Management of radioactive waste from decommissioning of nuclear sites: Guidance on Requirements for Release of nuclear sites from Radioactive Substances Regulation (GRR)

Technical Q&A

Document History		
Issue number	**Description**	**Issued**
1	First issue including compilation of questions and answers pre-dating publication of the GRR in July 2018 and queries submitted since publication. Data freeze date for Issue 1: 16/03/2020.	October 2020

1 Purpose of this document

1.1 This Technical Q&A is a compendium of queries that have been submitted to the environment agencies before and after publication of the GRR, and the responses given to those queries. It includes queries submitted by outside organisations and by regulators within the environment agencies.

1.2 This document concerns technical and regulatory queries. A non-technical Frequently Asked Questions (FAQ) document is also available and operators can request this from their regulator.

1.3 The Technical Q&A is owned by the GRR Technical Working Group, a regulators' group constituted under the GRR Programme Team for implementation of the GRR. The group includes representatives from each of the three environment agencies. The GRR Technical Working Group is responsible for answering technical questions about the interpretation and application of the GRR and for maintaining the integrity of the GRR during implementation of the guidance.

1.4 The Technical Q&A is for use by regulators and nuclear site operators during implementation of the GRR and during subsequent day to day regulation of environmental permits for the management of radioactive waste. References to 'waste' in this document refer to radioactive waste and 'Directive waste' means non-radioactive waste.

1.5 The Technical Q&A will be made available to the nuclear industry and ONR through established channels.

1.6 The material contained in this Technical Q&A will be considered when the GRR is reviewed either as part of the normal periodic review process or if an update is identified for other reasons. Until the GRR is reissued, this Technical Q&A will be updated and re-issued as described in paragraph 2.2.

1.7 If you do not find a relevant question and answer in this document, questions can be submitted by environment agencies staff to the GRR Technical Working Group via the mechanism described in section 3 below. For external stakeholders, questions should be addressed to the relevant site inspector in the first instance.

1.8 Some questions submitted since publication of the GRR have not yet been fully addressed and work is underway to develop responses. This version 1 of the Technical Q&A includes responses finalised as at 16 March 2020.

2 Document control

2.1 Entries in the Technical Q&A are responses to queries that have been developed by the GRR Technical Working group with final approval undertaken though the normal processes of the three environment agencies.

2.2 The environment agencies staff member submitting a query will receive a written response in accordance with the procedure followed by the GRR Technical Working Group. The GRR Technical Working Group will re-issue this Technical Q&A periodically to provide an up to date compendium of queries and responses. We envisage that re-issue will occur no less frequently than annually during the implementation of the GRR while sites are developing their initial Waste Management Plan (WMP) and Site-wide Environmental Safety Case (SWESC).

2.3 The GRR Technical Working Group maintains editorial control of the Technical Q&A. Users of the Technical Q&A have read-only access to the document. If the need for amendments is identified by users, they should inform the GRR Technical Working Group using the mechanism described in section 4 below.

2.4 The Technical Q&A includes queries that were submitted prior to publication of the GRR in July 2018. The response included here to such queries may differ from the original response where the regulators' thinking has advanced as a result of development of the final guidance or implementation of the GRR.

2.5 This Technical Q&A is intended as a living document that provides the most up to date position of the environment agencies on a technical topic connected to the GRR.

3 Before submitting a query

3.1 Before submitting a technical query to the GRR Technical Working Group you should ensure that you have:

- read the GRR thoroughly, including the Annexes;
- consulted the relevant module of the GRR Technical Training series;

- considered the documents “Implementing the GRR in a Proportionate Manner” and the Frequently Asked Questions about the GRR, as appropriate;
- reviewed this Technical Q&A to see if the query has already been addressed; and
- discussed, where possible, your proposed query with a colleague who has more knowledge and experience of the GRR.

3.2 If your question has still not been answered, then follow the steps described in section 4.

4 Submitting a technical query

4.1 The preferred mechanism for submitting a technical query about the GRR is to use the email account GRRsupport@environment-agency.gov.uk This email account can be used by regulators in SEPA and NRW as well as the EA.

4.2 Any queries received by individual email or by letter will be directed to the GRR Technical Working Group.

4.3 Queries raised in verbal discussions with members of the GRR Programme Team will be captured and logged for consideration by the GRR Technical Working Group. Anyone raising a query verbally is encouraged to follow up with an email to the account GRRsupport@environment-agency.gov.uk to confirm the substance of their query.

4.4 The GRR Technical Working Group also maintains a database recording queries raised, but not considered relevant to the GRRTWG. These queries are passed to relevant groups or individuals to progress.

4.5 The GRR Technical Working Group will deal with the query in accordance with the group’s written procedure.

4.6 If users of the Technical Q&A consider that amendments are required in between formal updates being issued, they should inform the GRR Technical Working Group using the email account GRRsupport@environment-agency.gov.uk. For external stakeholders, this should be done through their site regulator.

5 Index of questions

6 Layout of the Technical Q&A

6.1 Questions and answers are laid out in the following sections by topic area as listed in the index at Section 5.

6.2 Each question is set out under an identifier box as follows.

Question number & Subject	**Response applicable in:**	**Origin of question**
Question number and general subject matter; as given in the index.	*Country where the response applies e.g. Scotland, England & Wales. Applicability is often across the board, but legislative differences sometimes mean that responses are only applicable in specific countries.*	*Source / Organisation submitting the question; and indicative date of submission.*
Question *The question submitted. In some cases, questions have been paraphrased where they are very long, edited to improve clarity, and made site-anonymous. This is done to provide a broad response that has application beyond the immediate context of the original question.*		
Response *Answer to the above question, developed by the environment agencies GRR Technical Working Group.*		
Our Ref: *a reference for use by the GRR Technical Working Group*		
Related queries: *where applicable, queries that are similar, linked or mutually helpful will be indicated in this box. The number refers to the Question number in this document.*		

6.3 Responses are provided within each question box. The response given is the current view of the environment agencies and may differ from any previous response issued before the publication of the GRR as described in paragraph 2.4 above.

Topic Area 1: Scope of the GRR

Question number & Subject	Response applicable in:	Origin of question
1.1 – Waste disposal facilities	*Scotland* *England & Wales*	*Environment Agency Nuclear Waste Assessment team January 2017*

Question

Will stand alone disposal facilities such as LLWR need to take into account GRR guidance for their permit surrender?

Response

Operators of radioactive waste disposal sites whose permits include conditions requiring a WMP and SWESC will need to follow the requirements of the GRR in order to surrender their RSR permit. Decommissioning activities at disposal sites will include removal of plant used to support the waste disposal operation and final capping and closure of the waste disposal areas. There may be areas of contamination remaining on the site associated with the operations rather than with the authorised waste disposals. The WMP should address any wastes arising from decommissioning activities and remediation of any contamination. The existing environmental safety case prepared under the Near-Surface Guidance on Requirements for Authorisation (NS-GRA) will make up the majority of the SWESC, with limited additional effort needed to demonstrate that the standards for release are met for any additional radioactive substances remaining on site.

Our Ref: N/A

Related queries: 1.2

Question number & Subject	Response applicable in:	Origin of question
1.2 – Near surface GRA	*Scotland* *England & Wales*	*Environment Agency Nuclear Waste Assessment team January 2017*

Question

At what point would a disposal move from being covered under GRR to NS-GRA?

Response

"NS-GRA" refers to our guidance 'Near-surface Disposal Facilities on Land for Solid Radioactive Wastes: Guidance on Requirements for Authorisation' (2009).[1] It describes the requirements for authorisation to dispose of radioactive waste to a dedicated near-surface disposal facility, whether on or off a nuclear licensed site.

The GRR focusses on on-site disposals that may be proposed on a nuclear site (e.g. as part of the process of decommissioning the site) and preparing for surrender of the RSR permit. This may include the development of a dedicated near-surface facility at a site but recognises that other forms of disposal may also be considered (e.g. in-situ disposal).

Note that there is no difference in radiological protection criteria between the NS-GRA and the GRR.

