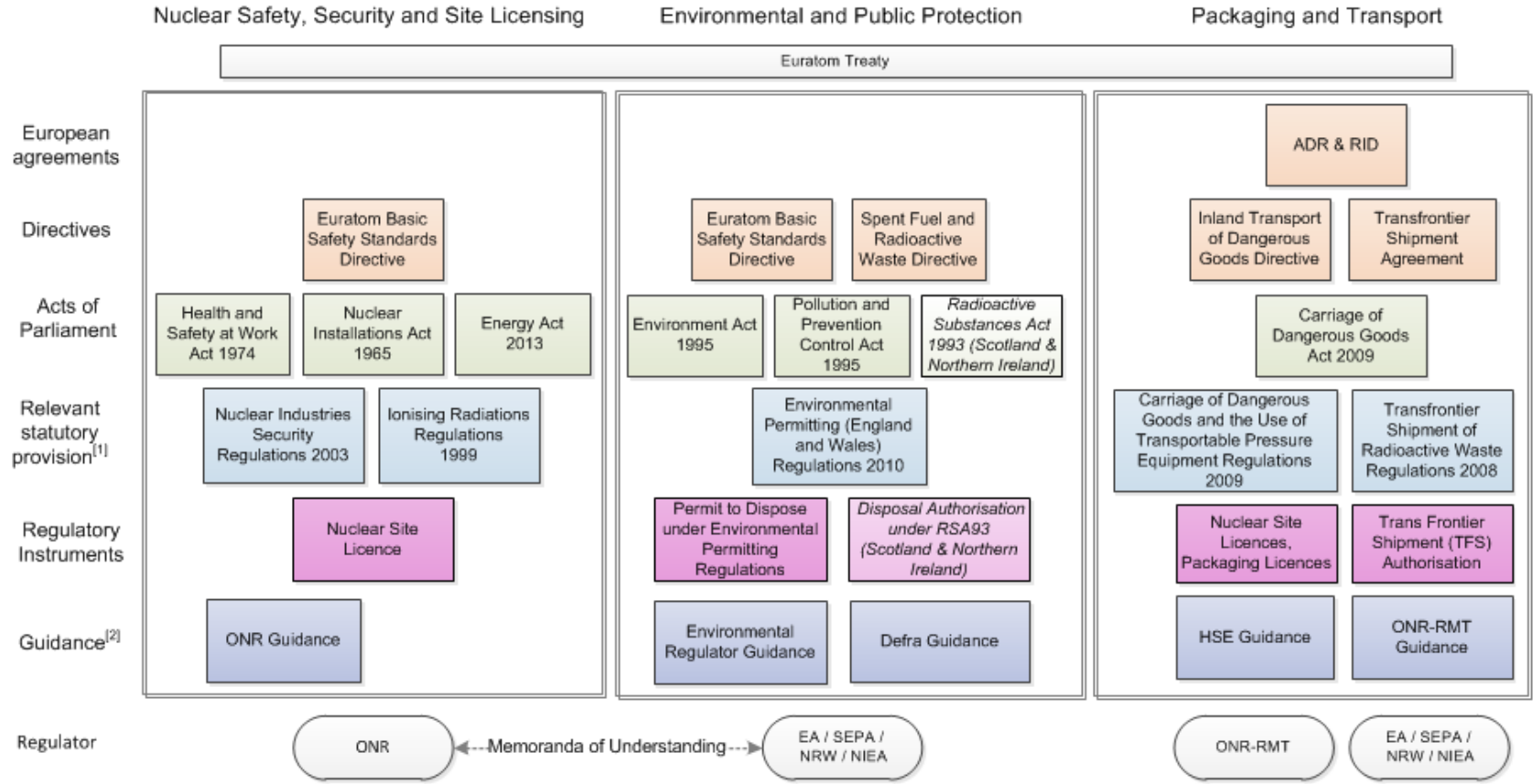
Disposal of radioactive waste and radioactive discharges to the environment at or from nuclear sites are regulated by the environment agencies. At non-nuclear sites the environment agencies regulate both the accumulation of radioactive materials (including radioactive wastes) as well as the disposal of radioactive wastes.

The regulators have areas of mutual interest, thus close collaboration is required to ensure that both can perform their regulatory function while avoiding issuing conflicting requirements to licensees. Memoranda of Understanding (MoU) between the ONR and each of the environment agencies provide frameworks for this interaction (separate MoU exist for the Environment Agency (EA) [1], the Scottish Environment Protection Agency (SEPA) [2] and Natural Resources Wales (NRW)).

Some activities related to the UK's defence nuclear programme are regulated by the Defence Nuclear Safety Regulator (DNSR). DNSR works closely with ONR, in joint regulation of relevant areas, to minimise the impact on operators and ensure, so far as is practicable, that they are not subject to differing requirements. A 'Letter of Understanding' (LoU) between DNSR and ONR captures the working relationship. DNSR also works closely with the EA and SEPA.

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¹ The relevant statutory provisions (e.g. the regulations made under an act) are not necessarily positioned in the diagram in direct relation to their parent Act of Parliament.

² This guidance refers to guidance on the interpretation of the legislation and compliance with regulations. Extensive detailed and specific guidance exists on undertaking the activities involved in compliance, but this guidance falls outside the scope of this document

Figure 2: Hierarchy of UK legislation concerning LLW management at or from nuclear sites

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2. UK LLW Policy and Strategy

The management of low level radioactive waste (LLW) in the UK is directed by the Government's policy and strategy. A Government policy is a statement of what the government aims to achieve to bring about change to a particular situation. A strategy is the means of effecting a policy, i.e. a description of the necessary actions and steps needed to implement it.

2.1 Policy

The Government's Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom [3] was published in 2007, and supersedes the previous policy, which was set out in Cm2919 [4]. The policy covers all aspects of generating, managing and regulating solid LLW, including LLW from both nuclear and non-nuclear activities. It also identifies the need for guidance to be published by the regulatory authorities.

The policy sets out:

- the definitions of LLW and VLLW
- the expectation that waste producers will have a management plan for LLW
- the requirement for **consideration of all practicable options** for the management of LLW (e.g. Best Practicable Environmental Option (BPEO) studies)
- the requirement for the use of a **risk-informed approach** in the creation of LLW management plans, including the use of **Best Practicable Means** (BPM) and reducing **dose As Low As Reasonably Achievable** (ALARA)
- the need to manage LLW in accordance with the **waste hierarchy**
- the government's expectation that there will be a **presumption towards early solutions** in LLW management (including decay storage)
- the principles that should guide public / stakeholder engagement and consultation
- the government's policy on import and export of LLW
- the role of the Nuclear Decommissioning Authority (NDA)

In the policy, it was recognised that, at the time of publication, the UK's national LLW disposal facility, the Low Level Waste Repository (LLWR), did not have the volumetric or radiological capacity to accept all of the LLW that was forecast to arise in the period covering the decommissioning of existing UK civil nuclear facilities (to 2130). The opportunity to adopt more flexible solutions to the management of LLW was recognised as key to ensuring that the capacity of the LLWR is preserved for waste that requires disposal in engineered facilities. The policy identified the need for UK strategies to be developed for the management of LLW, both from the nuclear industry and from other non-nuclear industries, in addition to enabling, for the first time, the development of a regulatory approach to permit landfill disposal of LLW from the nuclear industry.

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2.2 National Nuclear LLW Strategy

The UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry was published in 2010 [5]. This strategy was produced by the NDA on behalf of UK Government. The strategy was based on the principles set out in the Government's policy and outlines the strategy for the management of LLW from the nuclear industry in the UK. Two subsequent national LLW strategies have been developed, addressing both the management of anthropogenic LLW from non-nuclear industries, as well as the management of Naturally Occurring Radioactive Material (NORM) waste. These are not components of the LLWR "National Waste Programme" and so are considered further here.

A revised strategy has been produced by DECC and was issued for consultation in January 2015 [6]; it is due to be published later in 2015. The scope and direction are unchanged but the revised strategy reflects the developments in LLW management practices since the publication of the first version of the strategy.

The three main themes of the strategy are:

- application of the waste hierarchy (see section 5.3)
- making the best use of existing LLW management assets
- the need for new fit-for-purpose waste management routes

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3. International Obligations & their Application in UK Law

Radioactive waste management policy in the UK is influenced by several international treaty obligations and by the UK's observance of the protocols agreed by the International Atomic Energy Agency (IAEA) and International Commission on Radiological Protection (ICRP).

3.1 European Union (EU) & EU Directives

Regulation of activities involving nuclear materials or radioactive waste in the UK is partially guided by the UK being an EU Member State. The EU issues regulations and directives. A regulation is a law that is applicable to all individuals in all EU countries, while directives set out general rules to be transferred into the national law of each EU country as they deem appropriate; EU Directives are implemented in the UK through their transposition into UK legislation.

3.1.1 Non-radioactive Waste - Waste Framework Directive

European Union Directives deal with radioactive and non-radioactive waste separately. The Waste Framework Directive (WFD) (2008/98/EC) [7] applies to non-radioactive waste only. The WFD has been implemented in the UK through several pieces of legislation including the UK Environmental Permitting Regulations 2010 (as amended) (EPR) [8].

Once a waste has been defined as radioactive, the controls and requirements of the WFD do not apply directly, even when the radioactivity is a minor polluting element of the waste, as radioactive waste is not 'Directive' Waste [9]. There are exceptions to this, including where radioactive waste is exempted from the requirement for an environmental permit in respect of a radioactive substances activity or is classified as out-of-scope of the legislation governing management of radioactive waste, but has hazardous properties and is therefore covered by the hazardous waste regulations. However, UK Government guidance on the EPR makes clear that there is an expectation that the same level of protection should be delivered in the regulation of radioactive wastes, with regard to their non-radioactive properties, as would otherwise be required by the requirements of other relevant legislation.

