



Office for
Nuclear Regulation

Response to consultation on ONR's revised interpretation of 'bulk quantities'

November 2021

Response to consultation on ONR's revised interpretation of 'bulk quantities'

Contents

Introduction.....	1
Analysis of responses.....	2
Review of comments	3
Consideration of other factors in licensing decisions.....	3
Defining the site inventory for the purposes of calculating bulk quantities.....	4
Application to near surface disposal.....	5
Application to fusion	6
Other comments.....	7
Conclusions	7

Introduction

It is the policy of the UK government and devolved administrations of Wales and Northern Ireland to dispose of higher activity radioactive waste through emplacement in a Geological Disposal Facility (GDF). Geological disposal involves placing radioactive waste deep underground where a suitable rock formation provides long-term protection by acting as a barrier against the escape of radioactivity and by isolating the waste from effects at the surface. There is no facility currently available in the UK.

The Office for Nuclear Regulation (ONR) has no role in identifying the site for a GDF. However, a GDF will be subject to the requirements of the [Nuclear Installations Act 1965](#) (NIA65) and be licensed by ONR¹. The requirement to obtain a nuclear site licence would lead to independent regulation by ONR to ensure that any future facility can meet the high standards of safety and security required by UK law.

Our licensing framework does not currently require licensing of disposal facilities. The UK government intends to amend the law to add disposal facilities to the list of types of installation that require a nuclear site licence. This will address one of the recommendations from the International Atomic Energy Agency (IAEA) [Integrated Regulatory Review Service Mission](#) to the UK in 2019.

We expect the UK government to take a similar approach to prescribing disposal as that previously taken for storage, requiring a nuclear site licence for installations designed or adapted for disposal of 'bulk quantities' of radioactive matter. NIA65 does not include a definition of what is meant by 'bulk quantities', therefore we must interpret its meaning when making licensing decisions.

Between 19 November 2020 and 17 January 2021, we carried out a public consultation to gather views and feedback on how we should interpret 'bulk quantities' when applying the legislation, the UK government intends to bring forward to make a decision to licence a future GDF. While addressing this matter and following other recent legislative changes, we also sought feedback on our plans to update how we will make future licensing decisions relating to storage of radioactive matter.

Analysis of the consultation responses, in relation to the specific questions, identified the following common themes:

- Consideration of other factors in licensing decisions
- Defining the site inventory for the purposes of calculating bulk quantities
- Application to near surface disposal
- Application to fusion

¹ [Implementing geological disposal – working with communities: long-term management of higher activity radioactive waste \(publishing.service.gov.uk\)](#)

The responses to the consultation have helped to shape our updated position statement on the interpretation of 'bulk quantities' and will inform development of additional guidance to support licensing decisions.

This report presents the response to the public consultation on our revised interpretation of 'bulk quantities' in the context of licensing nuclear installations for storage and disposal of radioactive matter.

Analysis of responses

We received twenty responses to the consultation. All comments received were collated and carefully considered, with equal status applied to all. Overall, the responses received were positive and supportive of our proposed revised interpretation.

Comments outside of the scope of the consultation or outside our remit have been passed to the relevant government department or other organisations for further consideration, where appropriate.

Analysis of consultation responses to questions 1-3: The three main questions we asked in our consultation were:

<p>Do you think ONR's proposed interpretations are easy to understand?</p> <p>If not, which parts are not easy to understand and why?</p>	<ul style="list-style-type: none"> • Fifteen considered our proposed interpretations were easy to understand. • Three considered the consultation was clear in how we developed our proposed position but sought additional clarity on specific matters.
<p>Do you think ONR has considered appropriate criteria in developing its approach?</p> <p>If not, what other criteria do you think we could consider, and why?</p>	<ul style="list-style-type: none"> • Thirteen agreed we had considered appropriate criteria in developing our approach. • Two did not agree we had considered appropriate criteria and challenged our methodology in determining the proposed threshold in respect of disposal.
<p>Do you agree that ONR has adhered to its stated principles of good regulation?</p> <p>If not, please tell us why.</p>	<ul style="list-style-type: none"> • Fifteen agreed we had adhered to the stated principles of good regulation in developing our proposals. • One did not agree we had adhered to our stated principles in determining our proposed threshold in respect of storage. • One did not agree we had adhered to our stated principles in determining our proposed threshold in respect of disposal.