[1] Near-Surface Disposal Facilities on Land for Solid Radioactive Wastes: Guidance on Requirements for Authorisation

There is no firm line between the application of the NS-GRA and the provisions in the GRR for authorisation of on-site disposal of radioactive waste. The level of engineering applied to any form of radioactive waste disposal must be appropriate to the nature of the waste and the degree of environmental protection required. Of more significance is whether waste acceptance criteria (WAC) are expected to be required. In general, disposals made under the GRR are not expected to require WAC because the inventory to be disposed of will be known (e.g. a particular batch of lightly radioactively contaminated concrete is proposed to be disposed of in a particular void on-site). In contrast, the NS-GRA is applied where the facility provides a disposal solution for more than one waste producer, accepting a range of wastes in accordance with the WAC defined by the Environmental Safety Case (ESC). Should a dedicated disposal facility be proposed on a nuclear site then the ESC for that specific facility will form a component of the SWESC for the nuclear site as a whole.

Our Ref: N/A

Related queries: 1.1, 1.3, 4.2

Question number & Subject	Response applicable in:	Origin of question
1.3 – On-site landfill and inclusion in the SWESC	*Scotland* *England & Wales*	*Environment Agency Nuclear Regulator generated in discussion with Industry, July 2019.*

Question

A nuclear operator has an on-site landfill within its permitted area. Disposals of radioactive waste have been authorised to this area under the current site permit in the past and are continuing as the area is still open. The waste disposal limits and other conditions for the landfill are included in the RSR permit for the whole nuclear site. The landfill has its own Environmental Safety Case (ESC) including a closure plan in place. Does the ESC for the on-site landfill need to form part of the SWESC to ensure the operator presents an assessment of the overall impact from the whole site?

Response

Put simply, yes and also in the WMP.

If an on-site landfill is one of the waste management options being utilised on a site it must be covered in the waste management plan (WMP) prepared in accordance with the GRR along with all other radioactive wastes, and the ESC considered as a component of the SWESC for the whole permitted area.

Historic on-site disposals should also be addressed in the WMP and Site-Wide Environmental Safety Case (SWESC). The radioactive waste that has been placed into the landfill is still defined as radioactive waste until such time as the permit is surrendered.

Paragraph 3.3.2 of the GRR states: *The WMP should identify any past disposals of radioactive waste on-site, and all proposed disposal routes over the lifetime of the site. Disposal routes may include…. disposal by emplacement on-site, such as into an on-site waste disposal facility*

Regarding the SWESC, paragraph 4.3.2 states:

The SWESC should take account of all radioactive substances (whether disposed waste or contaminated ground or groundwater) remaining on and adjacent to the site. Where the on-site landfill site is a disposal facility permitted in accordance with our guidance "*Near Surface Disposal facilities on Land for Solid Radioactive Wastes* (known as the NS-GRA)" paragraph A4.11 of the GRR makes the following statement: *We recognise the possibility that one or more near-surface disposal facilities (either purpose-built or adapted from existing structures) may be constructed on a nuclear site. In this guidance we distinguish between a disposal facility constructed solely for the purpose of disposal of radioactive waste and other types of disposal such as disposal in situ and disposal for a purpose. A constructed disposal facility must meet the requirements of the NS-GRA and will have its own environmental safety case (ESC), which will define the waste acceptance criteria for the facility. The ESC for the disposal facility will provide a component of the wider SWESC for the site as a whole. Figure A1* (in the GRR guidance) *illustrates the relationship between the SWESC and the NS-GRA for a range of possible disposals options.* Therefore any on-site radioactive waste landfill should be included in the site SWESC as well as the WMP. NB. If as an outcome of the process of developing the WMP and SWESC for the wider nuclear site, the operator decides to recover the waste from the landfill and dispose of it off-site or elsewhere on the site, the disposals will be regulated as appropriate according to the location of the proposed disposal.
Our Ref: GRRTWG_18
Related queries: 1.2

Question number & Subject	**Response applicable in:**	**Origin of question**
1.4 – Contaminated structures	*Scotland* *England & Wales*	*Site End States Strategic Steering Group, March 2016*
Question When do radioactively contaminated structures become disposals as opposed to accumulations of radioactive waste?		
Response This is addressed in the "On-site disposal of solid radioactive waste on nuclear licensed sites. Joint Regulators' Statement of Common Understanding" document available at: http://www.onr.org.uk/land-quality-management.htm		
Our Ref: SES-5 March 2016		
Related queries: 2.2		

Topic Area 2: Timings

Question number & Subject	Response applicable in:	Origin of question
2.1 – Production of WMP and SWESC	*Scotland* *England & Wales*	*Site End States Strategic Steering Group, January 2017*
Question When should the WMP and SWESC be produced and submitted?		
Response In England and Wales, the timetable for preparation of the first iteration of the WMP and SWESC is set out in the RSR permit and any related agreement in writing (this will be reflected in the Compilation of Environment Agency Requirements (CEAR)). In Scotland all permits have been varied with requirements for the production and maintenance of WMPs and SWESCs. The production timescales for the first iterations are in place in outline in Scotland, final details will be worked out with individual site inspectors. The operator should keep the WMP and SWESC up to date. Notifications of significant changes to the WMP and SWESC should be made in accordance with the requirements of any relevant permit conditions. The WMP and SWESC should be comprehensively reviewed on a timescale that is agreed with the site inspector; the GRR sets out a general expectation that this should be no less frequently than every 10 years. The WMP should be maintained and implemented until all planned work involving radioactive substances is completed, while the SWESC should be maintained until the site is released from RSR.		
Our Ref: SES-15 January 2017		
Related queries: N/A		

Question number & Subject	Response applicable in:	Origin of question
2.2 – Identifying the act of disposal	*Scotland* *England & Wales*	*Site End States Strategic Steering Group, June 2017*
Question On a case by case basis could there be flexibility to allow burial or infill operations ahead of receiving a disposal permit and to consider the act of disposal in these instances to occur on receipt of the permit? In particular, when should disposal permits be sought for the following cases: (i) a contaminated, already-buried structure which does not require any further remedial or preparatory work and could simply remain in-situ as a radioactive waste disposal; and (ii) infilling of a contaminated void or structure.		
Response This is addressed in the "On-site disposal of solid radioactive waste on nuclear licensed sites. Joint Regulators' Statement of Common Understanding" document available at: http://www.onr.org.uk/land-quality-management.htm		
Our Ref: SES-15 June 2017		
Related queries: 1.4		

Topic Area 3: WMP

Question number & Subject	Response applicable in:	Origin of question
3.1 – RWMCs and WMP	*Scotland* *England & Wales*	*Environment Agency Nuclear Waste Assessment team January 2017*
Question What is the relationship between the WMP and a Radioactive Waste Management Case (RWMC)?		
Response The WMP should cover all existing radioactive wastes, and those radioactive wastes anticipated to arise in the future, from planned activities, including decommissioning and clean-up of the site. The GRR is non prescriptive on the format of the WMP. For completeness, we would expect the WMP to acknowledge what has happened with the ILW/HAW on site by referring out to more detailed documents like RWMCs where they exist. In their absence however the information should be contained in the WMP. However the main focus of the WMP is expected to be the management of Lower Activity Waste, particularly where this could lead to any proposals to leave waste on site.		
Our Ref: N/A		
Related queries: N/A		

Topic Area 4: SWESC

Question number & Subject	Response applicable in:	Origin of question
4.1 – Areas beyond current site boundary	*Scotland* *England & Wales*	*Galson Sciences, May 2017*

Question

(i) Does the SWESC need to consider areas beyond the geographical boundary of the permitted site?

(ii) How about if the site permit boundary has changed a number of times?

Response

Part (i): Does the SWESC need to consider areas beyond the geographical boundary of the permitted site?

The GRR states in Section 1.7 that "*In general, 'site' in this guidance means the area of land delineated on the site plan in the environmental permit as constituting the authorised premises. This is the area within which the radioactive substances activity is carried out and is therefore the area which will eventually be subject to an application for release from RSR.*"

Permit variations issued after publication of the GRR contain a new condition requiring the operator to establish and maintain a SWESC (and a WMP). The conditions of the permit only apply to the RSR activities carried out within the permitted area delineated on the current site plan. Demonstration through the SWESC that the standards for release from regulation have been met therefore needs to be made for the permitted area, since only this area can be subject to an application for release.

However, in making such a demonstration, the SWESC needs to consider all relevant sources of radioactive substances and **all possible receptors**, even where these extend beyond the boundary of the permitted site. As the GRR states (Section 1.7), "*in cases where contamination of ground or groundwater arising from the radioactive substances activity extends beyond the boundary of the authorised premises, such areas should be considered in the scope of the SWESC.*"

Part (ii) How about if the site permit boundary has changed a number of times?