3.2 Euratom Treaty & Directives

The Euratom (European Atomic Energy Community) Treaty [10], establishing the European Atomic Energy Community, was signed in 1957 and covers activities involving radioactive substances. The UK has signed the Euratom Treaty and is thus bound to implement the treaty requirements, as well as subsequent Euratom Directives, which are issued under the terms of the treaty.

Chapter 3 of the treaty, covering health and safety provisions, is particularly significant to radioactive waste management. Chapter 7 covers safeguards and may also have particular resonance for LLW management where LLW contains special fissile materials.

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Article 37 of the treaty requires the Euratom Community to be informed about any new plan for the disposal of radioactive waste [11], which should include an assessment of potential impacts on neighbouring Member States, including the potential for contamination of the soils, airspace or water of another Member State. This information must be provided before the appropriate regulator can issue a permit or authorisation for disposal of waste, including the disposal of LLW.

The details of how this requirement operates are set out in Commission Recommendation 2010/635/Euratom of 11 October 2010 on the application of Article 37 of the Euratom Treaty [12]. Article 37 is a UK obligation and requires that a positive 'opinion' is received from the Euratom community before any permit issued by the relevant environmental regulator can take effect. The need to seek opinion under Article 37 can be triggered by a number of events including (but not limited to) any increase in permit limits for radioactive disposals to the environment or changes to reference accident scenarios.

3.2.1 Directive on the Management of Spent Fuel and Radioactive Waste

Of relevance to LLW is Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste [13]. Requirements of this Directive are detailed below, as they underlie many of the UK statutory requirements relating to LLW management.

The Directive requires that member states have:

- **a National Policy**
The directive requires that Member States have national policies that ensure the responsible and safe management of spent nuclear fuel and radioactive waste, both now and in the future. The UK Government's LLW policy (see section 2.1) fulfils this requirement for LLW.
- **National Programme(s)**
The Directive also requires that member states establish a national programme which is responsible for implementation of this policy. The UK National Programme for spent fuel and radioactive waste will be published in 2015.
- **a competent regulatory authority**
Member States must establish a competent regulatory authority which is responsible for radioactive waste management. This must be separate from any other organisation associated with the promotion or exploitation of nuclear energy or radioactive material, electricity generation using nuclear power or the management of spent fuel and radioactive waste. ONR and the environment agencies fulfil this requirement in the UK.
- **Licence Holders**
Licence Holders have prime responsibility for the safety of spent fuel and radioactive waste management; they are responsible for assessing and verifying the safety of

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their facility and activities under the regulatory control of the competent regulatory authority. Reference to a 'licence holder' here refers to the various organisations granted permission by the relevant regulatory authority – including nuclear site licenses, environmental permits and authorisations (such as nuclear site licence holders and permitted landfill operators).

Safety cases

The Directive also sets out the requirement for a safety demonstration (or safety case); this is prepared as part of the licence application for a facility or activity; it must cover the development and operation of an activity or facility and the decommissioning of a facility. For disposal facilities, the safety case should cover the closure and post- closure phase. The safety case should be proportionate to the complexity of the operation and the magnitude of the hazards associated with the facility or activity.

3.2.2 Basic Safety Standards Directive

A revised Basic Safety Standards (BSS) Directive (2013/59/Euratom) [14] was adopted on the 5th December 2013; UK Government must implement the Directive into UK law by the 6th February 2018. The new BSS Directive incorporates the latest recommendations from the International Commission on Radiological Protection (ICRP), published in 2007; it aligns the Euratom Directive with the Basic Safety Standards of the International Atomic Energy Agency (IAEA) and replaces Directive 96/29/Euratom [15].

The 1996 BSS Directive (Directive 96/29/Euratom), which is the version transposed into the current UK legislative framework, lays down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation. It sets out the principles of justification, optimisation and dose limits for practices involving ionising radiation.

The parts of the BSS Directive that relate to optimisation, radiation dose limits and qualified experts were implemented in the UK through transposition into different legislation in each of the devolved administrations:

- England and Wales: Radioactive Substances (Basic Safety Standards) (England and Wales) Direction 2000 [16]; (these requirements are now included in Schedule 23, Part 4 of the Environmental Permitting (England and Wales) Regulations 2010 (EPR10) (see section 5.2))
- Scotland: Radioactive Substances (Basic Safety Standards) (Scotland) Direction 2000 (Scottish Executive 2000) [17]
- Northern Ireland: Radioactive Substances (Basic Safety Standards) Regulations (Northern Ireland) 2003 [18]

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The Ionising Radiations Regulations 1999 (SI 1999/3232) (IRR99) [19] implement some further requirements of the BSS Directive, particularly those relating to occupational exposure to ionising radiation (see section 4.2).

The Justification of Practices Involving Ionising Radiation Regulations 2004 (SI 2004/1769) (the Justification Regulations) [20] implement the BSS Directive requirements with respect to the justification of a practice resulting in exposure to ionising radiation. Justification means that for a type of practice, the overall benefits must outweigh the health detriments that may be caused. Guidance [21] produced by the Government and the devolved administrations, on the Justification Regulations, advises that *'management and disposal of radioactive waste is an integral part of the practice producing the waste and should not be viewed as a free-standing practice that requires specific justification.'*

3.3 International Atomic Energy Agency (IAEA)

The IAEA is an international organisation which was established in 1957 to promote safe, secure and peaceful use of nuclear technology. The UK has been a member of the IAEA since 1957.

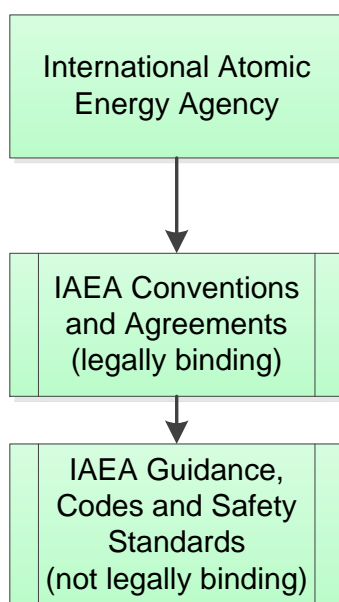


Figure 3: IAEA instruments

3.3.1 Safety Standards

The IAEA publishes Safety Standards documents, which establish the IAEA's safety objective, the requirements for meeting this objective and provide guidance on how to comply with the safety requirements. The publications by means of which the IAEA establishes standards are issued in the IAEA Safety Standards Series. This series covers nuclear safety, radiation safety, transport safety and waste safety. The publication categories in the series are Safety Fundamentals, Safety Requirements and Safety Guides. The chief users of the safety standards are regulatory bodies and organisations which operate nuclear facilities or are involved in their design or manufacture, for example, the Safety Standards are used by ONR in its review of setting its own standards and principles for the regulation of nuclear sites. The IAEA has published advice on the legal and governmental responsibilities for the safety of nuclear facilities, the safe use of sources of ionising radiation, radiation protection, managing radioactive waste and transporting radioactive material safely [22]. The IAEA's advice feeds into national and international legislation and codes of practice and is regarded as a statement of good practice by the UK environment agencies.

3.3.2 Joint Convention

The UK has ratified the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management [23]. The Joint Convention applies to spent

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fuel and radioactive waste from civilian nuclear reactors and applications. The Joint Convention also applies to planned and controlled releases of liquid or gaseous radioactive materials into the environment, from regulated nuclear facilities. Under the Joint Convention, the UK is required to:

- Establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management
- Ensure that the design and construction of a radioactive waste management facility provides for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases
- Submit a national report every three years, detailing the measures taken to implement the Joint Convention obligations.

3.4 International Commission on Radiological Protection (ICRP)

The International Commission on Radiological Protection (ICRP) is an independent advisory body that provides recommendations and guidance on radiation protection. It is not mandatory to transpose this guidance into law, but most members, including the UK, observe it closely. Public Health England (PHE) (formerly the Radiation Protection Division of the Health Protection Agency) publishes advice on the recommendations of ICRP [24] and advises the government on whether the recommendations are acceptable and how they should be applied in the UK.

The ICRP recommendations also inform possible changes to the Basic Safety Standards Directive and consequently to the UK legislation which implements the directive.

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4. Office for Nuclear Regulation

In the UK, the safety of nuclear installations is assured by a system of regulatory control based on a licensing process in which a corporate body is granted a licence to use a defined site for specified activities [25]. ONR is an independent statutory body, established by Part 3 of the Energy Act 2013 [26] and regulates the safety of nuclear installations (including conventional safety) and the transport of radioactive materials [27].

ONR carries out interventions (such as inspections and assessment of documentation provided by licensees) to ensure that licence conditions are complied with. ONR undertakes enforcement activities ranging from the provision of advice through to prosecution.

4.1 Energy Act 2013

The Energy Act 2013 is the legislation which sets the framework for nuclear regulation in the UK. The Energy Act 2013 gave ONR legal powers for enforcement of 'relevant statutory provisions' (RSP) under Schedule 15 of the Health and Safety at Work Act 1974 (HSW 74) such as parts of the Nuclear Installations Act 1965 [28], the Nuclear Industries Security Regulations 2003 [29] and the Carriage of Dangerous Goods Regulations 2009 (as amended) [30] as they apply to the carriage of radioactive material for civil purposes. Each of these is discussed in more detail in the following sections.

