

GUIDANCE NOTE FOR DEVELOPERS AND OPERATORS OF RADIOACTIVE WASTE DISPOSAL FACILITIES IN ENGLAND AND WALES

Near-surface Disposal Facilities on Land for Solid Radioactive Wastes: Guidance on Requirements for Authorisation

Supplementary guidance related to the implementation of the Groundwater Directive

1. Introduction

This note supplements and updates our guidance about the Groundwater Directive (Directive 2006/118/EC) which we provided in the publication “Near-surface Disposal Facilities on Land for Solid Radioactive Wastes: Guidance on Requirements for Authorisation” (the “Near-surface GRA” document). We published the Near-surface GRA in partnership with the Scottish Environment Protection Agency (SEPA) and the Northern Ireland Environment Agency (NIEA) in February 2009.

Defra and the Welsh Government have provided guidance from the Secretary of State and Welsh Ministers to the Environment Agency on implementation of the Groundwater Directive in England and Wales. This guidance is available at <http://archive.defra.gov.uk/environment/policy/permits/documents/ep-groundwater-activities.pdf>.

Earlier, Defra and the Welsh Government had provided draft guidance from the Secretary of State and Welsh Ministers to the Environment Agency on this matter and we, in turn, produced an interim guidance note for developers and operators of near-surface radioactive waste disposal facilities in England and Wales. Defra and the Welsh Government consulted on the draft guidance, and the final version of the guidance from the Secretary of State and Welsh Ministers takes account of the responses to that consultation. Our final guidance note (this document) updates our interim guidance note in the light of the final version of the guidance from the Secretary of State and Welsh Ministers. There are **two substantive changes** to the interim guidance we previously provided. These are:

- Under the heading “(vi) Requirement R14: Monitoring”, where the paragraph has been revised to take into account separate guidance we have issued on groundwater monitoring for non-radioactive pollution; and
- Under the heading “**(b) Chapter 7 (Environmental Safety Case)**”, where the text has been clarified.

In the final version of the guidance from the Secretary of State and Welsh Ministers, Defra and the Welsh Government have updated the references to the implementing legislation for England and Wales, because the Groundwater (England and Wales) Regulations 2009 (GWR09) – to which the consultation draft from the Secretary of State and Welsh Ministers refers – have been superseded and replaced by the Groundwater provisions of the Environmental Permitting (England and Wales) Regulations 2010 (EPR10), in particular Schedule 22 of those Regulations. But EPR10 achieves the same effect, with regard to groundwater protection, as GWR09.

We do not propose to consult on this guidance note because we are referring to guidance from the Secretary of State and Welsh Ministers which has already been subject to consultation. However, we would welcome comments on it, which we would take into account in any future revision.

In Scotland, the Groundwater Directive has been implemented by the Water Environment (Groundwater and Priority Substances) (Scotland) Regulations 2009. SEPA has provided supplementary guidance on the application of these regulations with respect to radioactive substances in its publication "WAT-PS-10-01, Assigning Groundwater Assessment Criteria for Pollutant Inputs". The supplementary guidance for Scotland differs from that for England and Wales because of differences in how the Groundwater Directive 2006 has been implemented in the regulations. However, we have worked closely with SEPA with the aim of ensuring a consistent outcome for developers and operators of near-surface disposal facilities north and south of the border, even though some details in the two sets of supplementary guidance are different.

In England and Wales, Radioactive Substances Regulation, which was formerly subject to the provisions of the Radioactive Substances Act 1993, has also been brought within the provisions of EPR10 with effect from 6 April 2010. This development was foreseen when we produced the Near-surface GRA, and therefore we do not see an immediate need to amend the document on that account. Instead, we would expect to pick up the relevant consequential amendments when we, SEPA and NIEA jointly carry out any substantive review of the Near-surface GRA in the future.

2. Supplementary guidance relating to groundwater – to be read in conjunction with Part 1 ("Our Guidance") of the Near-surface GRA

NB If a developer or operator conforms to the requirements of the Near-surface GRA and all the supplementary guidance in this section, this should enable us to permit the disposal of solid radioactive waste as compliant with the groundwater activity provisions of EPR10.

The guidance set out below should be placed in the overall context of the Near-surface GRA. The guidance presented here is supplementary to that provided in the Near-surface GRA and does not replace or supersede it.

We specifically draw attention to the following two important areas:

- i. Chapter 3, Section 3.5, subsection "Proportionate approach and related considerations": With regard to the groundwater activity provisions of EPR10 we shall apply the guidance set down in this note in a manner proportionate to the hazard, both radiological and non-radiological, presented by the waste.
- ii. Chapter 6, Requirement R7, "Human intrusion after the period of authorisation", and specifically paragraph 6.3.44: Where natural barriers provide environmental safety functions, the developer/operator will need to discuss with the Environment Agency how far from the disposal facility itself it is reasonable to apply the dose guidance level for human intrusion rather than the risk guidance level.