The spatial extent of the SWESC must include all relevant sources and receptors. Since receptors are more distant from the site, these are likely to drive the size of the SWESC to a greater degree than the sources, even where the site has been reduced in size as a result of partial surrender or delicensing. If after such partial surrender or delicensing, there is radioactivity remaining outside the current boundary that is above out of scope values, the contribution of these sources to the total dose received by members of the public should be considered.

Our Ref: N/A

Related queries: N/A

Question number & Subject	Response applicable in:	Origin of question
4.2 – Complexity and scale of SWESC	*Scotland* *England & Wales*	*Environment Agency Nuclear Waste Assessment team* *January 2017*

Question

What is the expected complexity/scale of the GRR Site Wide Environmental Safety Case?

Response

The SWESC must include sufficient detail to present the claims, arguments and evidence that supports an application for on-site disposal of radioactive waste, or for surrender of the RSR permit, as the case may be. Further guidance is available in the note prepared by the environment agencies entitled “Implementing GRR in a proportionate manner” (November 2019).

As a guide, a SWESC supporting an application for on-site disposal under GRR may be of a similar size and complexity to those developed under the NS-GRA for landfills receiving radioactive waste, but probably less detailed than the LLWR 2011 ESC.

For sites where there is or may be a specific ESC for a dedicated radioactive waste disposal facility, this will need to be incorporated into the SWESC.

Our Ref: N/A

Related queries: 1.2

Topic Area 5: Numerical standards

Question number & Subject	Response applicable in:	Origin of question
5.1 – Intrusion into buried waste	*Scotland* *England & Wales*	*Nuclear Legacy Advisor Forum (NuLEAF)*

Question

In the GRR, requirement R10 states that, after release from radioactive substances regulation, the assessed risk from the remaining radiological hazards to a representative person should be consistent with a risk guidance level of 10^{-6} per year. Would this include people digging up an in-situ disposal? What about a disposal with an engineered cover?

Response

The risk guidance level of 10^{-6} per year applies to assessed risks from radioactive substances dispersed in the accessible environment (arising from radioactive waste or radioactive contamination) due to the migration or uncovering of radioactive substances by natural processes. The scenarios considered against the risk guidance level do not include intrusion into the waste because that is considered separately, against the dose guidance level for inadvertent human intrusion (requirement R11). Scenarios for inadvertent human intrusion include digging up all or part of a buried structure and intrusion into waste that is protected by an engineered cover.

A dose guidance level is used because it is not practicable to quantify the probability of future human actions. Instead we assume, for the purpose of assessment, that intrusion does occur and we cap the dose that could be received in such a situation to the range of around 3 millisieverts per year (3 mSv/y) to around 20 millisieverts in total (20 mSv). Application of the dose guidance level places upper bounds on the risks of exposure, whereas a risk assessment that meets our risk guidance level may contain within it scenarios in which a high dose (up to 100 mSv) may occur but with a very low probability. Annex B of the GRR provides more detailed information on the quantitative criteria, and provides the basis for them.

Our Ref: N/A

Related queries: N/A

Topic Area 6: Characterisation and monitoring

Placeholder section for Version 2.

Topic Area 7: Groundwater

Question number & Subject	Response applicable in:	Origin of question
7.1 – Disposal of radioactive waste below the water table	*England & Wales*	*Site End States Strategic Steering Group SES-11 September 2016; Magnox letter from Kevin Kostelnik September 2018*

Question

Where radioactively contaminated structures are credible candidates for on-site disposal (OSD) wholly or partly below the water table (i.e. within the saturated zone), can the regulators provide assurance that the interpretation of the Groundwater Daughter Directive does not preclude such OSD as a viable option?

Response

A full response to this question is still under development. The following statements have been given in interim responses.

Interim response provided to Magnox Limited, 5 November 2018:

It is a requirement of the Environmental Permitting (England and Wales) Regulations (EPR 2016) that an activity that is both a radioactive substances activity and a groundwater activity under the regulations is authorised through the radioactive substances activity permit. It is therefore essential that the groundwater protection requirements associated with any potential on-site disposals are fully addressed. It is possible that some options for on-site disposal may be constrained by these groundwater protection requirements, although we would not expect that to be the case for all options.

Update provided to Nuclear Industry Group for Land Quality, 15 October 2019:

Where waste is deposited below the water table, sufficient measures must be included in the design of the disposal system to provide attenuation of any leachate such that a direct input to groundwater does not occur. A groundwater risk assessment must be undertaken to determine what site specific engineering measures are required. Attenuation can be provided by naturally occurring in-situ material, an engineered barrier or an existing structure. The groundwater risk assessment will need to justify the permeability and the thickness of the proposed attenuation layer, and its performance over the period that the risk to groundwater remains.

Our Ref: GRRTWG 01

Related queries: 7.2

Question number & Subject	Response applicable in:	Origin of question
7.2 –Definition of direct discharge	*England & Wales*	*Discussion at Regulator-Industry meeting [Sept 18 WESTG meeting]*

Question

What is the definition of “direct discharge” and how is this interpreted for structures that are themselves contaminated with radioactivity and in which disposal of waste (radioactive or non-radioactive) is proposed?

Response

A full response to this question is still under development. The following is provided as an interim response.

The Water Environment (Water Framework Directive) Regulations 2017 (WER 2017) defines a direct discharge to groundwater as a “discharge of pollutants into groundwater without percolation throughout the soil or sub-soil”.

In paragraph 2 of Schedule 22 to the Environmental Permitting Regulations (EPR) 2016 the term ‘direct input’ is used in place of ‘direct discharge’ with the following definitions given:

- "direct input" in relation to groundwater means the introduction of a pollutant to groundwater without percolation through soil or subsoil;
- "indirect input" in relation to groundwater means the introduction of a pollutant to groundwater after percolation through soil or subsoil.

The EPR 2016 definitions are broadly the same as in WER 2017 but there is an understanding that “input” covers all pollutants that enter groundwater, and is not restricted to deliberate (e.g. waste) disposals.

Guidance on the interpretation of “direct discharge” is provided in paragraphs 4.13 and 4.14 of the Government guidance on Groundwater Activities:
https://www.gov.uk/government/publications/environmental-permitting-guidance-groundwater-activities
And on the Environment Agency pages on GOV.UK:
https://www.gov.uk/government/publications/groundwater-protection-technical-guidance/groundwater-protection-technical-guidance

The Government guidance on Groundwater Activities recognises that the Environment Agency may need to make case by case determinations as to whether a discharge is direct or indirect. There are developed positions for (Directive) waste landfills, for the water industry and for the oil and gas industry. In the case of decommissioning nuclear sites, regulators will use their professional judgement to make site-specific determinations of whether a particular proposal involves a direct discharge/ input of pollutants to groundwater.

In the case of contaminated structures that are proposed to be filled with radioactive or non-radioactive waste, our general approach is likely to be broadly as described below.

If the structure is entirely above the water table at all times, any discharge will be deemed to be indirect providing there are no rapid pathways to the water table (of the type described in paragraph 4.13 of the Government guidance on Groundwater Activities).

If the structure extends below the water table, we will consider

a) whether the proposed disposal scheme has the potential to generate a discharge of leachate and whether such a discharge will contain pollutants, and
b) whether the mechanism for discharge of leachate is directly into groundwater or not. Factors relevant to this assessment may include (but are not limited to):
    - permeability of the structure walls;
    - other attenuation properties of the structure walls and any proposed liner system;
    - penetrations through the structure and position of these with respect to the water table;
    - the process, timing and nature of ageing, and degradation, of the structure (for example, whether there is the potential for sudden direct conduits to the water table to open as the structure ages);
    - where the route for discharge of leachate is through the waste itself, the attenuating properties of the waste;
    - the route for escape of leachate in any "bathtubbing" situation;
    - any other features of the engineering of the disposal scheme that provide attenuation similar to that provided by percolation through an unsaturated zone.

We consider that the works necessary to prepare structures and voids for waste disposal are likely to be covered by the following exclusion (from the prohibition on direct discharges) set out in Article 11.3(j) of the Water Framework Directive (and replicated in paragraph 8(f) of Schedule 22 to EPR 2016):

construction, civil engineering and building works and similar activities on or in the ground which come into contact with groundwater

Where such construction, civil engineering and building works are necessary below the water table, a direct discharge to groundwater could be permitted where it arises from, for example, preparing an existing structural void for receiving radioactive waste for disposal. These works could include activities such as decontaminating the surface of the structure, sealing apertures, and installing lining materials. We are able to permit a direct discharge to groundwater from these activities so long as it does not compromise the achievement of the environmental objectives relating to groundwater in Article 4 of the Water Framework Directive.