4.2 Health and Safety at Work Act 1974

Nuclear industry employers have the same responsibilities as employers in other industries to ensure the safety of their employees. The relevant statutory legislation governing conventional safety is the HSW 74 [31] which sets out general safety requirements on all employers, and therefore covers safety aspects for workers dealing with spent fuel and radioactive waste. The Management of Health and Safety at Work Regulations 1999 (a RSP under HSW 74) make more explicit what employers are required to do to manage health and safety under HSW 74; like the Act, they apply to every work activity. In Northern Ireland, the Health and Safety at Work (Northern Ireland) Order 1978 [32] applies. ONR is responsible for regulating Health and Safety on nuclear licensed sites, under HSW 74. Details of ONR's regulation under HSW 74 can be found in its Nuclear Safety Technical Inspection Guide: The Regulation of Conventional Health and Safety on UK Nuclear Licensed Sites [33]. HSW 74 places duties on employers to ensure the health, safety and welfare of their employees, and that persons not in their employment are not exposed to risks to their health and safety due to the employer's operations. The employer is required to ensure that these duties are met "so far as is reasonably practicable" (SFAIRP). SFAIRP is therefore the basic legal requirement to which an employer needs to conform, and in nuclear safety is termed 'As Low As Reasonably Practicable' (ALARP). ONR judges ALARP essentially by balancing time, impact and cost against the benefit.

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4.3 Ionising Radiations Regulations 1999

The Ionising Radiations Regulations 1999 (IRR 99) [34] is an RSP under Schedule 15 the Health and Safety at Work Act 1974 and came into force on 1 January 2000 in concordance with the Basic Safety Standards (96/29/Euratom) 1996 Euratom Directive. On nuclear licensed sites, ONR inspects compliance with IRR 99.

IRR 99 sets out the requirements for the employer to ensure that their employees are adequately protected from ionising radiation, including the details of dose limits, the requirements for prior risk assessment, ALARP, keeping dose records, consultation with a Radiation Protection Adviser, appointment of a Radiation Protection Supervisor, designation of controlled and supervised areas, and setting local rules. Regulation 8 of IRR 99 requires the employer to take all necessary steps to restrict, as far as is reasonably practicable, the extent to which persons are exposed to ionising radiation.

4.4 Nuclear Installations Act 1965: Site Licensing

For nuclear installations, employers' responsibilities for health and safety are reinforced by the Nuclear Installations Act 1965 (NIA 65) as amended. Sites in the UK with nuclear reactors (except reactors forming part of a means of transport) and certain other classes of nuclear installations which are prescribed by the Nuclear Installations Regulations 1971 [35], must be licensed under NIA 65. There are no nuclear installations in Northern Ireland, therefore this Act does not apply there, but applies to the rest of the UK.

Sections 1, 3-6, 22 and 24A of the NIA 65 are relevant statutory provisions of the Energy Act 2013 and provides for ONR to regulate nuclear sites through licensing. Nuclear Site Licences may cover a site through its entire lifecycle including installation, commissioning, operation and decommissioning. ONR sets out site licence conditions that set out the general safety requirements to deal with the risks on a nuclear site. A Nuclear Site Licence and the conditions attached to it are the primary means of ensuring the safety of nuclear sites in Great Britain. The nuclear site licence granted by ONR is a legal document, containing site-specific information and defines the number and type of installations permitted (installations include nuclear power stations, research reactors, nuclear fuel manufacturing and reprocessing, and the storage of radioactive matter in bulk). A Nuclear Site Licence includes 36 Standard Conditions, which require licensees to implement adequate arrangements to ensure compliance. ONR sets out its requirements for Nuclear Site Licensees in its Safety Assessment Principles for Nuclear Facilities [27].

Where LLW is disposed of promptly, any assessment of management arrangements is conducted by the environment agencies (see section 5). Only where there is a deliberate delay in disposal will ONR assesses the management arrangements. This will be in accordance with the ONR Nuclear Safety Assessment Technical Guide: Management of Radioactive Materials and Radioactive Waste on Nuclear Licensed Sites [37]; this document includes guidance on Nuclear Site Licence conditions which are considered of particular importance to radioactive waste management.

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NIA 65 is not applicable to nuclear activities controlled by the Crown (including the Ministry of Defence (MoD)) or to nuclear submarines ('reactors in a means for transport').

4.5 Nuclear Industries Security Regulations

The Nuclear Industries Security Regulations 2003 (as amended) (NISR) are regulations made under HSW 74 and the Anti-terrorism, Crime and Security Act 2001 [38]. The purpose of the NISR is to ensure that nuclear licensed sites, nuclear material held on other nuclear premises or in the course of transport, the construction of new nuclear sites adjoining existing operating nuclear sites, sensitive nuclear information and uranium enrichment equipment/software held by the civil nuclear industry are subject to effective security protection. The NISR do not apply to nuclear premises operated primarily or exclusively by Ministry of Defence (MOD) or its contractors. The Regulations are administered and enforced by the Office for Nuclear Regulation (Civil Nuclear Security) (ONR CNS).

4.6 Environmental Impact Assessment for Decommissioning Regulations (EIADR)

The EIADR were introduced by the UK government in 1999, as the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (EIADR 99) [39], as amended by the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) (Amendment) Regulations 2006 (EIADR 06) [40], to implement the requirements of the EIA Directive (European Council Directive 85/337/EEC) [41] for nuclear reactors.

The EIADR set out the need for Environmental Impact Assessment (EIA) to be conducted prior to decommissioning certain nuclear reactors. An EIA must also be conducted for certain changes to decommissioning projects. The following are examples of changes or extensions to decommissioning projects, relating to LLW, which may require an EIA:

- A change in the amount of radioactive waste generated
- Changes to waste transportation arrangements
- Changes to siting and waste disposal arrangements
- Changes to waste treatment arrangements on site

This list is not exhaustive and further applicable changes can be found in the EIADR or ONR's guidance on EIADR [42].

The enforcing regulator for the EIADR is the ONR. If a change or extension (e.g. one of those listed above) is likely to result in significant adverse environmental impacts, a decision on whether an EIA is required must be made by ONR. ONR is also responsible for conducting the EIA if this is the case.

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It is the licensee's duty to determine whether an application should be made to ONR, for ONR to then decide whether an EIA is required.

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5. The Environment Agencies (EA, SEPA, NRW, NIEA)

The responsibility for the regulation of radioactive waste disposal, including emissions and discharges of radioactive materials to the environment, lies with the environment agencies. This regulation is a devolved power and is the responsibility of the devolved administrations within the UK. The environment agencies are:

- The Environment Agency (EA) in England
- Natural Resources Wales (NRW) in Wales
- The Scottish Environment Protection Agency (SEPA) in Scotland
- Northern Ireland Environment Agency (NIEA) in Northern Ireland

NRW was set up in 2013. Its regulation of nuclear sites in Wales is supported by resource from the EA, but NRW remains the responsible environment regulator for such sites. There are no nuclear sites in Northern Ireland, but the NIEA is the responsible regulator for disposal of radioactive wastes in or from Northern Ireland.

Whilst devolved administrations exist with separate regulators and different legislation for environmental management, by and large the requirements relating to management of LLW are the same (for example, there is a commonality in the definition of radioactive waste across the different administrations). The environment agencies work jointly where possible to ensure that consistent guidance is applied across the UK.

The environment agencies regulate disposal of radioactive waste from premises, including nuclear licensed sites, under the relevant statutory legislation. The agencies also regulate the keeping and use of radioactive materials and the accumulation of radioactive waste on sites other than nuclear licensed sites. A permit or disposal authorisation from the relevant regulatory authority is required to dispose of radioactive waste. Disposals include discharges into the atmosphere, surface waters and groundwater, disposals to land, and disposals by transfer to another site. The regulator may attach limits and conditions to the permit or authorisations. If operators do not comply with these limitations and conditions, or if they dispose of radioactive waste without an authorisation, they will be committing an offence. Note that tenants on nuclear sites require RSR permits for the keeping / use of radioactive material and the disposal of radioactive waste.

5.1 Environment Act 1995

The Environment Act 1995 sets the basis for the regulatory framework with respect to environmental protection, establishing the EA and SEPA, and their funding arrangements.

5.2 Radioactive Substances Act 1993

The Radioactive Substances Act 1993 (RSA 93) [43] remains the relevant statutory instrument in Scotland and Northern Ireland, where radioactive substances, including non-nuclear waste, must be handled in accordance with RSA 93. The BSS Directive and other EU Directives, and UK

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policies on radioactive waste are implemented in the devolved administrations through the RSA 93. Under RSA 93, SEPA in Scotland and NIEA in Northern Ireland are responsible for regulating disposals of radioactive waste from nuclear licensed sites and other premises using radioactive substances. SEPA sets out its regulatory policy in the SEPA Policy on the Regulation of Disposal of Radioactive Low Level Waste from Nuclear Sites [44].

Progress is being made in Scotland, through the Regulatory Reform (Scotland) Act 2014, to amend the environmental legislation in Scotland to enable a more integrated form of environmental permitting closer in nature to EPR.

5.2.1 Authorisation

Under RSA 93, radioactive waste producers in Scotland must be granted a Disposal Authorisation by SEPA, before they are permitted to dispose of the waste or discharge any radioactivity to the environment; this includes transfer of waste to another site or operator. The regulator may attach limits and conditions to the authorisation. RSA 93 sets out the definition of radioactive waste and lists those items which are exempt from regulation under this act.

5.3 Environmental Permitting Regulations 2010

In April 2010, RSA 93 was repealed in England and Wales and was incorporated into Schedule 23 of the Environmental Permitting (England and Wales) Regulations 2010 (EPR10) [8]. The requirements of the legislation have been subject to subsequent amendment.