Review of comments

In addition to the questions above, we asked for additional comments to help shape our proposed interpretation of 'bulk quantities'. Thirteen of the respondents provided additional comments for us to consider. Analysis of the comments revealed four common themes which enabled development of our consolidated responses.

Consideration of other factors in licensing decisions

In the consultation document, we referred to our support for government following an approach to prescribing disposal as a licensable activity that provides flexibility to make licensing decisions on a case-by-case basis. We received comments seeking additional context to explain what other factors ONR may consider when making a licensing decision.

While we consider the total disposal inventory to represent the simplest approach to measuring operational hazard on a broad scale, we also recognise that other characteristics of the radioactive waste consigned for disposal may have a bearing on the operational hazard at the facility. In some cases, these characteristics may limit the operational hazard and so by enabling a degree of flexibility in our licensing decisions for disposal sites, we retain the ability to regulate in a proportionate and targeted manner.

Where the total disposal inventory permitted for a site under the environmental permit is close to the 'bulk quantities' threshold, then we may also consider other factors relevant to the hazard presented by the waste to understand the risk associated with operations at the site. Other factors we may consider include the specific activity of the waste and waste package dose rates; the form of the waste; or the disposal concept and associated operational hazards that could affect nuclear safety on the site (e.g. potential for underground fire and dispersion of radioactivity). We recognise consideration of such factors requires application of expert judgement on a case-by-case basis and consider it to be impractical to base our decisions entirely on such factors, which is why we have decided to retain the disposal inventory as the primary criterion for licensing decisions.

We will provide additional guidance within our publication [Licensing Nuclear Installations](#) and highlight that enquiries regarding the prescribed status of a proposed installation or activity may be made to the Chief Nuclear Inspector at any time via contact@onr.gov.uk or by writing to the ONR office in Bootle².

We consider such an approach to provide flexibility and will ensure future regulatory judgements reflect the overall hazard of a facility when a final decision is made regarding whether to grant a nuclear site licence.

² Office for Nuclear Regulation, Building 4 Redgrave Court, Merton Road, Bootle, L20 7HS

Defining the site inventory for the purposes of calculating bulk quantities

We received comments that, while broadly supportive of our proposed approach, sought greater clarity regarding the basis for pursuing different thresholds for storage and disposal when in some instances the operations and therefore associated hazards may be similar. We also received comments seeking clarity on how we will define the inventory when calculating 'bulk quantities', including the potential for a site where there are both storage and disposal activities.

Disposal is defined by the International Atomic Energy Agency (IAEA) as "emplacement of waste in an appropriate facility without the intention of retrieval". To ensure waste can be safely disposed, it is conditioned to provide long-term passive safety such that no ongoing active controls are required. Storage is defined by the IAEA as "the holding of radioactive sources, radioactive material, spent fuel or radioactive waste in a facility that provides for their/its containment, with the intention of retrieval."

Storage will involve additional handling prior to disposal. Storage may therefore be of conditioned waste awaiting disposal, or unconditioned waste awaiting treatment prior to being deemed ready for disposal. Storage of unconditioned waste, particularly higher activity radioactive waste, may often require some form of active controls (such as cooling or ventilation) to ensure continued safety during the storage period. Storage of such wastes is associated with higher hazards and risks. We need to ensure our licensing criteria are based on the hazard from storage activities to ensure such activities are appropriately licensed while ensuring lower hazard storage operations (e.g. of Low Level Waste (LLW) or conditioned/packaged Higher Activity Waste (HAW)) are regulated proportionately.

With respect to how we will define the disposal inventory for the purposes of calculating 'bulk quantities', we consider that the total permitted disposal inventory provides the simplest correlation with hazard that does not require in-depth technical calculations or subjective judgement. In taking this approach, we are not seeking to constrain or control the total activity that may be disposed of at a particular site because we recognise this is clearly the regulatory responsibility of the relevant environment regulator.