The emplacement of radioactive or non-radioactive waste in the void does not come under the paragraph 8(f) exception.

Regulators of nuclear sites should consult with groundwater specialists in their organisation when addressing the above matters at individual sites.

Our Ref: GRRTWG_03
Related queries: 7.1

Topic Area 8: Non-radioactive wastes and landfills

Question number & Subject	Response applicable in:	Origin of question
8.1 – Integrated permitting	*Scotland* *England & Wales*	*Site End States Strategic Steering Group, September 2016*

Question

Can all wastes associated with a radioactive waste disposal be regulated within a single RSR permit and not separate permits for radioactive waste and non-radioactive waste (for example, where non-radioactive waste is emplaced in a radioactively contaminated redundant structure)?

Response

Should such a scenario for waste management be considered optimal by the operator, the approach of the respective environment agencies may vary. In Scotland, under the Environmental Authorisations (Scotland) Regulations 2018, there may, in certain circumstances, be the flexibility to include relevant conditions regarding directive wastes or non-radioactive materials (e.g. recovery activities) under the EASR authorisation for the radioactive substances activity. Consequently, SEPA would consider the most appropriate means of regulation on a site-specific basis.

Within England and Wales, RSR activities and Directive waste activities are separately defined under EPR 2016. There is provision in EPR 2016 for a class of regulated facility to be "*carried on as part of the operation of a regulated facility of another class*", but there are limitations to this. Landfill installations for Directive waste disposal cannot be carried on as part of an RSR activity, whereas waste operations (that is, disposal of inert waste and recovery of waste) can be carried on as part of an RSR activity if in practice they are sufficiently integrated. More information on this can be found at: https://www.gov.uk/government/publications/rgn-2-understanding-the-meaning-of-regulated-facility . If a waste operation was considered to be carried on as part of an RSR activity, a single permit would be issued (for an RSR activity) and the conditions of the permit would apply to the integrated activity. Additional conditions may be needed to control aspects of the waste operation that are not addressed by the standard RSR permit conditions.

Where there are separate regulated facilities (such as an RSR activity and a landfill installation) each regulated facility must be permitted; one facility is not considered to be operated as part of the other. Where two or more regulated facilities are carried on by the same operator on the same site, they can be regulated under a single environmental permit, if it is beneficial to do so. In such cases, this would typically be done through a consolidated permit containing separate schedules for each regulated facility.

In summary:

- If disposal of directive waste needs regulating as a separate activity then we would consider the best mechanisms to permit this;

- We encourage integrated planning of all waste management and disposal.

The mechanisms of permitting disposal activities are an administrative issue. Ultimately, this is unlikely to be significant in influencing decision making on the best approach to waste management at a site.

Our Ref: SES-10(i) September 2016
Related queries: N/A

Question number & Subject	Response applicable in:	Origin of question
8.2 – Use of CL:AIRE Definition of Waste Code of Practice	*England & Wales*	*Site End States Strategic Steering Group, September 2016*

Question
Can non-radioactive material used for emplacement in voids or for legitimate landscaping purposes be dealt with in a similar way to that described in the CL:AIRE Definition of Waste Code of Practice?

Response

A range of approaches to the classification and reuse of non-radioactive excavated material and waste on brownfield (potentially contaminated) sites are available.
The Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice (DoWCoP) provides a process which enables the reuse of excavated materials on-site or in some circumstances their movement between sites. Excavating and reuse of materials and the recovery of wastes is also facilitated by a range of other options including: waste exemptions (e.g. a “U1 Exemption” for use of waste in construction); standard rules or bespoke environmental permits; and the WRAP Aggregate Protocol, which enables inert aggregate waste (subject to set standards) to be fully recovered (so ceasing to be waste) and used at any site.
Any of these approaches could be deployed at a nuclear licensed site providing relevant qualifying conditions are met and the material is out-of-scope of radioactive substances regulation.

NOTE: at the time of writing, the DoWCoP, WRAP quality protocols and waste exemptions are all being reviewed. Depending on the outcome of these reviews their suitability for use on nuclear sites may change. Operators should be cautious about relying on these approaches in their plans until the future shape of each is clear.

Our Ref: SES-10(ii) September 2016
Related queries: 8.3

Question number & Subject	Response applicable in:	Origin of question
8.3 – Materials Management Plan (MMP) produced under the CL:AIRE DoWCoP	*England & Wales*	*Site End States Strategic Steering Group, September 2016.*

Question

What is the relationship between the Materials Management Plan (MMP) produced under the CL:AIRE DoWCoP and the Waste Management Plan (WMP) produced under the GRR?

Response

A MMP is a key element of the CL:AIRE Definition of Waste: Development Industry Code of Practice (DoWCoP). As well as meeting other defined constraints and limitations, four factors are required to be demonstrated for non-radioactive material to be in accordance with the DoWCoP:

1. Protection of human health and the environment;
2. Suitability for use without further treatment (if treatment is needed, an environmental permit for the treatment activity may also be required);
3. Certainty of use;
4. Quantity of material.

Under DoWCoP, a MMP must be produced prior to excavation of the material to demonstrate compliance with these four factors.

The MMP is not an alternative to the GRR requirement for a WMP, but the MMP may form a necessary component of the overall WMP and we encourage operators to take an integrated approach. The WMP is intended to assess and plan the work necessary to ensure that radioactive waste can be managed and where necessary disposed of safely and lawfully, including during the decommissioning and clean-up process, and to bring the site to a condition that would enable release from radioactive substances regulation.

In addition, it is the expectation of the environmental regulators that prior to any disposal decisions, operators assess opportunities for waste management as a whole, both directive and radioactive wastes, in an integrated way, from their creation to disposal taking account of the waste hierarchy.

Our Ref: SES-10(iii) September 2016

Related queries: 8.2

Question number & Subject	Response applicable in:	Origin of question
8.4 – Long term stockpiling	*England & Wales*	*Site End States Strategic Steering Group, September 2016*

Question

Where material is unlikely to be used straight away or in the short term (for example: recovered under the CL:AIRE DoWCoP), then will long term stockpiling of the material (e.g. up to C&M entry or reaching the IES) be allowed where likelihood of use can be demonstrated?

Response

Our regulatory response to the stockpiling of material or Directive waste will depend on what is proposed and the nature of the material. In all cases, stockpiles should be created and managed in ways that prevents harm to people and the environment.

Storing Directive waste

It is important that the stockpiling of material consisting of or potentially contaminated with non-radioactive substances (derived from excavations, building rubble etc.) is undertaken with due regard for legal requirements as well as health and environment implications. In the brownfield site context the loss of material through incorrect storage of stockpiles of building or demolition materials can be a major source of pollution; consequently long term static stockpiling facilities will require environmental permitting.

The CL:AIRE DoWCoP typically limits stockpiling activities to 12 months and requires demonstration of a number of factors:

i. certainty of use: lines of evidence need to be provided to demonstrate that the materials are certain to be used. This includes: production of the Materials Management Plan (MMP), an appropriate planning permission (or situations or conditions that link with the reuse of the stockpiled materials);
ii. an agreed Remediation Strategy;
iii. an agreed Design Statement;
iv. a Verification Report that provides an audit trail to show that materials and wastes have gone to the correct destination.

The Landfill Directive defines a landfill as a waste disposal site for the deposit of waste onto or into land, including a permanent site (i.e. more than 1 year) which is used for the temporary storage of waste. It excludes sites from being landfills where the waste is stored for less than 1 year prior to disposal or less than 3 years (as a general rule) prior to recovery. Directive waste stored for these timescales prior to disposal or recovery respectively does not therefore need to be permitted as a landfill. Other controls over temporary waste storage may be necessary, where there is an element of treatment or transfer (e.g. movement into or out of the storage site).

Where a waste or installations permit exists on a site, or plans are being made to apply for one, consideration must be given to including the long term storage of waste in those permits.

We note that at a decommissioning nuclear site, WMPs and SWESCs are being created that will focus on radioactive waste and contamination but which operators are being encouraged to consider in an integrated way with Directive waste management. We also acknowledge that despite the long timescales involved there is likely to be considerable "certainty of use" for such materials and confidence in site ownership, oversight and security.

Consequently, the environmental regulators are considering how the longer term storage of Directive waste should be regulated. We will work with industry to consider options and identify the best, proportionate outcome. In the meantime site specific decisions about stockpiles should continue to be taken in consultation with the relevant nuclear regulators and their local waste regulatory colleagues.