EPR10 is the current statutory instrument for regulation of LLW management in England and Wales. The EA and NRW regulate the keeping and use of radioactive materials and radioactive waste disposals under EPR10 in both England and Wales respectively. EPR10 implements the requirements of a number of EU Directives, including the Waste Directive.

5.3.1 Permitting

Permitting requirements are derived from Government policy and European Directives, as transposed in the legislation applying to England and Wales (EPR10). Guidance on the permitting process is detailed in the Core Guidance on the Environmental Permitting Regulations [45]. Specific Government guidance on EPR for radioactive substances legislation and associated regulatory guidance is available from <https://www.gov.uk/government/publications/radioactive-substance-regulations-rsr-guidance/>.

5.4 Common requirements for radioactive waste management across the UK

There is a requirement for any waste producer who disposes of waste (including transfer of waste to another site), or discharges radioactivity to the environment, to hold a permit from the EA or NRW (for England and Wales respectively) or an authorisation from SEPA or NIEA (for Scotland and Northern Ireland respectively). Nuclear site licensees, licensed under NIA65, require an environmental permit or authorisation for disposal of radioactive waste. In addition, tenants on nuclear licensed sites and those on sites other than nuclear licensed sites require

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environmental permits or authorisations for the keeping or use of radioactive material, and the disposal of radioactive waste.

Operators who dispose of waste by transfer to other sites must hold an environmental permit or authorisation for these transfers; these can allow transfer to any site where the operator of that site holds a suitable environmental permit or authorisation to accumulate or dispose of the relevant type of waste.

The operators of disposal sites for LLW must also hold a relevant permit under EPR10 or authorisation under RSA93. Guidance on permitting for the operator of a waste disposal facility is set out in the environment agencies' Guidance on Requirements for Authorisation (2009) [46].

Liquid and gaseous radioactive discharges are outside the scope of this guidance document, but much of the published guidance on the EPR10 and RSA93 applies to all forms of LLW disposal. Permits issued under EPR10 and authorisations under RSA93 include limits and conditions on solid, liquid and gaseous waste disposals.

5.5 Clearance, Exemption and Out-of-Scope

The terms 'exclusion', 'clearance' and 'exemption' are defined in UK legislation derived from the Basic Safety Standards [14, 15] which also explain the use of the concepts for establishing the scope of regulatory control. Exemption levels are set out in Annex 1 of the BSS Directive.

The Environmental Permitting Amendment Regulations 2011 (SI 2011/2043) amended the regulatory framework in England and Wales to include and update the previous exemption orders system. Equivalent changes were achieved in Scotland and Northern Ireland through regulations that amended RSA93.

The legislation introduced two definitions relating to the clearance and exemption of waste:

- The 'out-of-scope of regulation' definition – these are wastes which are not subject to regulation under the legislation pertaining to radioactive wastes (i.e. EPR10 or RSA93).
- The 'exempt from permitting' definition – these are substances which are considered to be radioactive but which are exempt from the need for a permit under the legislation.

Guidance on clearance of waste and the thresholds which apply is set out in the Nuclear Industry Code of Practice for Clearance and Exemption [49] and additional guidance is available from Government and the devolved administrations [50]. Wastes and materials which are out of scope or conditionally exempt from permitting under EPR10 or RSA 93 are not exempt from other legislation, for example, wastes may be classified as hazardous, non-hazardous or inert wastes depending on their properties.

Hazardous Waste

Certain requirements of the Waste Directive have been transposed into the Hazardous Waste (England and Wales) Regulations (2005) as amended [51]. Wastes which have been cleared as out-of-scope and therefore exempted from regulation under EPR10, but which have hazardous properties, may be classified as hazardous waste, in which case they will be subject regulation under the Hazardous Waste Regulations (England and Wales), or Special Waste Regulations (Scotland) [52]. Guidance on the Hazardous Waste Regulations can be accessed at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/369810/LIT_5426_WM2.pdf (Hazardous waste: Interpretation of the definition and classification of hazardous waste (3rd Edition 2013), SEPA, NIEA, NRW & EA) (Note: New Technical Guidance (WM3) is due to be issued in 2015, and the 1st edition is currently available in draft form.)

5.6 Optimisation

There is a requirement under the environmental legislation and regulation for duty holders to demonstrate optimisation with respect to their decision making and arrangements for radioactive waste management. Optimisation requires operators, when making disposals of radioactive waste, to keep the radiological impacts on people as low as reasonably achievable whilst taking economic and social factors into account. Key considerations in optimisation are the Waste Hierarchy, As Low As Reasonably Achievable (ALARA) / AS Low As Reasonably Practicable (ALARP) and Best Available Technique (BAT). Guidance on optimisation relating to RSR is available from <https://www.gov.uk/government/publications/radioactive-substance-regulations-rsr-guidance/>.

5.6.1 Waste Hierarchy

Article 4 of the EU Waste Framework Directive sets out the need for waste to be managed in accordance with the waste hierarchy. In the UK, this requirement is implemented into the UK statutory requirements as part of EPR10. The UK LLW strategy [5, 6] states the following regarding the waste hierarchy:

“Implementation of the waste hierarchy is mandated by policy and environmental regulation throughout the lifecycle of a facility, and is recognised as good practice in all aspects of radioactive and non-radioactive waste management. It is also an essential consideration for determining BAT.”

Guidance on how operators can demonstrate that they are managing waste in line with the waste hierarchy can be found in the EA’s Technical Guidance Note: How to Comply with your Environmental Permit [47] and in guidance published by LLW Repository Ltd [48].

SEPA’s policy states that it *“requires the disposer of the waste to identify the most advantageous option for managing the waste taking into account such factors as the waste hierarchy, the proximity principle and the lifecycle environmental and social benefits of managing waste at higher levels of the waste hierarchy.”*

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Delivery of waste management that aligns with the Waste Hierarchy is one of the goals of optimisation; however it is recognised that simple application of the Waste Hierarchy may not always be appropriate when optimising protection of people and the environment.

5.6.2 ALARA and ALARP

There is a statutory requirement for operators to ensure that exposures to ionising radiation, of employees, members of the public and of the populations as a whole, are kept As Low As Reasonably Achievable (ALARA), economic and social factors being taken into account. This optimisation requirement is conferred by the BSS Directive and implemented into UK law through IRR 99, EPR10 (England and Wales) and RSA 93 (Scotland and Northern Ireland). Article 6(3) of BSS Directive defines the optimisation principle (Schedule 23, Part 4, paragraph 1).

ALARA is similar to As Low As Reasonably Practicable (ALARP); the requirement for risks to be ALARP is fundamental and applies to all activities within the scope of the HSW 74. ONR's guidance on ALARP [53] states that ALARP arguments need to consider all the types of risk that are relevant, not just the nuclear or radiological ones.

ALARP is central to radiological protection and is used to ensure that that employees work down from statutory dose limits, rather than up to them. IRR Regulation 8 requires that exposure should be restricted 'So Far As Is Reasonably Practicable' (SFAIRP). SFAIRP requires the same tests to be applied as ALARP; SFAIRP and ALARP are effectively the same thing.

5.6.3 Best Available Techniques (BAT)

The UK LLW Strategy [5, 6] states the following regarding the use of Best Available Techniques (BAT):

"The process for deciding the best techniques for managing LLW in specific cases... should be made in an open and transparent manner. These decisions should be taken through the application of the BAT process, which seeks to identify a practicable solution with the least environmental impact, whilst taking cognisance of other factors such as safety, security, sustainability and lifecycle costs."

It is a requirement of permits issued by the Environment Agency, under EPR10, that waste producers and waste management or disposal facility operators demonstrate the use of BAT when making waste management decisions:

"An operator should use the "Best Available Techniques" (BAT) in relation to waste management and other associated matters which could have an impact on radiation doses to members of the public, in order to achieve the optimisation requirement [9]."

Guidance on conducting BAT assessments can be found in the Best Available Techniques NCoP [54]. It is a requirement of SEPA that holders of disposal authorisations, under RSA 93, demonstrate the use of Best Practicable Means (BPM) when disposing of LLW [44]. Regulatory

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guidance is that BAT and BPM are equivalent and represent essentially the same assessment process, with the same aim.

6. Transport

In addition to the road transport law and regulations applicable to all goods transportation in the UK, there exist legislative articles specific to dangerous goods; radioactive materials including waste, are classed as 'dangerous goods' (Class 7: Radioactive Materials).

ONR Radioactive Materials Transport (ONR-RMT) is responsible for regulating the safety (and in some cases security) of radioactive materials during transport in the public domain, by road and rail in Great Britain. ONR-RMT also advises on the transport of radioactive material by air or sea, within UK territorial waters. ONR-RMT is responsible for enforcing compliance with the regulations, inspections of duty-holders under these regulations and assessment of submissions for approval of certain radioactive materials transport packages and shipments. For Defence activities DNSR regulates the transport of radioactive materials.

LLW must be transported in accordance with national and international regulations applicable to the mode of transport used (i.e. road, rail, or sea). The international regulations concerning the

transport of radioactive material are the IAEA SSR-6 Regulations [55]. These International standards on the transport of dangerous goods by road are derived from the recommendations of the UN Committee of Experts, contained in the UN Recommendations on the Transport of Dangerous Goods (UNRTDG). These are model regulations, which incorporate the IAEA regulations. Regulations are designed to protect people, property and the environment, whenever radioactive material is transported in the public domain and are the primary technical basis for the safe transport of radioactive material. They are implemented into UK legislation through the transposition of EU Directives.

