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| ONR Technical Inspection Guide (TIG)  LC33: Disposal of radioactive waste |



ONR Technical Inspection Guide (TIG)

LC33: Disposal of radioactive waste

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# Introduction

1. Many of the licence conditions attached to the standard nuclear site licence require, or imply, that licensees should make arrangements to comply with regulatory obligations under the conditions. ONR inspects compliance with licence conditions, and also with the arrangements made under them, to judge the suitability of the arrangements made and the adequacy of their implementation. Most of the standard licence conditions are goal setting, and do not prescribe in detail what the licensees' arrangements should contain; this is the responsibility of the dutyholder who remains responsible for safety.

## Purpose

1. To support inspectors undertaking compliance inspection, ONR produces a suite of guides to assist inspectors to make regulatory judgements and decisions in relation to the adequacy of compliance, and the safety of activities on the site. This Technical Inspection Guide (TIG) has been prepared as a guide to inspections performed by ONR inspectors during which they judge the adequacy of licence condition compliance arrangements and their implementation.
2. The purpose of this TIG is to assist ONR inspectors in carrying out their duties related to Licence Condition 33 (LC33), to facilitate a consistent approach to the regulation of LC33 benchmarked against applicable IAEA standards and guidance [1] [2].
3. This TIG has six main elements:

* Wording of LC33;
* Purpose of LC33;
* Guidance on ONR’s expectations with respect to LC33;
* Guidance on issuing directions under LC33;
* Guidance on carrying out inspections relating to LC33; and,
* Sources of additional background guidance on the management of radioactive waste for inspectors’ awareness, including guidance on relevant interfaces with the environment agencies.

## Scope and Applicability

1. On nuclear licensed sites in England and Wales, “radioactive waste” has the meaning assigned thereto in paragraph 3 of Part 2 of Schedule 23 to the Environmental Permitting (England and Wales) Regulations 2016 (EPR16) [3]. On nuclear licensed sites in Scotland, “radioactive waste” has the meaning assigned thereto in paragraph 5 of Part 1 of Schedule 8 to the Environmental Authorisation (Scotland) Regulations 2018 (EASR18) [4]. The definition in Licence Condition 1 (Interpretation) [5] is consistent with both EPR16 and EASR18. Definitions of terms commonly used in the management of radioactive waste can be found in the joint guidance document “Basic Principles of Radioactive Waste Management” [6].
2. In general terms, radioactive waste may be summarised as any material that is either radioactive itself or is contaminated by radioactivity, for which no further use is envisaged by its owner. The definition, and therefore LC33, does not distinguish between physical form and includes solid, liquid and gaseous radioactive waste. Government policy [7] means that certain radioactive materials, such as uranium and plutonium, are considered as assets. Spent fuel should not be categorised as waste while a future use can be foreseen by the owner. Any decisions related to these materials, including whether they should be declared as waste, is a matter for the owner of such materials. The organisation that owns the radioactive material (including any radioactive waste arising from its use) may or may not be the licensee of the nuclear licensed site where the material has accumulated. For example, the owner may be the Nuclear Decommissioning Authority (NDA), Ministry of Defence, or another third party).
3. The licensee’s arrangements should identify the holder of financial liability for the costs of managing radioactive material and radioactive waste held on the licensed site. If two separate organisations are involved, interactions between the licensee and the owner of radioactive material should include an efficient mechanism by which radioactive material can be declared to be a radioactive waste in a timely manner as soon as no further productive use for it is foreseen.
4. On matters affecting the management of radioactive waste on nuclear licensed sites, ONR takes account of the interests of the relevant environment regulator: the Environment Agency in England, the Scottish Environment Protection Agency (SEPA) in Scotland and Natural Resources Wales (NRW) in Wales (collectively referred to as the “environment agencies” in the remainder of this TIG).
5. Inspectors should familiarise themselves with ONR’s Memoranda of Understanding (MoU) with the Environment Agency [8], SEPA [9] and NRW [10], as well as the associated guidance documents on working together on aspects of mutual interest [11] [12] [13].
6. The requirements of LC33 outlined in this TIG, and ONR vires therein, apply to solid, liquid and gaseous radioactive waste on nuclear licensed sites, and apply to all the following categories of radioactive waste:

* High Level Waste (HLW) – waste that is sufficiently radioactive for its decay heat to significantly increase its temperature and the temperature of its surroundings, such that heat generation has to be taken into account in the design of storage and disposal facilities;
* Intermediate Level Waste (ILW) – waste that exceeds the radioactivity limits for Low Level Waste, but which does not require heat generation to be taken into account in the design of storage or disposal facilities;
* Low Level Waste (LLW) – waste having a radioactive content not exceeding 4 GBq per tonne of total alpha activity or 12 GBq per tonne of total beta/gamma activity;
* Very Low Level Waste (VLLW) – a sub-category of LLW with maximum radioactivity concentrations of 4 MBq per tonne, the activity limit for tritium being 40 MBq per tonne; and,
* Exempt and out of scope waste – waste that is outside the scope of, or can be exempted from some requirements of, the environmental legislation if the preconditions specified in that legislation can be satisfied [14].

1. The environmental legislation (EASR18 in Scotland and EPR16 in England and Wales, referred to collectively as Radioactive Substances Regulation (RSR)) requires a nuclear licensee to obtain a permit from the relevant environment agency whenever it intends to:

* Discharge radioactive gases to the environment;
* Discharge radioactive liquids to the environment;
* Transfer radioactive waste to another site for the purpose of waste treatment or waste storage;
* Consign radioactive waste to a final disposal facility, including in situ disposal such as an incinerator or solid waste repository, from which there is no intention to retrieve the waste; and
* In Scotland only, manage radioactive waste on site (including treatment and storage). On nuclear licensed sites in England and Wales, the requirement of EPR16 to obtain a permit for the accumulation of radioactive waste does not apply. Further guidance on the interface between the Nuclear Installations Act 1965 (NIA65) [15] and environmental regulation is provided in Appendix A – Interfaces with the environment agencies relevant to the regulation of LC33.

1. “Higher Activity Waste” (HAW) comprises a number of categories of radioactive waste: HLW, ILW and LLW that currently has no disposal route available. Inspectors should be aware that government policies for the long-term future management of HAW differ in Scotland (management in near-surface facilities, located as near to the site where the waste is produced as possible) [16] and England and Wales (disposal in a geological disposal facility or, for suitable ILW, in a near-surface disposal facility) [7]. HAW is currently stored on nuclear licensed sites as disposal routes are not yet available. Inspectors of sites that produce or store HAW should familiarise themselves with the joint guidance document “The management of higher activity radioactive waste on nuclear licensed sites” [17]

# Licence Condition 33: Disposal of radioactive waste

1. On nuclear licensed sites in England and Wales, LC33 is worded as follows [5]:

The licensee shall, if so directed by ONR, ensure that radioactive waste accumulated or stored on the site is disposed of as ONR may specify and in accordance with an environmental permit, or an existing permit which has become an environmental permit, granted under the Environmental Permitting (England and Wales) Regulations 2016.

1. On nuclear licensed sites in Scotland, LC33 is worded as follows [5]:

The licensee shall, if so directed by ONR, ensure that radioactive waste accumulated or stored on the site is disposed of as ONR may specify and in accordance with an Authorisation granted under the Radioactive Substances Act 1960 or, as the case may be, the Radioactive Substances Act 1993.

Note: In Scotland, EASR18 has replaced RSA93 as the legislation under which environmental permits are granted. The guidance in this TIG reflects this change, recognising that the Licence Conditions will also be updated to reflect the fact that EASR18 has replaced RSA93.

1. The two versions of LC33, quoted above, reflect that different environmental legislation applies between the UK’s devolved administrations. Further detail is provided in ‎Appendix A – Interfaces with the environment agencies relevant to the regulation of LC33.

# Purpose of the Licence Condition

1. LC33 provides ONR with the primary power to direct a licensee to dispose of radioactive waste from a nuclear licensed site.
2. The power to sign a direction under LC33 is delegated to the relevant Director of Regulation (or the Executive Director of Regulation) in accordance with the ONR Scheme of Delegation ONR-GOV-FW-002 [18].
3. As nuclear licensees require a permit from the relevant environment agency for the disposal of radioactive waste, if a licensee needs to take action to comply with a direction from ONR under LC33 it will also need to satisfy the requirements of the relevant environment agency. This is reflected in the wording of LC33.