Storing radioactive waste

The storage of radioactive waste is already regulated by the ONR and the environment agencies where appropriate. The GRR requires storage, along with other waste management options, to be considered in the production of the WMP and SWESC. Please refer to relevant ONR (e.g. their technical assessment guide NS-TAST-GD-24 revision 6 on "Management of radioactive materials and radioactive waste on nuclear licensed sites")) and environment agency guidance (including the GRR) for details.

Our Ref: SES-10(iv) September 2016

Related queries: 8.2, 8.3

Topic Area 9: Disposal of specific materials

Question number & Subject	Response applicable in:	Origin of question
9.1 – Removal of asbestos	*Scotland* *England & Wales*	*Site End States Strategic Steering Group, March 2016*
Question Is it necessary to remove all traces of asbestos fibres from a radioactively contaminated structure undergoing on site/in situ disposal if there is concern this is not optimal (e.g. because of dose to workers, no significant reduction in long-term hazard, significant cost)?		
Response Where asbestos contamination is low density and intimately bound within the structure that is to be disposed of in situ, and it will not be readily available to human receptors, the environment agencies may not consider the removal of all fibres to be absolutely necessary. However, we would expect the operator to make a reasoned and substantiated case for this in the SWESC. Where it is practicable to remove unbound or partially bound asbestos fibres, we would expect the operator to give appropriate attention to the management options for the asbestos and undertake removal unless this is clearly sub-optimal. The hazard arising from the asbestos in the structure must be addressed under Requirement 15 of the GRR (Protection against non-radiological hazards associated with the radioactive waste). Other relevant legislative requirements should also be met by the operator. For example, depending on circumstances The *Control of Asbestos Regulations 2012* might apply or material might need to be managed as directive waste and/or hazardous waste.		
Our Ref: SES-1 March 2016		
Related queries: N/A		

Question number & Subject	Response applicable in:	Origin of question
9.2 – Removal of metal items	*Scotland* *England & Wales*	*Site End States Strategic Steering Group, March 2016*
Question Is it necessary to strip out all metal items from structures that will remain in situ?		
Response As part of optimisation of waste management options, the operator should consider the minimisation of environmental effects through the effective application of the waste management hierarchy for all wastes, including metals. We would not seek the removal of all sections of metal components integral to the structure (e.g. rebar, pipes and beams) where this would threaten the structural integrity of the structure proposed to remain in situ. However, we would expect the operator to assess the potential contribution of metallic substances to long term impacts on the environment by considering this as part of the		

SWESC. This should also consider the attractiveness of metal items where this could encourage potential future human intrusion for recovery. We would also seek assurance that any penetrations and internally contaminated pipes were adequately treated, removed or sealed to limit sub-surface voidage, remove some sources (e.g. of loose or potentially mobile contamination), and to remove the potential for such items acting as fast pathways to the environment where appropriate.
Our Ref: SES-2 March 2016
Related queries: 9.3

Question number & Subject	**Response applicable in:**	**Origin of question**
9.3 – On-site disposal of radioactive metal items	*Scotland* *England & Wales*	*Site End States Strategic Steering Group, September 2016*

Question

Can on-site disposal of radioactive metallic waste be considered subject to a satisfactory BAT/BPM case? In other words, is it ok to not assume that off-site recycling is always the optimised disposition route for radioactive metallic wastes?

Response

As per Requirement R1 in the GRR, optimisation of waste management options is required to identify the option that represents the best way of managing any waste stream overall. As stated in paragraph A3.6 of the GRR, optimisation must balance many considerations, including (but not limited to) minimising environmental effects through the effective application of the waste management hierarchy.

We draw attention to other resources, including those within the National Waste Programme and their publication of a "National Strategic BAT for Metallic Lower Activity Radioactive Wastes" in March 2015. A key conclusion from the latter study was that there is no one option, or combination of options, that will be the optimised outcome for all metallic wastes, but that there is a generic hierarchy with a preference for reuse and recycling. The characteristics of individual waste streams will need to be reviewed within the site specific context in order to identify the optimised outcome.

Assuming that the optimisation process has determined disposal to be the optimal solution we will only authorise the disposal of radioactive waste on site if the operator demonstrates, through the SWESC, that such disposals are safe that is, acceptable in terms of current and future doses and risks to people and the environment.

Our Ref: SES-12 September 2016
Related queries: 9.2

Question number & Subject	Response applicable in:	Origin of question
9.4 – Large blocks of concrete	*Scotland* *England & Wales*	*Site End States Strategic Steering Group SES-16 February 2017*

Question

Regarding large blocks of concrete from decommissioning: (i) should they be considered as being in storage pending authorisation of disposal (whether this be on-site or off-site disposal), and (ii) are such blocks expected to be crushed before emplacement?

Response

Part (i): should large blocks be considered as being in storage pending authorisation of disposal (whether this be on-site or off-site disposal)?

The document "On-site disposal of solid radioactive waste on nuclear licensed sites. Joint Regulators' Statement of Common Understanding" (April 2020)[2] provides a starting point for addressing this type of issue with any further clarification for site specific questions being addressed through dialogue with the relevant environment agency and ONR.

Any decision to remove, move or store blocks within a void space is an operational decision for the site. Working with the ONR and the environment agencies to agree pragmatic solutions that will enable decommissioning work to proceed is viewed as the best way forward. Where a case is made to emplace such blocks into voids they may be treated as waste in storage and regulated by the ONR as an accumulation; pending the granting of a variation that authorises their disposal. However, in Scotland under EASR SEPA's vires extends to the management of radioactive waste on a nuclear licensed site so arrangements in Scotland might differ. Until authorised for disposal, such wastes should be managed under appropriate safety and environmental cases and accounted for under ONR Licence Condition 25.

The regulators wish to avoid sham storage, in which the operator claims that a decision regarding intent to retrieve or dispose of radioactive wastes has not been made, where in fact it constitutes a disposal. Therefore where there is evidence of incremental emplacement or poor logistics management resulting in a build-up of a large number of such blocks that potentially become difficult to remove for disposal elsewhere, or it becomes difficult to implement the final disposal configuration, the Agencies and ONR might take the view that there is an intent to dispose of the waste. At this point the regulators may intervene to seek requirement for an RSR EPR permit variation before the emplacement of any more blocks.

Where block wastes are not radioactive waste, these will fall within the scope of the Waste Framework Directive (2008/98/EC) and be treated, as 'Directive Waste' where they are discarded. Whilst the environment agencies may take a similar pragmatic position over the temporary storage of these wastes, interim storage of directive wastes may also be subject to controls through EPR permitting or exemptions.

[2] On-site disposal of solid radioactive waste on nuclear licensed sites. Joint Regulators' Statement of Common Understanding; April 2020 http://www.onr.org.uk/land-quality-management.htm

For England and Wales blocks categorised as Directive waste will not satisfy the requirements for classification as excavated materials or soil substitutes under the CL:AIRE Code of Practice.[3] Their disposal will require control through non-RSR waste management and permitting under EPR as the recovery or disposal of wastes.

Work has begun to establish in more detail the scenarios that are likely to be encountered on a nuclear site in terms of the storage, stockpiling or re-use of potential directive waste materials. Please contact grrsupport@environment-agency.gov.uk for more information.

Part (ii): are blocks expected to be crushed before emplacement?

There is no expectation from the environment agencies that materials should be crushed before emplacement in a void. This remains an engineering / operational consideration for the operator. However, in considering the form of the void infill material (both radiological and non-radiological properties), there are several factors that may be relevant, including the need to optimise the protection of human health and protect the wider environment, and the need to establish the suitability and certainty of use. In determining the impacts on people and the environment via the groundwater pathway, the form of the void infill material is a relevant consideration in determining whether the entry of hazardous substances to groundwater has been adequately addressed, and should also form part of the SWESC.

Our Ref: SES16, February 2017

Related queries: N/A

[3] CL:AIRE Code of Practice is a voluntary arrangement which applies to England and Wales. The arrangements may differ in Scotland and Ireland where separate guidance exists. http://claire.co.uk/index.php

Topic Area 10: Interaction with other EPR permits

Question number & Subject	Response applicable in:	Origin of question
10.1 – Surrender of permits for other regulated activities	*Scotland* *England & Wales*	*Environment Agency Nuclear Regulator generated in discussion with Industry, October 2018.*

Question

Where an operator holds a number of separate permits for different activities (different EPR activities in England and Wales; different regulated activities in Scotland) undertaken on a nuclear site with an RSR permit can the other permits be surrendered and any remaining regulatory issues addressed as part of the surrender of the RSR permit?