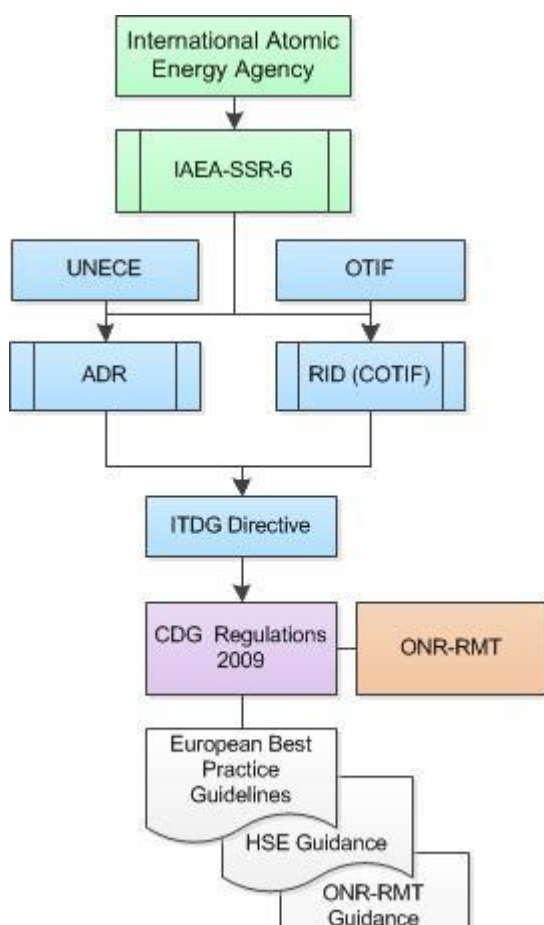


Figure 4: Hierarchy of legislation for the Carriage of Dangerous Goods (CDG) Regulations 1009

6.1 Carriage of Dangerous Goods Regulations

The primary legislation governing the overland transport of radioactive materials in the UK is Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (CDG 2009) (as amended) [56]. The relationship between this legislations and international agreements is shown is figure 4. The CGD 2009 Regulations implement the Inland Transport of Dangerous Goods Directive 2008 (ITDG 2008) (Directive 2008/68/EC) [57] which is based on the

European Agreement concerning the International Carriage of Dangerous Goods by Road

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(ADR), produced by the UN Economic Commissions for Europe (UNECE) [58] and Appendix C of the Convention Covering International Carriage by Rail (COTIF): the Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) [59] produced by the International Governmental Organisation for International Carriage by rail (OTIF). The ITDG 2008 directive effectively makes ADR and RID apply to domestic as well as international transport. ADR and RID are prescriptive and incorporate the IAEA SSR-6 Regulations. ADR and RID are effectively UK law, as CDG 2009 directly references ADR and RID, and it is these agreements that contain the detailed requirements.

6.2 International Transport

The ADR and RID are effectively the legislation governing international transport of dangerous goods by road and rail respectively. The International Maritime dangerous Goods (IMDG) code and the technical instructions issued by the International Civil Aviation Organisation (ICAO) deal with the carriage of dangerous goods by sea and air respectively.

6.2.1 Sea

Figure 5 shows the legislation governing the movement of dangerous goods by sea transport. The IMDG code contains internationally agreed guidance on the safe transport of dangerous goods by sea; most commonly the carriage of dangerous goods in freight containers and tank containers. It is mainly used by shipping operators, but it is also relevant to those transporting dangerous goods on journeys involving a sea crossing. Individual countries are responsible for implementing the IMDG Code under their own legislation; in the UK this is done through the Merchant Shipping (Dangerous Goods and Marine Pollutant) Regulations 1990, which are enforced by the Department of Transport, and the Dangerous Substances in Harbour Areas Regulations 1987, as enforced by HSE

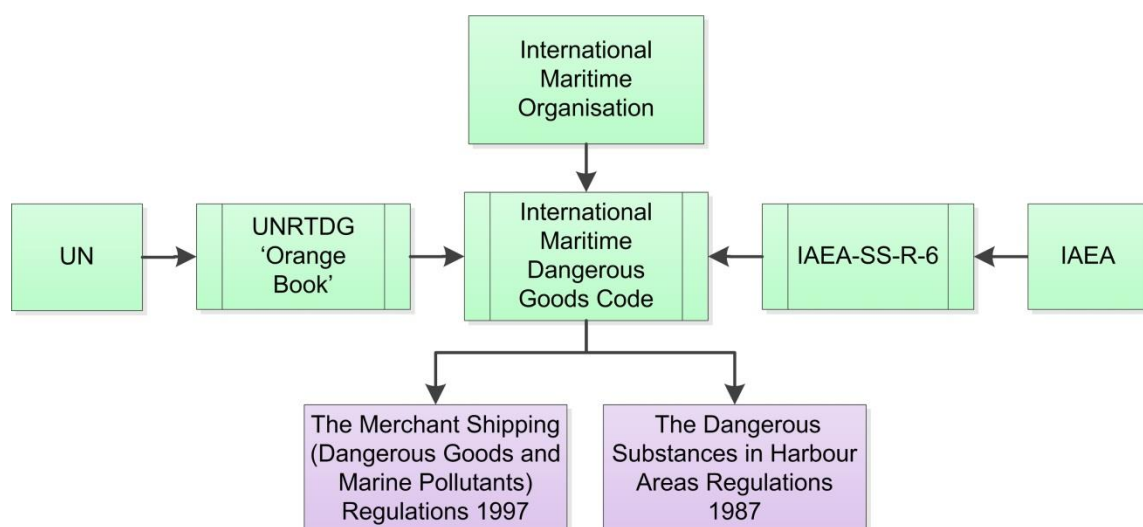


Figure 5: Sea transport regulations

6.2.2 Air

Figure 6 shows the regulations for transporting dangerous goods by air. For goods packaged and consigned for air transport, the International Civil Aviation Organisation (ICAO) Technical Instructions set the relevant standards. Enforcement is by the Civil Aviation Authority (CAA). Airlines usually work to International Aviation Transport Authority (IATA) rules, which are based on the ICAO technical instructions.

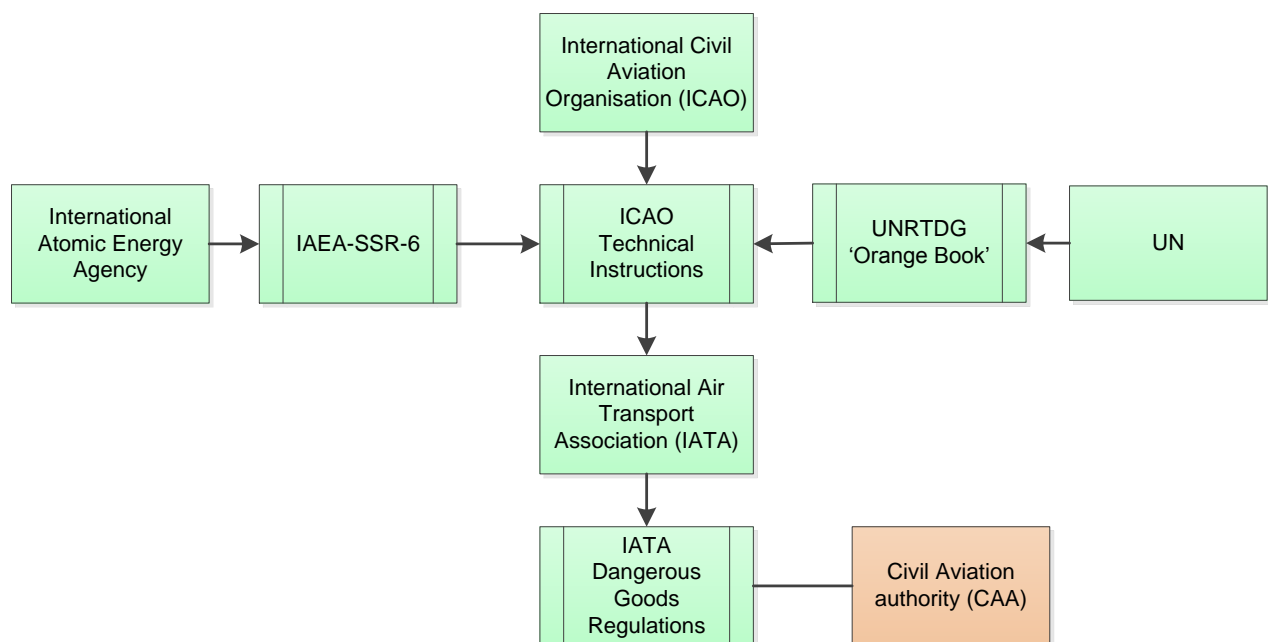


Figure 6: Air transport regulations

6.3 The Transfrontier Shipment of Radioactive Waste and Spent Nuclear Fuel Regulations

Overseas transport of LLW is regulated under The Transfrontier Shipment of Radioactive Waste and Spent Nuclear Fuel Regulations 2008 (SI 2008/3087) [60], which transpose Council Directive 2006/117/Euratom 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel, into UK legislation. The Transfrontier Shipment Regulations set out the circumstances and conditions under which radioactive waste and spent nuclear fuel may be imported and exported. These regulations are enforced by the relevant competent authority (EA in England and Wales, SEPA in Scotland and the Chief Inspector in NI) and complement the environment agencies' powers and duties under EPR10 and RSA 93. A transfrontier shipment authorisation must be granted by the regulator before the shipment of radioactive waste overseas may occur. In some cases, for certain materials or items, an export licence may also be required. This licensing is carried out by the Export Control Organisation, part of the Department for Business, Innovation and Skills.