## Guidance on circumstances in which a direction under LC33 may be appropriate

1. Before considering issuing a direction under LC33, inspectors should seek advice from an ONR Nuclear Liabilities Regulation (NLR) specialist inspector and the NLR Professional Lead, and consult the relevant environment agency in accordance with the appropriate MoU.
2. Circumstances in which inspectors may consider recommending that ONR issues a direction under LC33 for a licensee to dispose of radioactive waste include, but are not limited to, if the inspector considers:

* A licensee is accumulating a significant quantity of radioactive waste on a licensed site for which a feasible disposal route is readily available, in contravention of ONR’s expectations for LC32;
* A licensee is not competent to safely manage an accumulation of radioactive waste that is being stored on its licensed site, such that the workforce, environment and/or the public are being exposed to an unacceptable level of risk;
* A licensee is managing radioactive waste in a manner that is not demonstrably within the safe operating envelope justified in the applicable plant safety case;
* Radioactive waste has been created as the result of an adverse event (such as a major release of radioactivity) in a manner that presents an unacceptable risk to the workforce, environment and/or public; or,
* Any other reason the radioactive waste will not otherwise be competently managed in accordance with the applicable regulatory expectations.

1. Inspectors should assess whether a direction under LC33 would secure an effective remedy to the situation causing concern. Relevant factors in making this assessment include, but are not limited to:

* Whether a direction under LC33 would be compatible with ONR’s Enforcement Management Model (EMM) [19] and ONR’s Enforcement Policy Statement [20], including a consideration of alternative enforcement options;
* Whether a feasible disposal route is available for the radioactive waste in question, including consideration of whether this site has or could obtain a permit for disposal of the waste from the relevant environment agency;
* Whether the radioactive waste would be adequately managed at the site(s) that will receive it;
* Whether disposal of the radioactive waste in question would be compatible with all applicable government policies; and,
* Whether the licensee has the required competence and specialist resources to achieve disposal of the radioactive waste in question in an adequately safe manner.

1. NIA65 does not include an explicit definition of “disposal”. Inspectors should seek guidance from ONR’s Professional Lead for Nuclear Liabilities Regulation on whether disposal could include the transfer of radioactive waste to another site for the purpose of processing or storage, if they believe it may be fitting for ONR to issue a direction under LC33 to this effect.
2. In recent years, significant volumes of solid radioactive waste have been routinely sentenced from GB nuclear licensed sites to facilities overseas for processes such as smelting of LLW metal. Inspectors should note that it would not normally be appropriate for ONR to issue a direction for disposal of radioactive waste to take place overseas. The Transfrontier Shipment of Radioactive Waste and Spent Fuel (EU Exit) Regulations 2019 [21], enforced by the relevant environment agency, set out the circumstances under which radioactive waste and spent nuclear fuel may be imported and exported. These regulations complement the environment agencies’ powers and duties under RSR.
3. Inspectors should be aware that if a direction under LC33 requires the licensee to obtain a new environmental permit, or a variation to an existing environmental permit, the relevant environment agency is required to consider whether the disposal is liable to result in transboundary radioactive contamination [22].

## Guidance on issuing a direction under LC33

1. If ONR decided that issuing a direction under LC33 was a fitting course of action, the direction should contain as a minimum:

* A suitably detailed description of the radioactive waste requiring disposal, including the quantity, waste category, waste type and its location;
* The timescale within which ONR believes it is reasonable for the licensee to dispose of the radioactive waste;
* Applicable legislation with which the licensee must comply while carrying out the disposal; and,
* Any other particular requirements that ONR believes the licensee needs to comply with, so that the radioactive waste in question will be disposed of in an adequately safe and secure manner.

1. Wherever possible, requirements included in a direction issued under LC33 should be Specific, Measurable, Achievable, Realistic and Timely (SMART).
2. ONR should avoid becoming the “controlling mind” with respect to the details of how a disposal that is directed under LC33 should be carried out. The optioneering of the technical approach should be left to the licensee wherever possible.
3. Inspectors should engage with the ONR Communications Team prior to issuing a direction under LC33, due to the strong likelihood of stakeholder interest.