Response

Where the RSR permitted site includes other permitted activities within the same defined geographical area, an appropriate surrender process will need to be followed for each separately permitted activity.

The RSR permit cannot be used to exercise control over the surrender process for separately regulated activities. Applications for surrender of each separate permit need to be individually assessed against the relevant surrender criteria as they apply to the particular activity that was carried out under that permit.

While the different permitted activities will be subject to separate surrender processes, the co-ordination of the individual surrenders is important. For example where the capability provided by a non-RSR permitted installation on an RSR permitted site is required to facilitate decommissioning activities. Regulators and the operator should discuss the potential co-ordination at an early stage in order to ensure clarity, consistency and efficiency in how this is achieved.

Our Ref: GRRTWG_05

Related queries: N/A

Topic Area 11: Extensions beyond main nuclear site

Question number & Subject	Response applicable in:	Origin of question
11.1 – Pipelines: WMP and SWESC and early decommissioning	*Scotland* *England & Wales*	*Environment Agency Nuclear Regulator generated in discussion with Industry, June 2019.*

Question

Nuclear site RSR permit holders may have off-site discharge pipelines defined as part of the single RSR permitted area, yet extending a considerable distance (potentially tens of miles) from the "main site". In these situations:

i. Should separate WMPs and SWESCs be prepared for the pipeline?
ii. Can the operator fast-track clean-up of the pipeline route ahead of the main site?
iii. If a section of the pipeline is proposed to be disposed of in-situ and this is isolated from the main site, how will this affect permitting?

Response

Part (i) Should separate WMPs and SWESCs be prepared for the pipeline?

Permit conditions impose the requirement to prepare a WMP and a SWESC for the whole site. In the GRR, "site" is defined as the authorised premises, as delineated by the map in the permit. The GRR (3.3.4) states that the "*WMP and SWESC should also cover any waste and contamination associated with discharge pipelines that may pass through land not owned by the operator, or may extend many kilometres to remote discharge points".* Therefore, the expectation is for a single WMP and SWESC for each permitted site. This is intended to ensure that the generation and disposal of radioactive waste is optimised across the whole RSR permitted area, and that the site as a whole has been brought to a satisfactory state (the "site reference state").

If the pipeline extends into an environment with characteristics materially different from those at the main site, the operator may need to assess the effects of any radioactivity that might remain in situ using different models. Similarly, the operator may need to assess separately the effects of radioactivity on different groups of receptors in different locations. Nevertheless, the GRR requires such separate assessments to be incorporated in a single SWESC.

Part (ii) Can the operator fast-track clean-up of the pipeline route ahead of the main site?

We acknowledge that operators may wish to carry out early decommissioning and clean-up activities on pipelines.

The operator's decisions about the optimal way to manage radioactive waste and contamination associated with discharge pipelines need to be adequately substantiated by the WMP.

Where the optimal management option for the pipeline or part of the pipeline has been demonstrated to be removal and disposal off-site, then clearly this work can go ahead as it will not have any impact on the decisions to leave waste or contamination on the rest of the site. We anticipate that where early decommissioning of parts of a nuclear site is undertaken, the logic behind the operator's decision making process may be broadly as follows:

1) individual waste streams or parts of waste streams are assessed to determine the best thing to do with that waste;
2) where an individual waste stream or part of a waste stream is best managed by off-site disposal, work can proceed;

3) where an individual waste stream or part of a waste stream is best managed by on-site disposal a suitable SWESC will be required before a definitive decision to propose on-site management can be taken;
4) the WMP and SWESC will need to be sufficiently developed to give confidence to proceed with any on-site disposal option and make an application for authorisation of the disposal;
5) If the SWESC cannot support the WMP then the management options for the individual waste streams or parts of a waste stream will need to be reviewed.

Together the WMP and the SWESC should demonstrate site-wide optimisation and environmental safety for all radioactive waste and contamination remaining on-site.

Part (iii) If a section of the pipeline is proposed to be disposed of in-situ and this is isolated from the main site, how will this affect permitting?

The GRR requires the WMP to include details of the matters considered in evaluating waste management options for an off-site pipeline, including for example:

- The operational history of the pipeline i.e. demonstration of its integrity and engineering, maintenance, inspection and testing arrangements.
- Sufficient understanding of any land quality issues along the length of the pipeline (e.g. contamination arising from past leaks from the pipeline).
- The full range of available techniques for decommissioning and remediation of the pipeline, drawing on other industry experience where applicable e.g. the oil and gas industry. Options, where appropriate, such as preferential removal of the inner (more highly contaminated) liner should be evaluated.
- Land use, physical constraints, land ownership, amenity and other stakeholder factors that may influence optimisation of waste management in relation to pipeline decommissioning (e.g. protected habitats, archaeological features, etc.).

If it can be shown to be optimal and environmentally safe to dispose of one or more sections of pipeline by in-situ disposal, in the full context of site-wide optimisation and environmental safety (see Parts (i) and (ii) above), then in principle it should be possible to permit such disposals of radioactive waste in advance of any subsequent on-site disposals at the main site. This would be done through a variation of the existing RSR permit to include the in-situ disposal as an authorised disposal of solid radioactive waste within the permitted area boundary; we would not authorise it under a separate RSR permit.

The land inside the RSR permitted boundary where any in-situ disposal of a section of pipeline has taken place will remain part of the authorised premises unless a partial surrender (or transfer) is applied for and granted. As stated in paragraph 2.2.5 of the GRR, we wish to avoid fragmentation of a permitted site into a number of physically separate parts if this is likely to interfere with our regulation and the operator's own controls. The maintenance of a permit covering land on which an in-situ disposal has taken place need not preclude that land being used for another purpose, provided the permit holder ensures that any such use of the land complies with the conditions of the permit.

Our Ref: GRR TWG Reference 02/07

Related queries: N/A

Topic Area 12: Application of GRR for sites with an evolving end state

Question number & Subject	Response applicable in:	Origin of question
12.1 – On-site disposals and evolving end state	*Scotland* *England & Wales*	*Site End States Strategic Steering Group SES-17(i) June 2017*

Question

How will the environment agencies deal with a proposed end state that continues to evolve as they review and comment upon a disposal permit application? Will all optimisation and end state design details need to be completed before disposal permit approval can be given?

Response

Regulators should refer to the internal guidance note "Implementing GRR in a proportionate manner" which has been shared with the Joint Industry-Regulator GRR Task Group and the Nuclear Industry Group on Land Quality via the NDA Hub. Operators may request a copy of this internal guidance.

Regulators will want to assure themselves that the WMP and SWESC are appropriate and proportionate to the stage in its lifecycle that the nuclear site has reached, and to the complexity of the activities and environmental circumstances at the site.

The WMP and SWESC must be maintained as "live" products, developing throughout the lifetime of the site and operators should set out a credible programme of work for their further development for the next stage in the lifecycle of a site.

Where an operator's optimised plan includes some radioactive waste and/or contamination remaining on the site, the WMP and SWESC will need to be sufficiently comprehensive to demonstrate that the regulatory standards are met, and to support any permit variation applications for on-site waste disposal.

Note that where a quiescent period is planned for the site, Regulators would expect the WMP and SWESC to robustly support the approach proposed by the operator to the management of wastes remaining on the site during this period. The SWESC must also demonstrate that the environment will be adequately protected, with no deterioration resulting from leaving the site in the proposed condition for the duration of any quiescent period.

The environment agencies recognise that circumstances on nuclear sites undertaking a decommissioning activity may be complex, so that identifying those activities that represent the disposal of radioactive waste and determining when disposal occurs and therefore the timing of an application to vary the RSR permit, may not be straight-forward. We encourage operators to enter into early discussions with the relevant environment agency about these issues and reference should be made to the following publication:

On-site disposal of solid radioactive waste on nuclear licensed sites. Joint Regulators' Statement of Common Understanding

Our Ref: SES17
Related queries: 14.1

Question number & Subject	Response applicable in:	Origin of question
12.2 – Permit conditions for on-site disposal in the context of End State uncertainty	*Scotland* *England & Wales*	*Site End States Strategic Steering Group SES-17(ii) and (iii), June 2017.*

Question

i) What kind of disposal permit conditions will the environment agencies apply if they are aware that the site is continuing to optimise and there are potentially other disposal components to add to the developing end state, knowing the site is still to be decommissioned and remediated?

ii) As a consequence, how will the inventory/inventories of the end state components be specified in the disposal permit?