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6.4 Dangerous Goods Safety Advisor

Businesses that handle, process or transport dangerous goods on a regular basis must appoint a Dangerous Goods Safety Advisor (DGSA) in order to comply with HSW 74. The DGSA is responsible for monitoring compliance with rules governing transport of dangerous goods, advising on the transport of dangerous goods, monitoring procedures and safety measures and advising on the potential security aspects of transport. These regulations can apply to any person who allows dangerous goods to be carried, not just the transport operator.

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7. Enforcement

Failure to comply with the requirements of regulations or with the conditions of a permit, authorisation, or licence condition is a criminal offence. The regulators have a range of enforcement powers including entry, investigation and collection of evidence, prohibition of activities and prosecution.

7.1 Office for Nuclear Regulation

ONR is empowered to appoint suitably qualified individuals to act as inspectors under the Energy Act 2013 and the Health and Safety at Work Act 1974 (HSW 74). Inspectors can enforce the relevant statutory provisions and legislation under these acts.

ONR carries out both permissioning inspections and compliance inspections; the former are designed to allow ONR to ensure that hazards are fully understood and controlled prior to its permissioning radioactive substances activities, while the latter ensure that the licensee is compliant with their licence conditions.

If licensees/operators are found to be repeatedly non-compliant (in the case of a minor breach) or a serious non-compliance event is observed, (with potential or actual severe safety consequences), a system of enforcement actions is used to enforce compliance [61].

The ONR has available a range of tools for enforcement of the relevant statutory provisions. These include regulatory actions termed 'primary powers', which include consents, approvals, directions, agreements, notification, specification and agreements. These powers allow ONR to take a range of actions including directing a licensee to stop a particular operation; the details of each primary power are set out in ONR's publication 'Licensing Nuclear Installations [25].

In the case of repeated or serious non-compliance, the enforcement actions available to ONR are:

- **Improvement Notices** (Under powers granted to ONR by the Energy Act 2013 and HSW 74)

Contraventions of one or more relevant statutory provisions where the contravention is likely to be repeated will result in an improvement notice being served which requires the contravention to be remedied.

- **Prohibition Notices** (Under powers granted to ONR by the Energy Act 2013 and HSW 74)

An inspector may serve a prohibition notice if they are of the opinion that activities are being, or are likely to be carried out, which risk causing serious personal injury. The notice prohibits the activity continuing.

- **Prosecution** (Under powers granted to ONR by HSW 74)

Contraventions of the provisions of the Energy Act 2013, HSW 74 or any of its relevant statutory provisions may lead to a criminal prosecution.

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A breach of the licence conditions is an offence, for which the licensee, as well as any other person with duties on the site who commits such a breach, may be prosecuted. Prosecution may lead to a criminal conviction, fines and / or imprisonment, as well as to reputational damage to organisations.

7.2 Environment Agency

Under the powers granted to the EA by the acts and statutory instruments under which it regulates, the EA is entitled to enforce compliance with the legal requirements set out in the legislation. Enforcement means any action taken by the EA, where it is suspected that an offence has occurred or, in some cases, is about to occur. The EA has a system of enforcement actions, which it may take in the event of non-compliance. Enforcement can be issued against individuals or organisations. Criminal offences under the acts and regulations which the EA regulates under may lead to a Warning, Formal Caution or Prosecution. The enforcement actions are set out in detail in the EA's Enforcement and Sanctions Policy Statement [62].

In Wales, the enforcement powers held by the EA have been transferred to NRW.

7.3 Scottish Environment Protection Agency

Where possible, SEPA seeks to engage, encourage and inform those who are subject to environmental legislation, to secure compliance. Where breaches of the law arise, SEPA will undertake enforcement action in a proportionate manner; enforcement means any action taken to ensure compliance with the legislation that SEPA has a duty to enforce.

SEPA officers use mechanisms of increasing formality and impact on those who fail to meet regulations or comply with licence conditions. In the majority of cases, SEPA will take the least formal action necessary to secure compliance. Further details of SEPA's enforcement activities are set out in its Enforcement Policy [63].

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9. Acronyms, Abbreviations and Definitions

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ALARA	As Low As Reasonably Achievable
ALARP	As Low As Reasonably Possible
BAT	Best Available Technique
BPEO	Best Practicable Environmental Option
BPM	Best Practicable Means
BSS	Basic Safety Standards
CDG 2009	Carriage of Dangerous Goods and the use of Transportable Pressure Equipment Regulations 2009
Cm2919	Command 2919
DECC	Department for Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
DNSR	Defence Nuclear Safety Regulator
EA	Environment Agency
EA 13	Environment Act 2013
EC	European Commission
EIADR	Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations
EPR10	Environmental Permitting (England and Wales) Regulations 2010
EU	European Union
HAW	Higher Activity Waste
HSE	Health and Safety Executive

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HSW 74	Health and Safety at Work Act 1974
IAEA	International Atomic Energy Agency
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
ICRP	International Commission on Radiological Protection
IRR 99	Ionising Radiations Regulations 2009
IMDG	International Maritime Dangerous Goods Code
IMO	International Maritime Organisation
ITDG	Inland Transport of Dangerous Goods Directive
LA-LLW	Lower Activity Low Level Waste
LLW	Low Level Waste
LLWR	Low Level Waste Repository
MoU	Memorandum of Understanding
NDA	Nuclear Decommissioning Authority
NIA65	Nuclear Installations Act 1965
NICoP	Nuclear Industry Code of Practice
NIEA	Northern Ireland Environment Agency
NORM	Naturally Occurring Radioactive Materials
NRW	Natural Resources Wales
ONR	Office for Nuclear Regulation
ONR CNS	Office for Nuclear Regulation (Civil Nuclear Security)
ONR RMT	ONR Radioactive Materials Transport
OTIF	Intergovernmental Organisation for the International Transport of Goods by Rail
PHE	Public Health England

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RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
RSA 93	Radioactive Substances Act 1993
RSP	Relevant statutory provision
SAPs	Safety Assessment Principles
SEPA	Scottish Environment Protection Agency
SI	Statutory Instrument
SLC	Site Licence Company
UNECE	United Nations Economic Commission for Europe
UNRTDG	United Nations Recommendations on the Transport of Dangerous Goods
VLLW	Very Low Level Waste
WFD	Waste Framework Directing

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Definitions

ADR the European Agreement concerning the International Carriage of Dangerous Goods by Road “*Accord européen relatif au transport international des marchandises Dangereuses par Route*”, concluded at Geneva on 30 September 1957.

Best Available Techniques (BAT) means the latest stage of development of processes, facilities or methods of operation which indicate the practical suitability of a particular measure for limiting waste arisings and disposal. In determining what constitutes BAT consideration shall be given to:

- comparable processes, facilities or methods which have been tried out successfully
- technological advances and changes in scientific knowledge and understanding
- the economic feasibility of such techniques
- time limits for installation in both new and existing plants
- the nature and volume of the disposals concerned

It follows that BAT will change with time in the light of technological advances, economic and social factors, and changes in scientific understanding.

Command 2919 (Cm2919) The Review of Radioactive Waste Management Policy: Final Conclusions White Paper, published in July 1995. This was the last comprehensive UK Government radioactive waste policy statement, prior to the publication of the 2007 policy. Areas of this statement have been superseded by the decisions and actions of subsequent UK Government administrations.

Disposal occurs when packages of radioactive waste are deposited in a disposal facility, with no intention of retrieval. Under legislation disposal may also include discharging radioactive wastes such as liquid and gaseous effluent into the environment and transfer of wastes from one site to another.

Exempt / out-of-scope waste Some radioactive waste is considered exempt, because its levels of radioactivity fall below the threshold lower activity limit for LLW defined in legislation. Disposal of this waste does not require a radioactive substances permit or authorisation from the environmental regulators under the Environmental Permitting Regulations 2010 (EPR10) in England and Wales, or the Radioactive Substances Act 1993 (RSA 93) in Scotland. However, disposal of exempt waste may be subject to other environmental regulation (e.g. Hazardous Waste Legislation) because of its non-radiological properties.

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Higher Activity Waste (HAW) All High Level Waste (HLW) and Intermediate Level Waste (ILW), and a small fraction of Low Level Waste (LLW) with a concentration of specific radionuclides that prohibits its disposal at existing and planned future disposal facilities for LLW.

High Volume Very Low Level Waste (HV-VLLW) is defined as radioactive waste with maximum concentrations for four megabecquerels per tonne (MBq/Te) of total activity which can be disposed to specified landfill sites. For waste containing hydrogen-3 (tritium), the concentration limit for tritium is 40MBq/Te. Controls on disposal of this material, after removal from the premises where the waste arose, will be necessary in a manner specified by the environmental regulators.

High Level Waste (HLW) radioactive waste exceeding the upper boundaries of activity for classification at LLW, that is sufficiently radioactive that the decay heat significantly increases its temperature and the temperature of its surroundings, so requires cooling to be considered when designing management and storage facilities.

Intermediate Level Waste (ILW) Wastes exceeding the upper boundaries for classification as LLW, but which do not require heating to be taken into account in the design of storage or disposal facilities.

Low Level Waste (LLW) Wastes having a radioactive content not exceeding 4 GBq per tonne of alpha activity, or 12 GBq per tonne of beta / gamma activity.

Low Volume Very Low Level Waste (LV-VLLW) is defined as radioactive waste which can be safely disposed of to an unspecified destination with municipal, commercial or industrial waste, each 0.1m³ of waste containing less than 400 kilobecquerels (kBq) of total activity or single items containing less than 40kBq of total activity. For wastes containing carbon-14 or hydrogen-3 (tritium): in each 0.1m³, the activity limit is 4000 kBq for carbon-14 and hydrogen-3 taken together; and for any single item, the activity limit is 400 kBq for carbon-14 and hydrogen-3 taken together. Regulatory controls on disposal of this material, after removal from the premises where the wastes arose, are not necessary.