(a) Chapter 6 (Management, radiological and technical requirements):

(i) Requirement R5: Dose constraints during the period of authorisation

We shall require the developer or operator of a radioactive waste disposal facility in all cases to show that the radiation dose to members of the public through the groundwater pathway during the period of authorisation of the facility is consistent with, or lower than, a dose guidance level of 20 microSv/year. The means of doing so may be proportionate to the radiological hazard presented by the waste at these times.

(ii) Requirement R6: Risk guidance level after the period of authorisation

We shall require the developer or operator of a radioactive waste disposal facility in all cases to show that the radiological risk to members of the public through the groundwater pathway after the period of authorisation of the facility is consistent with, or lower than, a risk guidance level of 10^{-6} per year. The means of doing so may be proportionate to the radiological hazard presented by the waste at these times.

(iii) Requirement R8: Optimisation

We shall expect the developer or operator of a radioactive waste disposal facility to demonstrate that proper consideration has been given to the input of radioactive substances to groundwater in optimising the design of the facility in relation to its geological environment, so that radiation doses to people are kept as low as reasonably achievable, subject to economic and societal factors. It will also be necessary to manage radiological risks to non-human species together with any non-radiological hazards associated with radioactive waste so that the EPR10 provisions for groundwater activities can be met. With respect to groundwater, the optimisation requirement will potentially entail (a) consideration of alternative design options and (b) establishing an appropriate balance in preventing or limiting, as appropriate, the input of pollutants to groundwater between the period of authorisation and the subsequent period, while ensuring that an adequately low level of input is achieved during both periods. The means of carrying out optimisation may be proportionate to the radiological hazard presented by the waste at the relevant times.

(iv) Requirement R10: Protection against non-radiological hazards

The means of complying with the groundwater activity provisions of EPR10 for non-radiological hazards may be proportionate to the non-radiological hazard presented by the waste.

(v) Requirement R11: Site Investigation

Before deciding whether to grant a permit to allow solid radioactive waste disposal, we shall require the applicant to undertake prior investigations which, as a minimum, must examine the hydrogeological conditions, the purifying powers of the soil and subsoil and the risk of pollution and alteration of the quality of the groundwater.

(vi) Requirement R14: Monitoring

Through the conditions of any permit we issue, we shall require the applicant to undertake whatever programme of monitoring and investigation we consider necessary before, during and after the radioactive waste disposal activity, to establish the level of input of pollutants to groundwater resulting from the disposal activity and the impact of any such input on the environment. In applying for a permit, the applicant should have regard to the Environment Agency's guidance relating to hydrogeological risk assessments for landfills and the derivation of groundwater control levels and compliance limits¹. In interpreting this guidance for a radioactive waste disposal facility, the applicant should take into account the magnitude of the non-radiological hazard and the effectiveness of the barrier to groundwater pollution provided by the geology.

¹ Environment Agency Horizontal Guidance Note H1 Annex J3, *Additional guidance for hydrogeological risk assessments for landfills and the derivation of groundwater control levels and compliance limits*, v 2.1, December 2011, or subsequent revision to this document.

(b) Chapter 7 (Environmental Safety Case)

The environmental safety case will need to substantiate that all necessary measures have been, or are being, taken to prevent or limit, as appropriate, the input of any pollutants into groundwater. Successive updates of the environmental safety case will also need to reflect the results of continuing monitoring and investigation as they relate to groundwater. In order to do this, the environmental safety case will need to comply with the legislation, take account of the guidance from the Secretary of State and Welsh Ministers, and respond appropriately to all applicable elements of the supplementary guidance set out above for Requirements R5, R6, R8, R10, R11 and R14.

3. Notes

Dose Guidance Level

The term 'dose guidance level' (see 2(a)(i)) employs the same concept as, but is used in a different context from, the term 'dose guidance level (for human intrusion)', which is defined in the Glossary of the Near-surface GRA. The new use of the term applies during the period of authorisation and applies only to the groundwater pathway. It is the means by which, during the period of authorisation and for radioactive substances, the Groundwater Directive 2006 is implemented in our guidance. The value chosen for the dose guidance level, 20 microSv/year, is approximately equivalent in risk terms to the risk guidance level of 10^{-6} /year.

The dose guidance level is not intended to be an absolute constraint on doses. Used in the present context, it is intended to indicate our broad expectations of how low the assessed level of dose delivered via the groundwater pathway needs to be.

A working definition is:

'Dose guidance level (groundwater pathway)

'The dose standard against which the radiological contamination of the groundwater pathway during the *Period of authorisation* is assessed. It indicates the standard expected but does not suggest that there is an absolute requirement for this level to be met.'

**Environment Agency
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