Response

Part i) What kind of disposal permit conditions will the environment agencies apply if they are aware that the site is continuing to optimise and there are potentially other disposal components to add to the developing end state, knowing the site is still to be decommissioned and remediated?

In a scenario where the determination of a site end-state continues to evolve over time, Regulators should remind the operator that the environment agencies want to assure themselves that the WMP and SWESC are up-to-date in terms of the stage in the site's lifecycle, the complexity of the activities and the environmental circumstances. The WMP and SWESC must be maintained as "live" products, supporting the evolution of activities on site, therefore we need to pay close attention to whether operators have a credible programme of work for their development.

Proposals by an operator may (on the face of it) seek to enhance safety and/or to improve levels of environmental protection, but operators need to be able to assure the environment agencies that these activities are consistent with the site-wide optimisation of radioactive waste disposal required by the WMP and SWESC and avoid foreclosure of alternative management options in the future.

Part ii) As a consequence, how will the inventory/inventories of the end state components be specified in the disposal permit?

Where on-site disposal of radioactive waste is authorised by the environment agencies, conditions will be added to the permit. In England and Wales, limits for the on-site disposal would be added to the EPR permit (added as a Table in Schedule 3). In Scotland appropriate conditions will be placed in the permit that reflect the safety case presented and adequately controls the activity.

If an on-site disposal of radioactive waste is permitted in advance of the final end-state of the site being known, conditions will be set as necessary to control the impact of the radioactive waste disposal during the period of continuing regulation of the site overall. In determining an application for on-site disposal, we will also look to the post-closure period and aim to ensure that the waste

disposal does not prejudice the ability of the site as a whole to achieve the site reference state after the end of all planned work involving radioactive substances. The waste disposed of remains radioactive waste until the final surrender of the permit. In cases of significant uncertainty, a re-evaluation of the optimised options for all wastes, including those already subject to on-site disposal, could be made where major changes to the end state occur.
Our Ref: SES-17(ii) and (iii), June 2017
Related queries: 12.1

Topic Area 13: Historic disposals and permits

Question number & Subject	Response applicable in:	Origin of question
13.1 – Past disposals under extant permits not held by the current operator	*England & Wales*	*Environment Agency Site Regulator in discussion with Industry, February 2019.*

Question

A nuclear site has two areas where radioactive waste was disposed of by burial on-site from the 1970s to the 1990s. The waste disposal sites are located entirely inside the permitted boundary of the main nuclear site. These disposals were made under two RSA60 permits that have not been subsequently consolidated into the main nuclear site permit. The waste disposal permits are extant and although deposits of waste ceased many years ago, no application for surrender has been made. The holder of the waste disposal permits is the former operator, not the same legal entity as the holder of the main nuclear site permit. However the main site operator is aware of the historic disposals and is expecting to include them in its considerations under GRR. It is understood that the operator is expecting to excavate the waste for disposal off-site as part of its decommissioning and clean-up programme.

How should these historic disposals be treated in implementing the GRR at this site?

Response

The historic waste disposals are subject to permits that have not yet been surrendered. The contents of the disposal sites are still legally radioactive waste. This waste is part of the inventory of radioactivity on site that needs to be considered for the decommissioning and clean-up of the site. The historic disposals should therefore be addressed in the WMP and SWESC. Paragraph 3.3.2 of the GRR states: *The WMP should identify any past disposals of radioactive waste on-site, and all proposed disposal routes over the lifetime of the site.* Paragraph 4.3.2 states: *The SWESC should take account of all radioactive substances (whether disposed waste or contaminated ground or groundwater) remaining on and adjacent to the site.*

The historic waste disposals lie within the boundary of the main nuclear site and the current operator acknowledges that the buried waste needs to be addressed for the site-wide optimisation of radioactive waste management. Although the operator's current expectation is that the historic disposals will be excavated and the waste removed, the optimisation arguments need to be made for the site as a whole through the WMP.

In England and Wales, there is the option under EPR 2016 to consolidate the waste disposal permits with the main nuclear site permit. This would ensure that the historic waste disposals are legally subject to the conditions in the RSR EPR permit requiring preparation of a WMP and SWESC. However, consolidation can only occur between permits held by the same operator, so would need to be preceded by an application to transfer the waste disposal permits to the same legal entity as currently holds the main nuclear site permit. Both parties must agree to make such a transfer application and circumstances may mean that this is not a practicable course of

action. If a transfer occurs, a regulator-initiated variation could then be issued to formally combine the waste disposal permits with the main nuclear site permit. In Scotland the procedures for combining permits are different, hence this aspect of the response is only applicable to England and Wales. However the general principle – that historic waste disposed of under an extant permit should be addressed in the WMP and SWESC – is the same in Scotland as in England and Wales.

If the permits cannot be consolidated as described above, the regulator should confirm that the historic waste disposal sites are included in the scope of the WMP and SWESC when the first versions of these outputs are prepared, and seek assurance in the documentation that the current operator will maintain this approach until the nuclear site permit is surrendered.

If, as an outcome of the process of developing the WMP and SWESC for the site, the operator decides to recover the waste from the historic disposal areas and dispose of it off-site or elsewhere on the site, such new disposals will be permitted through the operator's current permit for the site .

Our Ref: GRRTWG_10

Related queries: N/A

Question number & Subject	**Response applicable in:**	**Origin of question**
13.2 –Historic decommissioning activities on sites completed to the standard of the time	*Scotland* *England & Wales*	*Environment Agency Nuclear Waste Assessor generated, July 2019.*

Question

Ponds and drains have been decontaminated and remediated in the past, using the then widely recognised "de minimis" values of 0.4 Bq/g for solid materials and surface contamination values of 4 Bq/cm^2 for beta-emitting radionuclides and 0.4 Bq/cm^2 for alpha-emitting radionuclides. At the time the regulators were satisfied with the standards of clean-up adopted and implemented at the site. How should the areas subject to this historic decontamination and remediation be considered in the WMP and SWESC prepared for GRR implementation?

Response

The ponds and drains that were decontaminated and remediated in the past remain within the permitted area delineated on the site plan in the RSR permit. They are therefore within the scope of the SWESC for the site and need to be considered as part of the demonstration that the site as a whole can be brought to a condition where the permit can be surrendered.

The exception to this is if the levels of activity are below the out-of-scope values specified in the current legislation – in that case, no further consideration is required from the perspective of radioactive waste management.

Principle 1 in the GRR states: "*The site shall be brought to a condition at which it can be released from radioactive substances regulation, through a process that will provide protection*

against the radiological hazards to people and the environment, to the national standards applicable at the time when relevant actions are taken."

The GRR explains that Principle 1 "... *is consistent with the concept of intergenerational equity, including the availability of a clean environment to future generations. We will judge what constitutes a clean environment according to our present-day standards."*

Even though the decontamination and remediation was carried out to a level that at the time was considered to represent a very low level of activity, no decision to release these areas from regulation has yet been taken. Since that time, radiological standards have changed (for example with the introduction of the current out-of-scope values) and the standards for surrender of permits have been specified, as set out in the GRR. This means that preparations for surrender of the permit at this site need to be made against the standards specified in the GRR, and these standards apply to the whole site.

If the ponds and drains are contaminated to levels that are in scope of RSR, an optimised solution for what to do with the structures needs to be identified and recorded in the WMP. If they are to remain in situ, this will represent a disposal of radioactive waste and a permit to make this disposal should be applied for. The contribution of the residual radioactivity in the ponds and drains should be accounted for in the SWESC against the radiological standards set out in the GRR.

Our Ref: GRRTWG_16

Related queries: N/A

Topic Area 14 Nuclear sites in close proximity

Question number & Subject	Response applicable in:	Origin of question
14.1 – Separate nuclear sites in close proximity feeding separate WMPs into a shared SWESC?	*England and Wales*	*Environment Agency Site Regulator generated in discussion with Industry, March 2019.*

Question

A company currently operates two nuclear sites which each have their own RSR permits. The sites are located very close to each other in the same wider location but do not share a boundary and there are numerous other buildings and factory facilities in between the permitted areas. The operator is the same legal entity for both sites.

The sites are currently categorised as having an "enduring mission" i.e. there is no definitive end state, and it is expected that their purpose will continue. Therefore the sites will undergo some regeneration to ensure their capabilities are maintained.

The operator has suggested to its environmental regulator that they would like to submit a WMP for each of the sites, which would feed into a single SWESC covering both sites. The wastes produced from each site are different although the sites share resources for characterisation, treatment, accumulation and disposal of wastes.