Although the total permitted disposal inventory may exceed the quantities of radioactive matter handled in day-to-day site operations, an incident leading to a potential release of radioactivity would potentially affect the full inventory disposed of at the site. Therefore, we consider the maximum permitted disposal inventory should be included when considering the magnitude of the hazard on the site and whether this would meet the criteria for nuclear site licensing.

However, we also recognise that a disposal concept may recommend a phased approach where disposal areas are closed and sealed progressively. An operator may be able to demonstrate that reasonably foreseeable incidents will not disrupt disposal areas which have been closed, thus potentially enabling that part of the disposal inventory to be excluded from consideration. This approach would ensure we remain proportionate and do not unduly constrain permitted expansion of low hazard disposal sites.

There may be many prescribed installations on a licensed nuclear site. It is not the case that a separate licence is required for each type of facility on the site. This is already common practice for many existing nuclear site licences, which list multiple types of prescribed installation.

Therefore, a disposal site that also manages storage of 'bulk quantities' of other radioactive matter, pending processing or packaging on the site, is entirely feasible and would simply require both types of prescribed installation (storage and disposal) to be described in Schedule 1 of the nuclear site licence. When considering if each separate activity meets the criteria for handling 'bulk quantities' or not, we will consider the total radioactive inventory that could be handled safely within each facility as defined within the operational safety case. Where there were multiple instances of the same type of facility (e.g. multiple storage facilities), we would aggregate the total inventory for those facilities to determine the site-wide total.

It should be noted that we remain the enforcing authority for all health and safety legislation on a licensed nuclear site and will continue to regulate the safe operation of all activities on a licensed site, regardless of whether those are specifically listed on the nuclear site licence or not.

Application to near surface disposal

The purpose of our interpretation of 'bulk quantities' in the context of disposal is to provide clarity for licensing of a facility for deep geological disposal (typically 200 to 1000 metres below the surface). In response to the consultation, we received comments in relation to how we would apply our interpretation to the emerging potential for disposing of intermediate level waste (ILW) in near surface disposal facilities (which range from disposal at the surface to typically tens of metres below the surface). Near surface disposal is being explored by the Nuclear Decommissioning Authority (NDA) for suitable wastes in England and Wales and is already part of the Scottish Government's policy for management of HAW. Further information can be found in the recently published [NDA Strategy](#).

We consider that our interpretation of 'bulk quantities' in the context of disposal, although developed primarily to target licensing of a GDF, provides sufficient flexibility to enable proportionate application to near surface disposal in future, wherever such a facility may be considered within Great Britain. In accordance with the [Regulators' Code](#), we are committed to applying the principle of consistency across all of the nuclear sites we regulate in Great Britain, meaning that any approach taken in England and Wales will be the same as that taken in Scotland.

Whilst near surface disposal has been successfully implemented for ILW internationally, there is currently significant uncertainty with respect to adoption of near surface disposal as a disposal concept specifically for ILW in the UK. In particular, the inventory that could potentially be suitable for near surface disposal is not well defined in terms of quantity and its characteristics, preventing any accurate projection on the hazard potential of a near surface disposal facility. We consider that until plans for near surface disposal become clearer, in terms of the inventory and disposal concept design, it is too early to state if such a facility should or should not be subject to nuclear site licensing.

The relevant IAEA safety standard for near surface disposal facilities is restricted to the disposal of Very Low Level Waste (VLLW), LLW and only ILW with a radioactive half-life shorter than approximately 30 years. As such, wastes suitable for near surface disposal are typically less hazardous to the environment in the longer-term, and can be safely disposed of at facilities that offer lower levels of long-term isolation, provided they can still demonstrate safety by an adequate environmental safety case and comply with the relevant environmental permit(s). VLLW and LLW are typically associated with lower operational risk owing to the lower radiological hazard they present and are already safely handled at non-licensed disposal sites under an environmental permit and in accordance with the [Ionising Radiations Regulations 2017](#), which is enforced by the Health and Safety Executive at these sites.

However, while short-lived ILW may be suitable for near surface disposal, that does not necessarily mean that the short-term hazards associated with handling of those wastes are also low. Indeed, many short-lived ILW waste-streams have high dose rates which in turn lead to increased radiological hazards in the short-term and may warrant regulation under the nuclear licensing regime.