Optimisation is the process by which a waste management option is selected, and the practices applied, that best meet the full range of relevant health, safety and environmental principles and criteria taking into account all relevant (e.g. social and economic) factors. Different regulatory regimes use different terminology and have their own guidance on this topic, i.e. reducing risks ALARP, best practicable environmental option (BPEO), use of best practicable means (BPM) and use of best available techniques (BAT). However, all of the above involve the same process: making a judgement between options by comparing benefits in terms of safety/environmental protection and costs in terms of time, effort or money.

RID the Regulations concerning the International Carriage of Dangerous Goods by Rail, appearing as Appendix C to the Convention concerning International Carriage by Rail (COTIF) concluded at Vilnius on 3 June 1999

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Storage of radioactive waste may take place at any stage in the radioactive waste management process. Storage may be used to make the next step in the management process more straightforward or to act as a buffer between or within steps. If it is intended that waste will be retrieved from a facility, this is defined as storage.

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Appendix A: Legislation

Table 1: Key legislation for LLW management. UK legislation can be obtained at <http://legislation.gov.uk>. EU legislation and Euratom legislation can be obtained at eur.lex. (Key to legislation types: A= UK Public General Act; NIOC= Northern Ireland Orders in Council; SI= UK Statutory Instruments; SRNI= Northern Ireland Statutory Rules, EAD= Euratom Directive, NISI= Northern Ireland Statutory Instrument; SSI= Scottish Statutory Instrument; ECR = European Commission Regulation; EUD= EU Directive; WSI=Wales Statutory Instruments)

Abbr.	Title of legislation and any subsequent amendments	Type
Nuclear Safety Regulation		
NIA 65	Nuclear Installations Act 1965	A
EA13	Energy Act 2013	A
Health and Safety		
HSW 74	Health and Safety at Work Act 1974	A
	The Management of Health and Safety at Work Regulations 1999 S.I. No. 3242	SI
	Health and Safety at Work (Northern Ireland) Order 1978 S.I. No. 1039	NIOC
IRR 99	The Ionising Radiations Regulations 1999 S.I. No. 3232.	SI
	The Ionising Radiations (Northern Ireland) Regulations 2000 S.I. No. 375	SRNI
Basic Safety Standards		
BSS	Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom [1]	EAD
	Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation	EAD
	Radioactive Substances (Basic Safety Standards) (Scotland) Regulations 2000 S.I. No. 100	SSI
	Radioactive Substances (Basic Safety Standards) Regulations (Northern	NISI

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Abbr.	Title of legislation and any subsequent amendments	Type
	Ireland) 2003 S.I. No. 208	
Justification		
	The Justification of Practices Involving Ionising Radiation Regulations 2004 S.I. No. 1769.	SI
Environmental Protection		
	Pollution and Prevention Control Act 1995	A
EPR10	Environmental Permitting (England and Wales) Regulations 2010, S.I. No. 675	SI
	Environmental Permitting (England and Wales) (Amendment) Regulations 2010, S.I. No. 676	SI
	Environmental Permitting (England and Wales) (Amendment) (No.2) Regulations 2010, S.I. No. 2172	SI
	Environmental Permitting (England and Wales) (Amendment) Regulations 2011, S.I. No. 2043	SI
	Environmental Permitting (England and Wales) (Amendment) (No.2) Regulations 2011, S.I. No. 2933	SI
	Environmental Permitting (England and Wales) (Amendment) Regulations 2012, S.I. No. 630	SI
	Environmental Permitting (England and Wales) (Amendment) Regulations 2013, S.I. No. 390	SI
	Environmental Permitting (England and Wales) (Amendment) (No.2) Regulations 2013, S.I. No. 766	SI
	Environmental Permitting (England and Wales) (Amendment) Regulations 2014, S.I. No. 225	SI
	Environmental Permitting (England and Wales) (Amendment) (England) Regulations 2014, S.I. No. 2852	SI
	Environmental Permitting (England and Wales) (Amendment) (England) Regulations 2015, S.I. No. 324	SI
	Environmental Permitting (England and Wales) (Amendment) Regulations 2015, S.I. No. 918	SI
	Environmental Permitting (England and Wales) (Amendment) (No.2) Regulations 2015, S.I. No. 934	SI

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Abbr.	Title of legislation and any subsequent amendments	Type
Security		
	Anti-terrorism, Crime and Security Act 2001	A
NISR	Nuclear Industries Security Regulations 2003 S.I. No. 403	SI
	Nuclear Industries Security (Amendment) Regulations 2006 S.I. No. 2815	SI
	Nuclear Industries Security (Amendment) Regulations 2013 S.I. No. 190	SI
	Nuclear Industries Security (Amendment) and Nuclear Security (Prescribed Material) Regulations 2014 S.I. No. 526	SI
Environmental Impact Assessment		
EIA Directive	Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment	EUD
EIADR 99	Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 S.I. No. 2892	SI
Non-Radioactive and Hazardous Waste		
WFD	Directive 2008/98/EC of the European parliament and of the council of 19 November 2008 on waste and repealing certain directives	EUD
	Commission Regulation (EU) No 1357/2014 of 18 December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives Text with EEA relevance	ECR
	Hazardous Waste (England and Wales) Regulations 2005 S.I No. 894	SI
	Hazardous Waste Regulations (Northern Ireland) 2005 S.I No. 300	SRNI
	Hazardous Waste Regulations (Northern Ireland) (Amendment) 2005 S.I No. 461	SRNI
	Hazardous Waste (Wales) Regulations 2005 S.I. No. 1806 (W. 138)	WSI
	Hazardous Waste (England and Wales) (Amendment) Regulations 2009 S.I No. 507	SI
	Hazardous Waste (Wales) (Amendment) Regulations 2009 S.I. No. 2861 (W. 250)	WSI
	Hazardous Waste (Amendment) Regulations (Northern Ireland) 2015 S.I No. 461	SRNI

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Abbr.	Title of legislation and any subsequent amendments	Type
	The Waste (Meaning of Hazardous Waste and European Waste Catalogue) (Miscellaneous Amendments) (Scotland) Regulations 2015 S.I. No. 188	SSI
Radioactive Waste		
	Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste	EAD
Domestic Transport		
ITDG	Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods	EUD
CDG 2009	Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 S.I. No. 1348	SI
Transfrontier Shipment Regulations		
	Council Regulation (Euratom) No 1493/93 of 8 June 1993 on shipments of radioactive substances between Member States	ECR
	Council Directive 2006/117/Euratom of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel	EUD
	Commission Recommendation 2008/956/Euratom of 4 December 2008 on criteria for the export of radioactive waste and spent fuel to third countries	EUD
TFS	The Transfrontier Shipment of Radioactive Waste and Spent Nuclear Fuel Regulations 2008 S.I. No. 3087	SI

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Appendix B: Guidance Documents

Extensive guidance on legislation relating to radioactive waste management has been published. Guidance published by government departments, regulators and professional groups is presented in the table below. This is not an exhaustive list, as regulators have published numerous guidance documents.

Table 2: Guidance on Low Level Waste Legislation and Regulations

Topic	Guidance Document	Details of contents	Issued by
Waste Hierarchy	UK Management of Radioactive Waste: A Good Practice Guide for Application of the Waste Hierarchy , May 2015 [48]	Provides guidance on waste avoidance and minimisation good practice with specific application of the Waste Hierarchy to the management of Low Level Waste (LLW).	LLW Repository Ltd.
	http://llwrsite.com/wp-content/uploads/2013/03/Guidance-for-Application-of-the-WMH-Rev1.pdf		
EIDAR	Guidance on the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations , 2007 [42]	Provides guidance on compliance with the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations. This guidance is intended to be of use to nuclear site licensees, and others who have an interest in the environmental impact of the decommissioning of nuclear reactors. The regulations have been reproduced in the same order as in EIADR, followed by an explanation and advice on compliance.	HSE (now ONR)
	http://www.onr.org.uk/eiadrguidance.pdf		
EPR10	Near Surface Disposal Facilities for Low Level Radioactive Waste: Guidance on Requirements for Authorisation (GRA) , 2009 [45]	Intended for the developers or operators of proposed or existing near-surface facilities for the disposal of radioactive waste. Explains the requirements that the environment agencies expect a developer or operator to fulfil when they apply for an authorisation to develop or operate such a facility.	Environment agencies: EA, SEPA, NIEA, NRW
	http://www.sepa.org.uk/media/103585/near-surface_disposal_facilities.pdf		