Currently no known radioactive contamination exists at either of the sites.

The sites are currently undergoing separate regeneration projects.

At present, the anticipated lifetime plans for the facilities indicate that there may be 50 years difference in operational life between the two sites.

Response

The requirement to prepare a WMP and a SWESC is expressed through a permit condition and therefore legally applies separately to each permitted site. The philosophy of the GRR approach is that implementation of the proposed options for radioactive waste management set out in the WMP are tested in the SWESC to determine whether the site can be released from RSR at an appropriate time in the future.

The GRR states (paragraph 1.7.4) "*Where there are several environmental permits held in the same area, the SWESC prepared for each permit should include any potential combined impacts on any representative persons as a result of activities in the adjoining or nearby sites. This applies whether the holders of the permits are the same or different operators, and whether the operations covered by the two permits are at the same or different stages of their lifecycles*."

A SWESC is based around a conceptual site model of how radioactivity and non- radioactive substances are likely to behave in the local environment and how they will impact on local receptors. Where there are sites in close proximity the conceptual site model that underpins the SWESC is likely to be the same, or very similar, for both sites. It is reasonable and proportionate for an organisation to develop a single SWESC to meet the requirements of both permits.

However, each operator should ensure that differences in the WMPs for each site, including differences in the nature, location and timing of radioactive waste disposals (both operational and decommissioning wastes), are fully catered for in the environmental safety case that is made for the two sites within any combined SWESC. Differences between the two sites in the wastes discharged or disposed of may lead to the need to incorporate dispersion models for one site and not the other. There may also be the need to consider receptors that are impacted by one permit and not the other.

During the operational lifetime of a site the WMP will focus on the management of operational wastes. However it will also anticipate the wastes that are expected to arise during decommissioning and clean-up, demonstrating that the plans for the management of these are optimised.

During operations, the SWESC provides a basis against which operators should consider their response to spills or contamination events. For sites undergoing decommissioning and clean-up, the SWESC is key to providing a demonstrable case that our requirements for release from regulation will be met.

The WMP and SWESC for a nuclear site are living outputs that must be kept up to date throughout the lifetime of the site. It is possible that the environmental safety case for each site will diverge over time. This will be the case for instance if there is a contamination event at a later date on one site and not the other, or the decommissioning and site regeneration programmes lead to very different levels of environmental impact, or one site is taken over by another operator

If a common “initial” SWESC is produced for each permit it should indicate points in the future when separate SWESCs may need to be considered. The operator of each site should consider and document when reviews will be required and how these will be managed.

As there is currently no end date identified for either site, an initial common SWESC could be produced in order to ensure compliance with the GRR conditions in both permits. If and when the SWESC is required to support an application for a variation for on-site disposal of solid radioactive waste or for permit surrender (of either of the site permits), then it must focus on the specific demonstrations that have to be made for the application in question. It must also take account of the status of the neighbouring site at that time.

Our Ref: GRRTWG_12

Related queries: N/A

Topic Area 15: Nuclear New Build

Question number & Subject	Response applicable in:	Origin of question
15.1 – GRR and Generic Design Assessment (GDA)	*England and Wales*	*Environment Agency Waste Assessor generated, March 2019.*

Question

How should the requirements of the GRR be addressed in the Generic Design Assessment (GDA) process?

Response

The objective for GDA is to provide confidence that the proposed nuclear reactor design is capable of being constructed, operated and decommissioned in accordance with the standards of safety, security and environmental protection required. Since GRR sets out the standards that nuclear sites need to meet in order to surrender their environmental permits, it follows that requesting parties should give appropriate and proportionate consideration to these requirements at the design stage. This is reflected in several places in the GDA guidance where the information required of requesting parties is listed. For example, the information required for the environment case submission includes: "a description of the proposals for the management and disposal of all radioactive wastes, solid, liquid and gaseous wastes, throughout the nuclear power plant's lifecycle - including commissioning and decommissioning" [taken from revised GDA guidance for requesting parties available here: https://www.gov.uk/government/publications/new-nuclear-power-plants-generic-design-assessment-guidance-for-requesting-parties]

Requesting parties should therefore anticipate the requirement, which will ultimately be expressed in a permit condition, to prepare a WMP and a SWESC . Before issuing our Statement of Design Acceptability, we will need to see sufficient evidence of a whole-lifetime approach to radioactive waste management to have confidence that a satisfactory WMP and SWESC is likely to be forthcoming after the facility is permitted. Clearly a fully developed SWESC can only be produced when the site for the new nuclear facility is known, but requesting parties should be able to show in their environment case that strategic consideration has been given to the GRR requirements at the GDA stage.

Once a site has been selected and the permit has been determined, the emphasis for the operator will be on understanding the baseline conditions of the site (including background levels of radioactive substances and any contamination that might already be present), as well as the development of a conceptual model of the site and its surroundings. This will form the basis of the SWESC that should be maintained throughout the lifetime of the site. This will provide a similar role to a site condition report required under pollution control legislation.

Our Ref: GRRTWG_13

Related queries: N/A

Topic Area 16: Records and Archiving

Question number & Subject	Response applicable in:	Origin of question
16.1 – Archive information for access by local authorities	*Scotland* *England & Wales*	*Nuclear Legacy Advisory Forum (NuLEAF)*

Question

If a site is developed while the RSR permit is in place, what steps would be in place to prevent digging up an in-situ disposal? Which information relating to the permits for former nuclear sites will the environment agencies publish and/or archive so that the local authorities do not have to actively look for it?

Response

It will not be possible to inadvertently dig up an in-situ disposal while the RSR permit is in place. Under the conditions of the permit, controls will be exercised to restrict access and take any other measures necessary to ensure this does not happen. The environmental regulators will be responsible for enforcing these controls until the standards specified in the GRR are met and permit surrender is granted by the relevant environment agency.

If the site is redeveloped while the RSR permit is in place, it will be the responsibility of the permit holder to continue to manage the SWESC for the site. Should the permit holder determine that they wish to develop the site then it will be their responsibility to ensure that either the plans do not disrupt any disposals, or to develop a WMP and revised SWESC that takes account of the implications of the planned development. Controls necessary to protect workers undertaking these activities will be exercised by the relevant safety authority; if the site is no longer a nuclear licensed site, this will be the Health and Safety Executive. Any radioactive waste that might be generated as a result of the work will need to be managed in accordance with the revised WMP and disposed of in accordance with the RSR permit, and if necessary by seeking a suitable variation to the permit.

During the period when the RSR permit is in force, records will be managed and retained by the site operator in accordance with the permit conditions. These records will include details of the wastes disposed of on-site and the controls applied for protection of people and the environment up until the surrender of the permit. These records can be accessed by local authorities through the site operator.

Our Ref:

Related queries: N/A

Question number & Subject	Response applicable in:	Origin of question
16.2 – Archiving after permit surrender	*Scotland* *England & Wales*	*Nuclear Legacy Advisory Forum (NuLEAF)*
Question After the permit is revoked, is there a requirement for the existing environmental records to be archived?		
Response Before the permit is surrendered, we will expect operators to ensure that records, including details of the final condition of the site and results of validation monitoring, are transferred to a suitable location (such as the national nuclear archive) for long-term safekeeping and record management.		
Our Ref: N/A		
Related queries: N/A		

Topic Area 17 Interactions with other Regulators / Authorities

Question number & Subject	Response applicable in:	Origin of question
17.1 – Interaction between GRR and the site licence conditions	*Scotland* *England & Wales*	*Environment Agency Nuclear Regulator generated in discussion with Industry, November 2019.*
Question The ONR produced 2018 guidance requiring Nuclear Safety Cases to include environmental impacts. What has ONR and EA agreed in respect of which aspects needs to be covered by each? Has there been discussion on the interaction between GRR and the site licence conditions in practice?		
Response The regulators are working together via the Joint Working Group on Land Quality Management (JWGLQM) to set out how GRR submissions required by the environmental permit may also satisfy ONR licence conditions. We do allow signposting, so there can be cross-reference to a range of documents, provided they are pulled together into a header document which conveys a clear narrative about the site's compliance with our requirements and standards set out in the GRR. More details will be provided in future updates of this document, but to be clear, we are committed to working closely with ONR and achieving a harmonised approach that minimises duplication of effort for operators.		
Our Ref: GRRTWG_32		
Related queries: N/A		

Topic Area 18: General questions / miscellaneous

Placeholder section for Version 2.

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