# Guidance on Arrangements for Licence Condition 33

1. While the wording of LC33 does not include a requirement for licensees to make adequate arrangements to comply with the condition, ONR would expect a licensee to recognise the powers available to ONR under LC33 and have in place a management system that will allow the licensee to respond should ONR issue a direction under LC33. This section provides guidance to inspectors on how a licensee could demonstrate that they would be able to respond adequately in the event ONR were to issue a direction under LC33.
2. The licensee’s arrangements should recognise that LC33 gives ONR the legal power to issue a direction that radioactive waste on the licensed site shall be disposed of by the licensee in a specified manner. The licensee should have a management system by which the licensee will secure compliance with any direction issued by ONR under LC33.
3. The management system should ensure any direction issued by ONR under LC33 will be delivered to a Suitably Qualified and Experienced Person (SQEP), holding a sufficiently senior position in the licensee's organisation to ensure compliance will be delivered.
4. The management system should ensure the licensee’s response to a direction under LC33 will secure disposal of the radioactive waste in question while complying with:

* The requirements of a suitable environmental permit and any other applicable requirements of the relevant environment agency;
* The regulatory requirements applicable to security, safeguards and off-site transport; and,
* The requirements of the site that will receive the waste.

1. The licensee should have a process that ensures an application will be made to the relevant environment agency for any changes to environmental permits that might be necessary to comply with a direction.

# Guidance on Inspection of Arrangements and their Implementation

1. Inspectors should check that the licensee’s arrangements recognise the powers available to ONR under LC33 and would enable the licensee to respond adequately in the event ONR were to issue a direction under LC33, with reference to the guidance provided in Section ‎4 of this TIG.
2. In the event that ONR has issued a direction under LC33, inspectors may choose to undertake targeted follow-up interventions to gain assurance that all the stated requirements will be properly complied with in a timely manner. During the planning stage of such interventions, inspectors should engage with the relevant environment agency (and the Defence Nuclear Safety Regulator on licensed sites that contribute to the MOD’s nuclear programme) Relevant factors for this type of intervention include, but are not limited to:

* Whether the licensee has identified all the technical and logistical enablers required to secure compliance with the direction;
* Whether any actions the licensee needs to take to comply with the direction will be carried out in accordance with an environmental permit from the relevant environment agency, or if required, the licensee has applied to the relevant environment agency for any permit amendments necessary to comply with the direction;
* Whether the licensee has produced an adequate safety case for any operations that may affect safety which are needed to comply with the direction, in accordance with the requirements of LC23;
* Whether any actions the licensee needs to take to comply with the direction will be carried out in accordance with applicable security, safeguards and transport regulations;
* Once the licensee has informed ONR that the directed disposal has taken place, an inspector may wish to check that all the intended radioactive waste has been suitably and safely disposed of;
* Whether adequate records have been made in accordance with the requirements of LC6 and LC25; and,
* Whether the licensee has identified learning and taken effective action to improve its arrangements in a sustainable manner, so that the failures that gave rise to ONR issuing a direction under LC33 will not be repeated.

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# Appendix A – Interfaces with the environment agencies relevant to the regulation of LC33

1. Management of radioactive waste on nuclear licensed sites requires close liaison between ONR and the environment agencies, due to common interests and the need to regulate in a coordinated manner that avoids imposing conflicting requirements on licensees. NIA65 places a requirement on ONR to consult the appropriate environment agencies on issues that affect the creation, accumulation or disposal of radioactive waste before issuing, amending or varying nuclear site licences, or attaching conditions to them.
2. The legislation under which the management of radioactive materials is regulated by the environment agencies differs between the UK’s various devolved administrations.

* Previously, the Radioactive Substances Act 1993 (RSA93) applied across the whole UK. RSA93 concerned the control and security of radioactive materials, including radioactive waste, to ensure that accumulation and disposals occurred with minimum radiological impacts on members of the public and the environment.
* RSA93 has since been superseded by EPR16 in England and Wales, where the enforcing authorities are the Environment Agency (in England) and NRW (in Wales). In Scotland, RSA93 was replaced by the EASR, where the enforcing authority is SEPA. Both EASR18 and EPR16 use the term “permitting” to describe the authorisation of radioactive substances activities by the environmental regulator.