We consider our proposed threshold for licensing of disposal facilities to be proportionate to the anticipated risks and provides appropriate flexibility for application to near surface disposal. We will continue to engage with the NDA (and any other developers) on near surface disposal to ensure our regulatory requirements are being considered, and to enable development of the necessary clarity with respect to potential licensing considerations.

Application to fusion

We received several comments in relation to the potential for inadvertently capturing large-scale fusion reactors owing to the proposed revision to our interpretation of bulk quantities in the context of storage.

We propose to use the radionuclide specific values set out in the [Radiation Emergency \(Public Preparedness and Information\) Regulations 2019](#) (REPIR) as the basis for our interpretation of bulk quantities. When REPIR was revised in 2019, these radionuclide specific values were amended following a revised methodology by Public Health England.

The consultation responses highlighted that the change in the REPIR value for gaseous tritium, used as a fuel in fusion reactors, could lead to the bulk quantity threshold for storage being exceeded leading to a fusion facility requiring a nuclear site licence. We agree with these respondents and consider that inclusion of any future large-scale fusion facility within the nuclear site licensing regime through using our interpretation of 'bulk quantities' to be inappropriate.

In its recently published Green Paper titled [Towards Fusion Energy](#), the government proposes that future fusion facilities should be regulated in a similar way to current fusion facilities by the Environment Agency and the Health and Safety Executive. To achieve this, the Green Paper proposes amending the relevant legislation to ensure fusion power plants are not inadvertently captured by nuclear installations regulations at any point in their lifetime. We agree that a legislative approach is appropriate for clarifying that a nuclear site

licence would not be needed for a fusion power plant. As such, we have not sought to address this through our revised interpretation of 'bulk quantities'.

Other comments

We received a small number of comments requesting clarity over definitions of terms such as 'storage' or 'disposal'. We are committed to benchmarking our Safety Assessment Principles and regulatory guidance to the safety standards developed by the IAEA, including as far as possible the use of the definitions of standard terms set out in the [IAEA Safety Glossary](#).

We received a small number of comments seeking confirmation as to how we will ensure consistency and clarity with respect to our regulatory partners who also have a role in regulating disposal of radioactive waste. There is already guidance available setting out how we work together with the environment regulators to ensure transparent, consistent and coordinated regulation of nuclear sites under our existing memoranda of understanding. Our [overview to regulating geological disposal](#), developed with the Environment Agency, sets out how we will work together to regulate a GDF, and was commended by the Committee on Radioactive Waste Management in its recent [position paper](#). However, we will continue to work with our regulatory partners to ensure those we regulate have access to clear information, guidance and advice to help them comply with their responsibilities.

We received a small number of comments regarding government policy and the legislative amendments required before ONR can grant a nuclear site licence for a radioactive waste disposal site. We note these comments, but these are matters for the Department for Business, Energy & Industrial Strategy as the responsible government department.

Conclusions

We have given due consideration to the consultation responses we received, the majority of which were supportive of our approach, and will help us when developing additional guidance to support licensing decisions. Along with the publication of this consultation response document, we have published our revised interpretation of bulk quantities.

ONR will use the radionuclide specific values set out in REPIR (2019) as the basis for our interpretation of bulk quantities in the context of storage and disposal of radioactive matter, as follows:

In the context of **storage**: quantities of radioactive matter at or above 100 times the levels set out in REPIR Schedule 1

In the context of **disposal**: quantities of radioactive matter at or above 1,000,000 times the levels set out in REPPiR Schedule 1

It is our intention to include the revised position in a future update to our published guidance on [Licensing Nuclear Installations](#) supported by additional guidance on its application.

For ONR to be able to grant a nuclear site licence for the purpose of installing or operating a radioactive waste disposal facility, there will need to be a change in the law. We will continue to work with the Department for Business, Energy & Industrial Strategy to develop the necessary legislative amendments.

We will continue to engage with and keep stakeholders informed of further developments with respect to our future role in regulating radioactive waste storage and disposal operations at nuclear sites.

Any enquiries related to this document should be sent to contact@onr.gov.uk

Published November 2021

© Office for Nuclear Regulation, 2021