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Topic	Guidance Document	Details of contents	Issued by
	Environmental Permitting Guidance: Core Guidance For the Environmental Permitting (England and Wales) Regulations 2010 , [44]	Describes the main provisions of the environmental permitting regulations, how the regulations should be applied and how particular terms should be interpreted in England and Wales.	Department for Environment Food and Rural Affairs (DEFRA)
	https://www.gov.uk/government/publications/environmental-permitting-guidance-core-guidance--2		
Environmental Permitting Regulations 2010	Environmental Permitting Guidance: Radioactive Substances Regulation For the Environmental Permitting (England and Wales) Regulations 2010 , September 2011 [9]	Intended for the EA, which is responsible for Radioactive Substances Regulations (RSR), and operators who use radioactive materials, and accumulate and dispose of radioactive waste. Sets out how RSR should be applied and implemented, explains the legal requirements and includes Schedule 23 of the EPR10.	DEFRA
	https://www.gov.uk/government/publications/radioactive-substance-regulations-rsr-guidance		
	Regulatory Guidance Series, No. RSR1 Environmental Principles for Radioactive Substances Regulation , 2008 [63]	Gives general principles which apply across all RSR activities. Provides the underlying basis for the technical assessments and judgements that Environment Agency staff make when regulating radioactive substances activities, including those about permitting and compliance.	EA
	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296388/geho0709bqsb-e-e.pdf		
	Regulatory Guidance Series, No. RSR 2: The regulation of radioactive substances activities on nuclear licensed sites , August 2012 [64]	An overview of EA policy and regulatory approach to nuclear licensed sites. Includes the permitting process for nuclear licensed sites, the principles of radiological protection and statutory requirements in relation to radioactive waste management.	EA
https://www.gov.uk/government/publications/rgn-rsr-2-regulation-of-radioactive-substances-activities-on-nuclear-licensed-sites			
Regulatory Guidance Series, No. RGN 4 Setting Standards for Environmental Protection , November 2011 [65]	Written for EA staff, this guidance sets out how the EA's regulatory package sets the standards of environmental protection required through the Environmental Permitting (England and Wales) Regulations 2010 and how the regulations implement various EU directives.	EA	
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296475/geho0112bukp			

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Topic	Guidance Document	Details of contents	Issued by
	<i>-e-e.pdf</i>		
	How to comply with your environmental permit for radioactive substances on a nuclear licensed site, 2012 [46]	Explains conditions of the environmental permit, which is issued by the EA, for operators who receive or dispose of radioactive waste from and on nuclear sites.	EA
	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296431/geho0812buss-e-e.pdf		
BAT	Best Available Techniques (BAT) for the Management of the Generation and Disposal of Radioactive Wastes: a Nuclear Industry Code of Practice, December 2010 [66]	This Code of Practice details the principles, processes and practices that may be used when identifying and implementing Best Available Techniques (BAT) for the disposal of radioactive waste in compliance with regulatory conditions. It is intended to provide guidance for practitioners of BAT and to assist those responsible for formulating policy and developing procedures. It also draws on examples of good practice and presents brief case studies. It is not intended to restrict the choice of methods for demonstrating BAT, or to constrain organisational policy.	BAT Working Group – Nuclear Industry Safety Directors Forum
	http://www.nuclearinst.com/write/MediaUploads/SDF%20documents/Best_Available_Techniques_for_the_Management_of_the_Generation_and_Disposal_of_Radioactive_Wastes_-_NICoP.pdf		
	Guidance for the Environment Agencies' Assessment of Best Practicable Environmental Option Studies at Nuclear Sites, February 2004 [67]	This guidance is primarily intended to support the Agencies' assessment of BPEO studies relating to the authorisation of radioactive waste disposal at nuclear sites.	Environment Agencies
	www.sepa.org.uk/media/103546/bpeo_guidance.pdf		
ALARA / BPM	Principles and guidelines to assist HSE in its judgements that duty-holders have reduced risk as low as reasonably practicable, December 2001	This paper defines ALARP and SFAIRP and sets out in plain terms what HSE believes the law requires.	HSE
	http://www.hse.gov.uk/risk/theory/alarp1.htm		

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Topic	Guidance Document	Details of contents	Issued by
	Satisfying the ALARA requirement and the role of Best Practicable Means , May 2012 [68]	Sets out how SEPA ensures that exposures to ionising radiation of the public are kept as low as reasonably achievable (ALARA) and the role that Best Practicable Means (BPM) fulfils in satisfying that requirement. This document also provides SEPA's interpretation of the term BPM and its expectations of operators who have to use BPM as required by their authorisations.	SEPA
	http://www.sepa.org.uk/media/103663/satisfying-the-alara-requirement-and-the-role-of-best-practicable-means.pdf		
RSA 93	Compliance assessment scheme guidance manual, Annex 8 , January 2012 [69]	Provides guidance on how SEPA assesses compliance with the Environmental Limit Conditions and Environmental Management Conditions set out in Disposal Authorisations	SEPA
	www.sepa.org.uk/media/96403/compliance_scheme_manual.pdf		
Clearance, Exemption and Out-of-Scope	Exemption Guidance: Very Low Level Waste , September 2011 [70]	Describes VLLW that is exempt from radioactive substances regulations, and provides guidance on the production, storage and disposal of VLLW.	EA, SEPA and NIEA
	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296426/geho0911buej-e-e.pdf		
	Guidance on the scope of and exemptions from the radioactive substances legislation in the UK. Defra, DECC and the Devolved Administrations , September 2011 [71]	Includes the legislation governing exempt radioactive materials, definitions of exclusion, clearance and exemption and the UK approach to out-of-scope materials.	Defra
	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69357/pb13624-rsl-guidance-110914.pdf		
	Nuclear Industry Code of Practice: Clearance and Exemption [48]	Provides high level guidance on characterisation and sentencing of radioactive waste, including fingerprint determination, sampling techniques and statistical analysis.	Nuclear Industry Safety Directors Forum
http://www.nuclearinst.com/write/MediaUploads/SDF%20documents/clearance_and_exemption_code_of_practice_final_issue_2_min_size.pdf			

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Topic	Guidance Document	Details of contents	Issued by
	Radiation Protection 122: Practical Use of the Concepts of Clearance and Exemption. Part 1: Guidance on General Clearance Levels for Practices , 2000 [72]	Recommendations of the Group of Experts established under the terms of Article 31 of the Euratom Treaty; in this guidance the Commission introduces the notion of general clearance levels for any possible application.	European Commission (EC)
	http://ec.europa.eu/energy/sites/ener/files/documents/122_part1.pdf		
Site Licensing	Safety Assessment Principles for Nuclear Facilities , 2014	Lists principles relating to nuclear safety, radiation protection and radioactive waste management. For use by ONR's inspectors, to guide regulatory judgements and recommendations when undertaking assessments of nuclear site licensees' documentation demonstrating safety.	ONR
	www.onr.org.uk/saps/saps2014.pdf		
	Nuclear Safety Technical Inspection Guide: Licence condition 32: Accumulation of radioactive waste , April 2013 [73]	Details inspection criteria for inspections assessing compliance with Licence Condition (LC) 32, which controls the production, accumulation and recording of radioactive waste on a nuclear licensed site.	ONR
	http://www.onr.org.uk/operational/tech_insp_guides/ns-insp-gd-032.pdf		
	Nuclear Safety Technical Inspection Guide: Licence Condition 33: Disposal of Radioactive Waste . ONR, May 2013 [74]	Details inspection of site licensee's compliance with LC33. Where ONR judges that radioactive waste management procedures are unsafe or inadequate, it may issue a direction to dispose of the waste in accordance with a permit issued by the relevant environmental regulator.	ONR
http://www.onr.org.uk/operational/tech_insp_guides/ns-insp-gd-033.pdf			
Nuclear Safety Assessment Technical Guide: Management of Radioactive Materials and Radioactive Waste on Nuclear Licensed Sites , May 2013 [37]	The guidance is applicable to the management of radioactive material and radioactive waste at all nuclear facilities on nuclear licensed sites. It is intended to assist ONR's inspectors in their technical assessment work in support of making regulatory judgements and decisions	ONR	
http://www.onr.org.uk/operational/tech_asst_guides/ns-tast-gd-024.pdf			

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Topic	Guidance Document	Details of contents	Issued by
NISR	Nuclear Industries Security Regulations 2003, Guidance Document , April 2013 [75]	This Guidance note is aimed at holders of a nuclear site licence, others who use or store nuclear and/or radioactive materials and those who are involved in the development of a nuclear site. This Guidance indicates how the requirements of NISR can be satisfied, and gives advice on the requirements of the Regulations relating to the transport of nuclear material and relating to the security of sensitive nuclear information.	ONR - CNS
	http://www.onr.org.uk/documents/security-regulations-2003.pdf		
Transport	TCSC 1006: Transport of Radioactive Material Code of Practice. Guide to the Securing / Retention of Radioactive Material Payloads and Packages During Transport 2012 [76]	Discusses the main requirements governing tie-downs, provides design criteria for various modes of transport, illustrates typical tie-down systems and makes recommendations regarding operation and inspection.	Transport Container Standardisation Committee
	http://tcsc.org.uk/newsite.htm		
	Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material , 2012 [77]	Provides detailed and prescriptive advice on the IAEA Regulations for the Safe Transport of Radioactive Material	IAEA
http://www-pub.iaea.org/MTCD/publications/PDF/Pub1586web-99435183.pdf			
IRR 99	Nuclear Safety Technical Inspection Guide: Ionising Radiations Regulations 1999 , November 2014 [78]	Written as an aid to inspection by ONR nuclear safety inspectors, in judging the licensee's compliance with the requirements of The Ionising Radiations Regulations 1999 (IRR99). This guidance provides a framework for inspection activities, to facilitate a consistent approach inspection of compliance with IRR99.	ONR
	http://www.onr.org.uk/operational/tech_insp_guides/ns-insp-gd-054.pdf		
	Work with ionising radiation: Ionising Radiations Regulations 1999. Approved Code of Practice and guidance , 2000 [79]	Gives detailed advice on the Ionising Radiations Regulations 1999. It is aimed at employers with duties under the Regulations but should also be useful to others such as radiation protection advisers, health and safety officers	HSE

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Topic	Guidance Document	Details of contents	Issued by
	http://books.hse.gov.uk/hse/public/saleproduct.jsf?catalogueCode=9780717617463		
Enforcement	Enforcement and Sanctions Guidance, 2014 [80]	This document provides guidance on enforcement and the use of civil and criminal sanctions by the Environment Agency in its regulatory activities.	EA
	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/389349/LIT_5551.pdf		