1. Section 68(1)(c) of the Energy Act 2013 and section 4 of NIA65 provide ONR with the power to regulate the storage and use of nuclear matter on GB nuclear licensed sites, which includes the accumulation of radioactive waste. ONR regulates the safety aspect of the handling, treatment and disposal of nuclear matter, and the discharge of any substance on or from the site through LCs 32 to 34, together with other relevant LCs such as LC4 (Restrictions on nuclear matter on the site). ONR works closely with the environment agencies under MOUs to ensure that nuclear safety and environmental regulation is delivered efficiently.
2. Nuclear licensees in England and Wales require a permit for the disposal or transfer off-site of radioactive waste. However, the requirement of EPR16 to obtain a permit for the accumulation of radioactive waste does not apply on nuclear licensed sites. The Environment Agency has published technical guidance on radioactive substances regulation on nuclear sites [23] [24] [25].
3. Nuclear licensees in Scotland require a permit for the management of radioactive waste on site, as well as for the long-term storage and for disposal of radioactive waste as set out in Schedule 8 of EASR18 [4]. SEPA has published guidance applicable to radioactive substances regulation on nuclear sites in Scotland [26] [27].
4. Some radioactive waste may be exempt from the requirement to have a permit if its activity does not exceed thresholds for quantity and concentration set down in EPR16 and EASR18, as applicable. However, if the waste has other hazardous properties, such as chemical content, it may still be necessary to comply with requirements set out in other legislation [28] [29] [30].
5. ONR is the appropriate authority for the Ionising Radiations Regulations 2017 (IRR17) [31] on nuclear licensed sites and on authorised defence sites. ONR is also the competent authority for the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations, which may also be applicable for radioactive waste to be generated through decommissioning projects [32].
6. In addition to the statutory consultation requirements under NIA65, ONR has entered into MoUs with the Environment Agency [8], NRW [10] and SEPA [9] to ensure coordinated regulation on nuclear licensed sites. Inspectors are reminded that an assessment or review that considers a licensee’s management of radioactive waste should include consultation with the applicable environmental regulator as appropriate under the applicable MoU. Inspectors should meet the standards of co-operation expected in the MoUs when undertaking any intervention on a nuclear licensed site that has a focus on management of radioactive waste. This is particularly pertinent in Scotland, where SEPA’s duties for environmental and public protection explicitly include the management and disposal of radioactive waste on nuclear licensed sites.
7. When a licensee proposes to condition HAW into a form suitable for long term storage or disposal, ONR seeks advice from the appropriate environment agency on the long-term disposability of the proposed product. This advice should inform ONR’s expectations for the safety-related aspects of processing, interim storage and transport of the packaged waste, and address the environment agencies’ regulatory expectations with respect to protection of the public and the environment over the longer-term. This is essential to minimise the risk that reworking of waste packages is needed to ensure disposal [33]. The environment agencies have published guidance on the requirements for authorisation of near-surface disposal facilities [34] and geological disposal facilities [35].
8. The Nuclear Waste Services (NWS) disposability assessment process is considered relevant good practice for demonstrating adequate consideration of future safety and environmental assessments for HAW. ONR’s position is that HAW packages conditioned in anticipation of geological disposal are also suitable for long-term management in near-surface facilities [33].
9. ONR and the environment agencies have published a joint statement on the requirements applicable to the on-site disposal of solid radioactive waste on nuclear licensed sites, and the harmonised approach the regulators will take in regulating such matters [36].
10. The Transfrontier Shipment of Radioactive Waste and Spent Fuel (EU Exit) Regulations 2019 [21] set out the circumstances under which radioactive waste and spent nuclear fuel may be imported and exported from the UK. These regulations complement the powers and duties of the environment agencies under RSR. The relevant environment agency should consult with ONR prior to granting consent for a transfrontier shipment from a UK nuclear licensed site.
11. From 1 January 2021, the requirement for the UK to submit information to the European Commission on plans for the disposal of radioactive waste no longer applies (known as Article 37). The updated arrangements have been defined by the Department for Energy Security and Net Zero (DESNZ) [22] and is delivered via the environmental permit application processes by the relevant environment agency, of which ONR is a statutory consultee. More specifically, the UK and Scottish Governments have introduced requirements through The Transboundary Radioactive Contamination (England) Direction 2020 and The Transboundary Radioactive Contamination (Scotland) Direction 2021, respectively. Views are invited on this through public consultation and DESNZ / Scottish Ministers will provide information to notifiable countries in such instances so that they can participate in the public consultation.
12. In England and Wales, paragraph 4 of Part 4 of Schedule 23 of EPR16 provides the relevant environment agency with the power to dispose of radioactive waste in certain circumstances, if the waste ought to be disposed of but the environment agency believes it is unlikely the waste will be lawfully disposed. In Scotland, paragraph 36 of Part 3 of Schedule 8 of EASR18 provides SEPA with a similar power to require disposal of radioactive waste in certain circumstances.